

Adapting Language Learning Materials for Digital Native: Infusing CEFR Standards in English Procedural Texts on Microlearning Apps

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Abstract

This study focuses on developing an educational application that marries English procedural text materials to microlearning techniques, designed specifically for digital native learners in accordance with the CEFR. It will lay down how to adapt conventional procedural text learning into a form based on microlearning. Using a descriptive case study research design, the study critically explored the processes involved in the design and development of the application, emphasizing strategic reconfigurations to integrate microlearning principles. These reconfigurations include segmenting complex instructional content into bite-sized, manageable learning units made richly interactive and multimedia-infused, which are necessary for addressing the abbreviated attention spans and digital preferences of modern learners. These results indicated that such adaptations were not only learners' engagement and understanding but also very successful in reinforcing language competence according to the CEFR standards. This study was designed to give a holistic frame for educators and developers in the area of effective microlearning materials that fit both educational content, and learning habits and needs of modern, digital-oriented students.

Objective: The aims of this study are to explore the processes involved in the design and development of the application, emphasizing strategic reconfigurations to integrate microlearning principles.

Methods: This study employed a descriptive case study design to integrate microlearning principles into CEFR-aligned language materials. Using a needs analysis with 22 teachers and 19 students, data collection involved structured interviews and document analysis of prototypes. Thematic analysis identified patterns to guide the redesign process, ensuring materials were user-centered and effective. Ethical protocols, including informed consent and data anonymization, safeguarded participants. This approach highlighted microlearning's impact on enhancing engagement and aligning educational content with CEFR standards.

Results: The study demonstrates MaMo's effectiveness in integrating CEFR standards with microlearning principles for procedural text learning. Key features, including simplified micro-competencies, short-duration modules, interactive content, and flexible learning paths, enhanced comprehension and retention. Its genre-based approach, structured into five activities, supported learners in achieving CEFR outcomes, particularly in oral and reading comprehension. The app's user-friendly design, multimedia integration, and clear objectives fostered learner engagement and autonomy, aligning with the needs of modern learners. These results highlight MaMo as an innovative tool for advancing structured and effective language proficiency.

Conclusions: MAMO integrates microlearning principles with CEFR standards to provide an engaging, mastery-based platform for A1 to B2 learners. Its focus on manageable activities, autonomy, and real-world application makes it effective for language skill development, especially for Generation Z learners. Future research could explore advanced proficiency levels, AI-driven personalization, multilingual support, and collaborative tools. Longitudinal and comparative studies could further refine MAMO's impact, solidifying its role as an innovative tool in language education.

Keywords: Digital native, Learning Material, Microlearning, Procedure Text, CEFR

1. Introduction

Microlearning, as an instructional strategy, centers on the delivery of brief, targeted units of information to facilitate efficient learning. This approach is characterized by its emphasis on concise learning experiences that align with the shortened attention spans often associated with contemporary learners (Allela, 2021; Hug, 2012; Sozmen, 2022). The principles of microlearning involve breaking down complex topics into smaller, digestible modules, ensuring that each unit addresses a specific learning objective (Allela, 2021; Gagne et al.,

2019; Hug, 2021; Jahnke et al., 2020b; Lee et al., 2021). This methodology not only enhances comprehension but also caters to the fast-paced, technology-driven lifestyle of Digital native learners, who favor information consumption in bite-sized formats (Buhu, 2019; Gherman et al., 2021; Pineda Castillo, 2022). Thus, the integration of microlearning principles into procedural text materials becomes a crucial consideration in adapting content to suit the preferences of this digitally native generation.

Shifting our focus to the global landscape of language teaching and learning, The CEFR stands as a global benchmark for language proficiency. It provides a standardized framework that categorizes language skills into distinct levels, ranging from A1 for beginners to C2 for advanced proficiency (Savski & Prabjandee, 2022). Incorporating the CEFR standards into procedural text learning materials offers a structured approach to language education, ensuring that the content aligns with internationally recognized proficiency levels. This alignment not only enhances the quality and rigor of instructional materials but also provides a clear roadmap for educators and learners alike (Hasselgreen, 2013). By integrating the CEFR standards, procedural text materials can effectively address language learning objectives and contribute to the overall proficiency development of Digital native learners within a globally recognized framework.

However, Procedural text learning materials pose unique challenges, especially in catering to the diverse preferences of Digital native learners. Traditional formats may struggle to engage this tech-savvy demographic (Chumak & Andrienko, 2020; Mendez-Reguera & Lopez Cabrera, 2020; Oparaocha et al., 2014), leading to potential gaps in comprehension and retention (Chicca & Shellenbarger, 2018). To bridge this divide, adaptation becomes imperative. Digital native learners, accustomed to interactive and visually engaging content, require procedural text learning materials that align with their preferences for shorter, visually appealing learning experiences (Chumak & Andrienko, 2020; Khan & Al-Shibami, 2019). The need to integrate multimedia elements, interactive features, and user-friendly interfaces into procedural text materials becomes evident. By addressing these challenges and aligning with Digital native preferences, educators can create materials that not only meet the pedagogical goals but also resonate with the distinctive learning styles of this digital generation.

In navigating the intricacies of teaching procedural text, learning procedural text poses unique challenges for educators, requiring careful attention. Unlike narrative or descriptive texts, procedural texts necessitate a step-wise approach to understanding (Geiger & Millis, 2004), where learners must grasp and execute a sequence of context-driven actions. The primary challenge is to ensure instructional materials are effective and clear, without causing confusion or misguidance. Procedural texts often contain technical or specialized language, adding another layer of difficulty for learners (Pankuchova & Gavlakova, 2010). Addressing these challenges is crucial for designing content that enables students to easily understand and apply procedural knowledge during the adaptation process.

Existing procedural text materials have limitations that can impede effective learning. These materials are often static and heavily text-based, unsuitable for Digital native learners who prefer dynamic and visually engaging content (Hampton et al., 2020; Ishak et al., 2022). Additionally, the lack of interactivity in traditional materials can lead to decreased engagement and diminished learner enthusiasm (Bolden et al., 2019). Recognizing these limitations is essential, as it informs the adaptation process. Understanding these deficiencies helps identify areas for improvement and innovation, guiding the development of procedural text materials that meet the needs of both the content and the learners.

The rationale for adapting procedural text learning materials goes beyond addressing these specific challenges and limitations. A key consideration is ensuring the adaptation aligns with broader educational goals, particularly those related to microlearning and language proficiency. Microlearning principles provide a suitable framework for adapting procedural text by segmenting complex procedures into smaller, manageable units. This approach not only improves comprehension but also aligns with the short attention spans of Digital native learners. Furthermore, aligning procedural text materials with language proficiency goals, as outlined by CEFR standards, ensures the adapted materials contribute to overall language skill development. Therefore, the adaptation process becomes a strategic initiative, enabling learners to access training and learning materials conveniently, while addressing the unique needs and preferences of Digital native learners in line with desired language proficiency goals.

Based on the discussion above, this research focused on defining the design principles for microlearning-based learning materials that not only incorporate the CEFR as the language proficiency standard but also cater specifically to the unique traits of Digital native learners. The goal is to establish an all-encompassing framework that satisfies Generation Z's expectations and learning style preferences by merging microlearning principles with CEFR's global standards. The project integrated instructional design theories grounded in technological advancements for digital material development, aiming to create materials that resonate with digital native learner. The objective of this synthesis is to generate insights for crafting adaptive, learner-centered language learning resources that bridge the gap between traditional pedagogical methods and the modern learner's expectations.

2. Research Methodology

This research utilized a descriptive case study design to thoroughly describe the design features of learning materials that combined microlearning principles within their format while conforming to the proficiency levels required by the CEFR standards (Greenwood & Lowenthal, 2005). The research focused on a specifically tailored set of learning materials that underwent an extensive redesign process to incorporate microlearning strategies effectively, enhancing both linguistic competencies and learner engagement. The participant group, consisting of 22 teachers and 19 students, was strategically selected to conduct a comprehensive needs analysis. This analysis was critical in identifying the specific requirements and preferences of the end-users, which informed the subsequent design and integration of microlearning features within the educational materials. Ethical considerations were prioritized throughout the research process. Participants were fully informed about the research objectives, procedures, and their roles in the study through a formal consent process.

Written informed consent was obtained, ensuring that participation was voluntary and that participants had the right to withdraw at any time without any negative consequences. To protect participants' privacy and confidentiality, all personal data were anonymized during data collection and analysis. Data were stored securely, accessible only to the research team, and used exclusively for the purposes of this study. Ethical approval for the study was obtained from an institutional review board to ensure that all procedures complied with established ethical standards. Research instruments included in-depth structured interviews and a detailed review of design documents and prototypes. The interviews were carefully constructed to explore stakeholders' perceptions and experiences, particularly focusing on their insights gleaned from the needs analysis regarding the practical application of microlearning in language education.

Additionally, document analysis allowed for an intricate examination of how the identified needs were translated into the design features of the learning materials, illustrated through detailed screenshots and wireframes. Data collection merged qualitative interviews, which provided rich, contextual feedback from users, with document analysis, to meticulously trace the alignment of design implementations with identified educational needs. Data analysis utilized thematic analysis, coding responses and document content to reveal emergent themes and patterns that validated the construction of microlearning characteristics and their impact on learning outcomes. This approach highlighted how the needs analysis conducted through participant feedback directly influenced the development of the learning materials, ensuring that the educational content was not only theoretically sound but also tailored to meet the practical needs and enhance the educational efficacy for learners. This detailed and participant-informed methodology afforded a deep understanding of the integration and efficacy of microlearning principles in meeting CEFR language proficiency standards and improving learner engagement in educational settings.

3. Results and Discussion

MaMo, which stands for "Mobile Microlearning," is a progressive Android app that changes the way teaching materials for learning how to read basic text are used. MaMo was carefully created to help students improve their language skills. It caters to modern learners by putting an emphasis on clarity, involvement, and real-world use in understanding and writing routine texts. The most important thing about MaMo is that it aligns with the CEFR guidelines and uses microlearning concepts. MaMo uses short, focused modules to give content. These modules are designed to fit the needs of modern learners, especially Generation Z, who like engaging, bite-sized learning material. This way of teaching not only improves understanding, but it also makes learning fun and easy to do.

It's important to note that MaMo's use of CEFR standards is intentional, with a focus on achieving certain goals in basic text learning. In line with the CEFR, MaMo wants to give app users the tools they need to understand, create, and interact with procedural texts at levels of competency clearly defined by the CEFR standards. The goals include both knowing basic texts and being able to clearly explain them. These goals are very close to the competence levels set by the CEFR standards. MaMo is an Android app that changes the way language is taught by making basic text learning fun and organized. Its name comes from the fact that it focuses on mobile microlearning. As users move through MaMo's courses, the material and tests are purposely matched to different CEFR levels. This makes sure that language skills improve in an organized way within the procedural text area. This agreement shows that MaMo is dedicated to giving students language skills that are known around the world. It proved that students can understand and produce practical texts according to the CEFR standards.

3.1 Content Adjustment Strategies in MAMO (Mobile Microlearning)

Structured interviews revealed the preferences of teachers and students regarding microlearning attributes in an educational context. Key attributes assessed include Simplified and Digestible Micro-Competencies, Short-Duration Learning, Clear Learning Objectives, Engaging and Interactive Content, Flexibility, Autonomy, Digital Accessibility, and Integration.

The methodology involved semi-structured interviews that allowed participants to articulate detailed opinions while focusing discussions on the predefined themes of microlearning. The sample consisted of 22 teachers and 19 students from various educational institutions. Responses were thematically analyzed and quantified to illuminate comparative insights between these two groups.

The findings are methodically presented based on the microlearning attributes discussed during the interviews. Each attribute is introduced and followed by a comparative analysis, supplemented with direct quotes from participants. For example, the attribute of Simplified and Digestible Micro-Competencies was highly valued by students, who highlighted the benefit of breaking content into manageable parts. One student noted, "Smaller learning units help me retain information better because I don't feel overwhelmed." Teachers also appreciated this attribute but stressed the importance of maintaining educational depth. Regarding Short-Duration Learning, both teachers and students favored materials delivered in brief segments. A teacher remarked, "Short modules keep the students engaged and allow for more flexible class structure," emphasizing the pedagogical advantages of this approach. Clear Learning Objectives were particularly significant to teachers, with one stating, "It's crucial that each microlearning module outlines its goals clearly at the start, so students know what they are expected to learn." Engaging and Interactive Content was favoured among students, with one saying, "Interactive quizzes and videos make learning much more interesting and less tedious." This preference points to the importance of dynamic and engaging learning environments. Flexibility and Autonomy were themes that resonated strongly with students, reflecting their desire for personalized learning experiences. "I prefer learning at my own pace, on my own time," stated one student, highlighting the appeal of self-directed learning opportunities. The necessity for Digital Accessibility and Integration was emphasized by both groups. A teacher pointed out the importance of seamless integration with other tools and accessibility across different devices: "The software must seamlessly integrate with other tools we use, and it must be accessible from different devices."

The result emphasized on the characteristics of microlearning that Simplified and Digestible Micro-Competencies, Short-Duration Learning, Clear Learning Objectives, to Engaging and Interactive Content, and the importance of Flexibility, Autonomy, Digital Accessibility, and Integration. The characteristic there presented below:

Simplified and Digestible Micro-Competencies:

The content is adjusted to be broken down into manageable micro-competencies, ensuring each learning unit is easily digestible for efficient comprehension. These competencies focus on outcomes aligned with A1 to B1 CEFR levels, specifically related to procedural texts. The analyzed CEFR data revealed a distribution across levels from A1 to B2, emphasizing the development of a broad spectrum of language skills, including Listening, Reading, and various forms of Speaking, such as interactive and mediating skills. Activities ranged from Oral and Reading Comprehension to Oral Interaction, Online Interaction, and Oral Production, reflecting a comprehensive approach to language proficiency that integrates understanding, communication, and mediation in both spoken and written contexts. To create simplified and digestible micro-competencies, each outcome is divided into five activities following a text-based approach. These activities include: Building Knowledge of the Field, Modeling and Deconstructing the Text (Observation), Joint Construction of the Text (Collaboration), Independent Construction of the Text (Application), and Linking Related Texts (Extension.) (Feez, 1999). The example of simplification to make digestible micro competencies as portrayed in the table below.

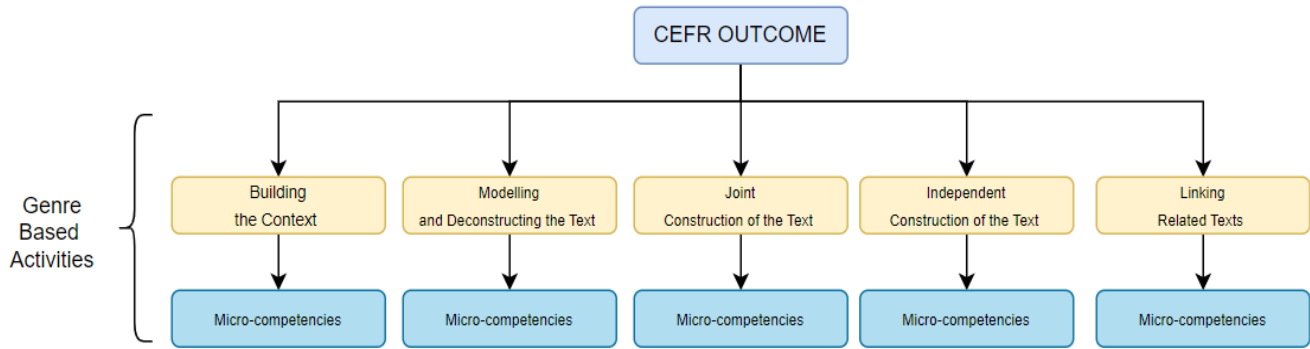


Figure 1. Flowchart Achieving CEFR

The image illustrates a flowchart detailing the sequential process of achieving CEFR (Common European Framework of Reference for Languages) outcomes through the development of micro-competencies via genre-based activities. This process is designed to be both progressive and interactive, fostering the gradual development of language skills. The flowchart's structure begins with 'Building the Context,' where learners explore a text's setting, purpose, and background to establish foundational understanding. It then moves to 'Modeling and Deconstructing the Text,' where learners analyze and identify genre-specific features and conventions. The next step, 'Joint Construction of the Text,' involves collaborative efforts where learners apply the observed features to co-create texts. This is followed by 'Independent Construction of the Text,' where individuals produce texts independently, applying the genre's conventions and demonstrating their acquired skills. The process concludes with 'Linking Related Texts,' which challenges learners to connect their created texts to others, fostering deeper analytical and synthesis abilities. This structured approach ensures a detailed breakdown of one outcome into actionable micro-competencies, paving the way for systematic language skill development.

Table 1. Analysis Microlearning Competencies

CEFR Outcome	Topic	Activities (Genre Based)	Micro competencies	Microfocus
Can understand instructions addressed carefully and slowly to them and follow short, simple directions.	Understanding and Following Instructions	Building the Context (Contextualization)	To familiarize learners with basic instructional language and context.	Familiarizing with instructional language and context.
		Modelling and Deconstructing the Text (Observation)	To analyze the structure and language of instructions.	Understanding sequence and language patterns in instructions.
		Joint Construction of the Text (Collaboration)	To collaboratively practice understanding and following instructions.	Practicing and constructing responses to instructions.
		Independent Construction of the Text (Application)	To apply learned skills in independently following instructions.	Independently interpreting and executing instructions.
		Linking Related Texts (Extension)	To relate instruction-following skills to a variety of contexts.	Applying instructions in different real-world scenarios.

Next, the user interface screen showcases how competencies are broken down into microlearning activities, aligning with the principles of microlearning. The app's design deconstructs the complex CEFR results into specific micro-competencies, providing concise and focused learning experiences. This approach ensures that each activity is easily comprehensible and memorable, fostering efficient skill

development through manageable and engaging steps.. The educational method is based on genre-based learning, as described by Susan Feez (1999), which includes five main activities: Establishing the Context, Analyzing and Breaking Down the Text, Collaboratively Creating the Text, Individually Creating the Text, and Connecting Related Texts. Every activity on the application mirrors these steps, providing guidance to learners as they go through a structured learning process. The phases of contextualization and observation, known as 'Set the Scene' and 'Unravel Words' respectively, are the earliest steps that provide the foundation for comprehending instructions. The concepts of 'Collaborative Creation' and 'Solo Creation' reflect the corresponding stages of constructing text in a collaborative or solo manner, highlighting the active use of linguistic abilities. Ultimately, 'Connect Ideas' corresponds to the act of connecting texts, fostering the capacity to expand language utilization to more expansive circumstances. This systematic analysis, influenced by genre-based learning, guarantees that every aspect of language acquisition is meticulously tackled, resulting in a thorough command of the skill set outlined by the CEFR outcome.

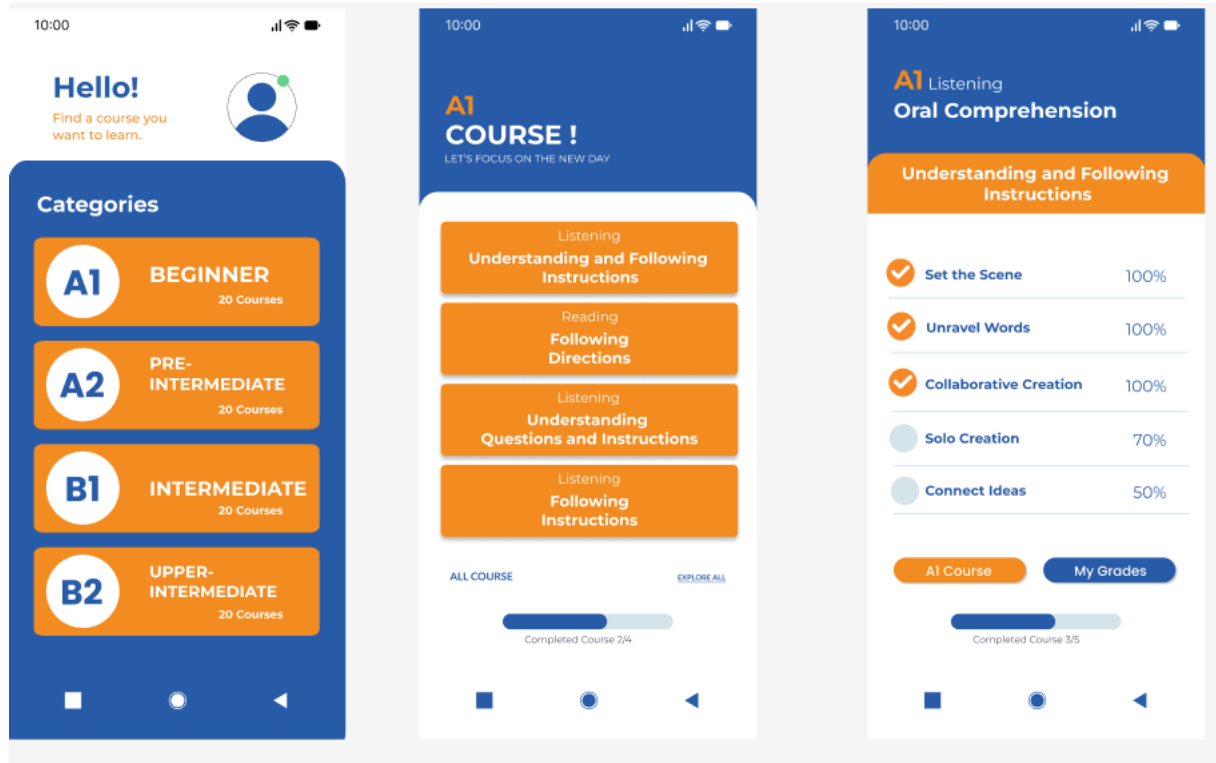


Figure 2. Mamo Interface

Short-Duration Learning:

In response to user needs, MaMo has organized its material into concise learning units, adhering to the principles of microlearning by delivering content in short and focused modules. This approach aligns with findings by Teichgräber et al. (2023), which emphasize the role of brevity and clarity in enhancing memory retention and comprehension. Additionally, similar strategies have been noted in the works of Hug (2012) and Jahnke (2020a), where breaking down complex content into micro-modules was shown to effectively cater to learners' abbreviated attention spans. By targeting specific aspects of procedural text learning, MaMo builds upon the foundational principles of microlearning while integrating CEFR outcomes, a method supported by Gagne et al. (2019) in the context of language learning. This alignment with prior studies not only reinforces the efficacy of MaMo's design but also contributes to the broader understanding of how microlearning strategies can bridge the gap between traditional learning materials and the digital preferences of modern learners.

Compact Learning Modules:

The educational content of MaMo is meticulously organized into easily digestible modules, a strategy supported by prior research emphasizing the benefits of microlearning in enhancing retention and comprehension. Gabrielli et al. (2017), Hughes (2020), and Javorcic (2019) have highlighted how breaking content into manageable segments facilitates better memory retention and comprehension. Similarly, Teichgräber et al. (2023) underscore the importance of small, focused learning units for memory consolidation and cognitive engagement. The alignment of MaMo's design with these findings demonstrates its adherence to best practices in educational technology. Further supporting this approach, Prasittichok and Smithsarakarn (2024) conducted a meta-analysis revealing microlearning's superiority over traditional methods in improving language skills among English learners. Additionally, Závodnák et al. (2024) showcased the adaptability and effectiveness of microlearning across diverse educational contexts, reinforcing its applicability in procedural text learning. By dividing procedural text learning into micro-competencies aligned with CEFR outcomes, MaMo not only aligns with established practices but also

sets a precedent for targeted language instruction.. The modules are also divided into small parts. For example, in this micro competencies:

Table 2. Example Micro competencies

Building the Context (Contextualization)	To familiarize learners with basic instructional language and context.	Familiarizing with instructional language and context.
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The modules focus on providing material that helps users familiarize themselves with the context and language related to the desired outcome. The content is further divided into compact and manageable parts, ensuring clarity and accessibility, as outlined below..

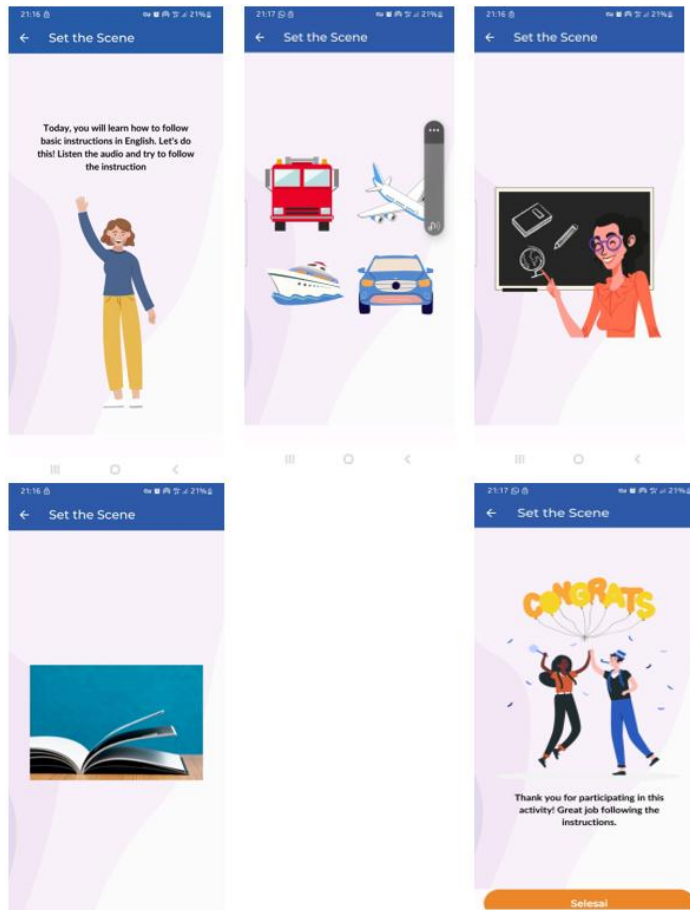


Figure 3. Content of MamoEach screen provides a compact module. In this listening part, and in the set scene part, the screens deliver audio in a compact manner

Consecutive Advancement:

The app presents a thoughtfully designed interface that embodies the essence of Consecutive Advancement in language acquisition. Its layout (figure 1) reflects an educational philosophy rooted in mastery-based learning, where content is methodically structured to facilitate a natural and progressive learning curve from the foundational A1 level to the more complex B1 level, in accordance with the CEFR guidelines. This structured progression is crucial for language acquisition, as highlighted by Prasittichok and Smithsarakarn (2024), who noted that a scaffolded approach in microlearning enhances language skills by building on previously mastered content.

Each module within the app is a testament to the careful curation of micro-competencies. These competencies are finely tuned to ensure that every segment of learning is compact and comprehensible, promoting efficient absorption of material. This is crucial for procedural text comprehension, which requires a clear understanding of process and sequence. The app's course progression—from A1 to B2—highlights a comprehensive approach to language development. It weaves together a tapestry of skills encompassing Listening, Reading, and various forms of Speaking. This broad spectrum is necessary for the learner to achieve proficiency in understanding, communicating, and mediating both spoken and written language. For instance, Gabrielli et al. (2017) and Teichgräber et al. (2023) argue that compact and comprehensible segments of material facilitate efficient learning and retention. In procedural text learning, where understanding sequence and process is vital, breaking content into manageable parts ensures clarity and reduces cognitive load, as suggested by Feez's (1999) genre-based learning framework. The app's design reflects this by offering five distinct activities—each tailored to specific learning objectives, promoting both collaborative and independent skill-building

Diving deeper into the A1 course displayed, the researchers can discern a structure that breaks down learning into five distinct activities.

These activities are designed to build upon each other, beginning with 'Building Knowledge of the Field,' where learners familiarize themselves with the essential context and terminology. Following this foundational stage, 'Modelling and Deconstructing the Text' allows for observation and analysis, encouraging learners to identify key structures and patterns within procedural texts. The next phase, 'Joint Construction of the Text,' emphasizes collaboration. Here, learners work together to construct their own examples of procedural texts, applying what they have observed. 'Independent Construction of the Text' then challenges learners to apply these concepts solo, promoting autonomy and internalization of the learning material.

Finally, 'Linking Related Texts' broadens the learner's understanding by connecting the procedural texts to other related content, enabling them to see the practical application of their learning in a wider context. This extension activity solidifies the learning experience, ensuring a robust grasp of the subject matter. As the app users progress, their achievements are visually marked, such as the 100% completion of 'Set the Scene' and 'Unravel Words.' This not only provides immediate feedback but also instills a sense of accomplishment, propelling them forward through the consecutive modules with confidence.

3.2 Clear Learning Objectives

Strategically modifying the procedural text learning materials of MAMO to include explicit learning objectives is an effort to improve the overall learning experience. As individuals interact with the material, the importance of explicit learning goals becomes apparent, furnishing a precisely delineated path for their scholarly progression (Zimmerman, 2002). Through the clear delineation of anticipated accomplishments for users in every microlearning module, MAMO guarantees that learners are capable of directing their endeavors towards tangible results. For example, in a module that focuses on understanding and following directions, the clear learning goals might include: getting to know the language and context of the lessons; analyzing the structure and language patterns of the lessons; working together to improve and create responses; independently understanding and following directions; and using these skills in a variety of real-life situations. These objectives function as guiding principles for users during the learning process and establish quantifiable standards for their success, promoting a deliberate and focused approach to learning procedural texts. The seamless integration of clearly defined learning objectives and the overall layout of MAMO's micro-competencies demonstrates a systematic and well-structured learning framework. By being tailored to specific CEFR outcomes, the micro-competencies harmoniously correspond with the well-defined learning objectives, thereby establishing a synergistic approach to the learning of procedural texts. By purposefully incorporating explicit learning objectives, users are able to commence their microlearning expedition with a precisely defined endpoint, thereby enhancing the educational experience within the application by providing direction, significance, and efficacy.

Through this meticulous alignment of learning objectives and microlearning modules, MAMO ensures that users are not only focused on tangible outcomes but are also equipped with the tools to achieve them effectively. Studies have shown that structured microlearning frameworks significantly enhance learner engagement and retention by breaking down complex concepts into manageable, goal-oriented units (Tira Nur Fitria, 2022). By embedding real-world relevance into each micro-competency, MAMO allows learners to transfer their acquired skills to practical contexts, a benefit also highlighted in research emphasizing microlearning's ability to promote the application of knowledge in real-life scenarios (Gagne, 2019). Furthermore, aligning these objectives with CEFR outcomes ensures that the learning process remains standardized and versatile, echoing findings that structured and adaptable microlearning approaches support diverse learner needs while maintaining a clear trajectory toward success (Marcelle & Brahim, 2023). This systematic approach not only enhances learner engagement but also fosters confidence and competence, empowering users to navigate their educational journey with purpose and efficacy.

3.3 Engaging and Interactive Content

In response to the desire for engaging and interactive content, MAMO tailors its procedural text learning materials to offer a rich multimedia experience. The inclusion of various audio, text, visual, and video elements enhances engagement and interactivity in each microlearning module. For instance, within CEFR level A1, activities like "Building the Context," "Independent Construction of the Text," "Joint Construction of the Text," "Linking Related Texts," and "Modelling and Deconstructing the Text" are accompanied by a combination of audio, text, and visual elements. This multimedia approach ensures that learners not only receive informative content but actively participate in the learning process. This related that audio visual material can engage student with the content (Herring et al., 2016; Karmilah, 2018).

For the activity "Modelling and Deconstructing the Text," which places emphasis on visual understanding, MAMO incorporates audio, text, and visual elements, creating a comprehensive and interactive learning experience. Learners engage with procedural text concepts through auditory explanations, textual guidance, and visual representations, fostering a deeper understanding of the text's structure and language patterns. Additionally, activities such as "Building the Context" and "Independent Construction of the Text" incorporate varied combinations of audio, text, and visual elements, providing learners with a holistic and engaging approach to procedural text comprehension. This intentional integration of multimedia elements in alignment with specific activities enhances the overall quality of the learning content, meeting the contemporary learner's expectations for dynamic and interactive educational experiences (Zurita & Nussbaum, 2004).

3.4 Flexibility and Autonomy

The interface of the language learning application, as shown in the figure 1, exemplifies MAMO's adjustment to flexible and autonomous learning, which acknowledges and supports the diverse learning preferences of its users. Here's how the app embodies these principles:

Flexibility in Learning Pace: The app's design features various levels of learning modules, from A1 to B2, each with a distinct number of

courses. This indicates that MAMO recognizes learners' varying speeds of comprehension. For instance, each module appears to be self-contained, which suggests that learners can complete 'Understanding and Following Instructions' or 'Oral Comprehension' at their own rhythm. This is evident in the progress indicators that show different completion rates for different activities, such as 'Solo Creation' at 70% and 'Connect Ideas' at 50%.

Autonomous Navigation: Learner autonomy is central to the app's navigation structure. The users are free to select any module at their current level, as seen in the first screen where categories from A1 to B2 are displayed. The choice to 'Explore All' implies that learners can jump between different modules or revisit them as needed, catering to their individual learning strategies.

Individualized Learning Experience: The app seems to allow for an individualized learning path, where users can focus on specific skills within a course. For example, within the A1 module, one can see different language skills such as 'Listening' and 'Reading' addressed separately. This modular approach enables learners to concentrate on developing particular competencies that align with their personal goals or areas for improvement.

Example of Flexibility and Autonomy: Imagine a learner who has a good grasp of listening comprehension but needs more practice with reading. The app allows this learner to focus on 'Reading Following Directions' without having to go through 'Listening' activities they're already comfortable with. Conversely, a learner who wishes to reinforce listening skills can repeat the 'Listening' modules as often as necessary to achieve mastery. By allowing users to control their learning pace and path, MAMO's app design fosters a learning environment that is both flexible and personalized. The learners are not bound by a rigid curriculum but are instead encouraged to take ownership of their educational journey. This is particularly effective for mastering procedural texts, as learners can approach complex instructions and processes in a manner that best suits their comprehension and retention styles, ensuring a more impactful and enjoyable learning experience.

3.5 Digital Accessibility

MAMO prioritizes digital accessibility, recognizing the vital importance of enabling learners to conveniently access microlearning material via its specialized mobile application (Allela, 2021; Jahnke, 2020; Leong et al., 2021). MAMO's decision to adopt a mobile app format is in line with the current preferences of modern learners, who are increasingly using mobile devices for educational reasons (Buhu & Buhu, 2019; El-Sofany & El-Hagggar, 2020; Sophonhiranrak, 2021). The mobile application not only provides learners with the convenience of accessing instructional text learning resources at any time and from any location, but it also offers a user-friendly layout for effortless navigation. This strategic decision maximizes the accessibility of digital information, enabling learners to effectively interact with microlearning materials, regardless of their location or the kind of learning environment they are in. MAMO's dedication to digital accessibility via the mobile app demonstrates its comprehension of the varied learning preferences and lifestyles of its user demographic. The platform guarantees that the mobile app functions as a portable, easily available, and user-focused gateway to efficient procedural text learning experiences. It prioritizes flexibility, convenience, and effectiveness in the learning process.

3.6 Format Modification

To enhance the microlearning experience within MAMO, several modifications have been implemented in its format, focusing on interactive modules, a user-friendly interface, and responsive design. These adjustments are integral to creating a seamless and effective learning environment. The interactive modules within MAMO play a pivotal role in engaging learners actively. Through dynamic content, such as interactive videos, quizzes, and simulations, users are encouraged to participate actively in the learning process. These interactive elements not only convey procedural text concepts effectively but also ensure that learners can apply their knowledge in practical scenarios. By incorporating engaging activities, MAMO transforms the learning experience from passive reception to active participation.

A user-friendly interface has been meticulously designed to facilitate easy navigation and accessibility. Intuitive menu structures, clear navigation pathways, and straightforward categorization of modules contribute to a seamless learning journey. Learners can effortlessly navigate through different sections, access specific content areas, and track their progress intuitively. This user-centric design ensures that learners can focus on the content without unnecessary challenges, fostering a positive and efficient learning experience. This approach enhances technology adoption and daily use by making systems more accessible and effective (Nor & Saeednia, 2008)(Saeed et al., 2016). In educational settings, user-centric adaptive learning systems improve learner satisfaction and efficiency by providing personalized learning paths and materials (Huang & Shiu, 2012). By understanding user goals and minimizing external disturbances, such designs foster better interaction and goal achievement (Ludbrook, 2012; Rahayu & Primajaya, 2023)). Additionally, incorporating user-centric UI/UX in learning tools significantly enhances engagement and learning outcomes, demonstrating the effectiveness of this approach in higher education (Bae, 2011)

Moreover, MAMO employs responsive design principles to adapt to various devices and screen sizes. Whether accessed on smartphones, tablets, or other devices, the platform adjusts its layout and functionality to provide an optimized experience. This responsiveness ensures that learners can access microlearning content conveniently, regardless of the device they are using. This adaptability contributes to the platform's accessibility and promotes a consistent learning experience across different platforms.

3.7 Alignment with CEFR Standards

The meticulous design of MAMO demonstrates a thoughtful alignment with CEFR proficiency levels, with a particular focus on the introductory A1 level. The microlearning activities embedded in MAMO are strategically tailored to cater to learners at the foundational stage of language proficiency. The design takes into account specific A1 CEFR outcomes, such as understanding and following short,

simple instructions, ensuring that learners grasp essential language structures relevant to everyday activities. This alignment is not merely a structural choice but a pedagogical strategy aimed at providing learners with a solid linguistic foundation that can be built upon as they progress through higher proficiency levels.

Within the A1 level, MAMO's design addresses key language skills development, placing a particular emphasis on oral comprehension. By integrating audio recordings and videos, learners are immersed in a language-rich environment that aligns with the CEFR's objective of understanding spoken instructions. Furthermore, the design fosters analytical skills through the deconstruction of text, encourages collaboration to enhance communication abilities, promotes independent language usage, and challenges learners with extension activities for contextual application—a holistic approach that goes beyond the mere attainment of proficiency, actively involving learners in language analysis, collaboration, and practical application. MAMO's design not only adheres to CEFR standards but also strives to create a dynamic and engaging learning experience that empowers learners to progress through higher proficiency levels with confidence.

Table 3. Procedure Text Related Outcome in CEFR Activities

	Skills	Level	Outcome
Oral comprehension	Listening	A1	Can understand instructions addressed carefully and slowly to them and follow short, simple directions.
Reading comprehension	Reading	A1	Can follow short, simple directions (e.g., to go from X to Y).
Oral comprehension	Listening	A1	Can understand questions and instructions addressed carefully and slowly to them and follow short, simple directions.
Oral Interaction	Listening	A1	Can act on basic instructions that involve times, locations, numbers, etc.
Oral Comprehension	Listening	A2	Can understand simple directions on how to get from X to Y, by foot or public transport.
Reading Comprehension	Reading	A2	Can understand everyday signs and notices, etc. in public places, such as streets, restaurants, railway stations; in workplaces, such as directions, instructions, hazard warnings.
Reading Comprehension	Reading	A2	Can understand simple instructions on equipment encountered in everyday life – such as a public telephone.
Reading Comprehension	Reading	A2	Can understand simple, brief instructions, provided they are illustrated and not presented in continuous text.
Reading Comprehension	Reading	A2	Can understand instructions on medicine labels expressed as a simple command (e.g., 'Take one tablet daily').
Reading Comprehension	Reading	A2	Can follow a simple recipe, especially if there are pictures to illustrate the most important steps.
Online Interaction	Speaking, Listening	A2	Can respond to simple instructions and ask simple questions in order to accomplish a shared task online with the help of a supportive interlocutor.
Mediating a Text	Speaking	A2	Can relay (in Language B) the point made in short, clear, simple messages, instructions and announcements, provided these are expressed slowly and clearly in simple language (in Language A).
Mediating a Text	Speaking	A2	Can relay (in Language B) in a simple way a series of short, simple instructions, provided the original (in Language A) is clearly and slowly articulated.
Mediating Concepts	Speaking, Writing	A2	Can give very simple instructions to a cooperative group, given some help with formulation when necessary.
Oral Comprehension	Listening	A2+	Can understand and follow a series of instructions for familiar everyday activities such as sports, cooking, etc., provided they are delivered slowly and clearly.
Reading Comprehension	Reading	A2+	Can understand regulations, for example, safety, when expressed in simple language.
Reading Comprehension	Reading	A2+	Can understand short instructions illustrated step by step (e.g., for installing new technology).
Oral Interaction	Listening	A2+	Can follow simple directions and instructions.
Oral Interaction	Speaking	A2+	Can give simple directions and instructions.
Online Interaction	Speaking, Listening	A2+	Can interact online with a supportive partner in a simple collaborative task, responding to basic instructions and seeking clarification, provided there are visual aids such as images, statistics, or graphs to clarify the concepts involved.
Oral Comprehension	Listening	B1	Can understand simple technical information, such as operating instructions for everyday equipment.
Reading Comprehension	Reading	B1	Can understand clearly expressed, straightforward instructions for a piece of equipment.
Reading Comprehension	Reading	B1	Can follow simple instructions given on packaging (e.g., cooking instructions).
Reading Comprehension	Reading	B1	Can understand most short safety instructions (e.g., on public transport or in manuals for the use of electrical equipment).
Online Interaction	Speaking, Listening	B1	Can respond to instructions and ask questions or request clarifications in order to accomplish a shared task online.
Mediating a Text	Speaking	B1	Can relay (in Language B) the contents of detailed instructions or directions, provided

			these are clearly articulated (in Language A).
Mediating a Text	Writing	B1	Can relay in writing (in Language B) specific information points contained in texts delivered (in Language A) on familiar subjects (e.g., calls, announcements, and instructions).
Mediating a Text	Speaking	B1	Can give simple, clear instructions to organize an activity.
Reading Comprehension	Reading	B1+	Can understand instructions and procedures in the form of a continuous text, for instance in a manual, provided they are familiar with the type of process or product concerned.
Oral Production	Speaking	B1+	Can describe how to do something, giving detailed instructions.
Oral Comprehension	Listening	B2	Can understand detailed instructions well enough to be able to follow them successfully.
Reading Comprehension	Reading	B2	Can understand lengthy, complex instructions in their field, including details on conditions and warnings, provided they can reread difficult sections.
Oral Production	Speaking	B2	Can give a clear, detailed description of how to carry out a procedure.
Oral Interaction	Listening	B2	Can understand detailed instructions reliably.

The design of MAMO places language skills development at the forefront, focusing on essential aspects of language acquisition within the A1 CEFR level. MAMO's approach to oral comprehension is robust, with a deliberate integration of audio recordings and videos to provide learners with exposure to spoken instructions—a foundational skill emphasized at the A1 level. Beyond mere comprehension, the design encourages analytical skills by deconstructing text, allowing learners to recognize patterns and structures in language, an integral aspect of language proficiency. The deconstruction of text within MAMO serves as a fundamental component for fostering analytical skills among learners. By breaking down the intricacies of language structure, learners are empowered to recognize patterns and structures, contributing to a more comprehensive understanding of language—a crucial foundation for language acquisition.

Collaborative learning is actively promoted during the collaboration phase of MAMO. This not only enhances listening and understanding but also encourages speaking and interaction. Through collaborative tasks, learners engage in meaningful communication, honing their ability to express themselves and comprehend others—a valuable skill set that extends beyond mere language proficiency.

The application phase within MAMO plays a pivotal role in skill progression at the A1 level. By requiring learners to independently interpret and apply instructions, MAMO reinforces their ability to use the language autonomously. This phase represents a critical step toward language proficiency, as learners transition from understanding language to actively applying it in various contexts.

Moreover, extension activities within MAMO present learners with challenges that demand the application of comprehension skills in diverse contexts. This not only reinforces their understanding but also promotes adaptability in language use—a key aspect of achieving proficiency that extends beyond the confines of traditional language learning approaches. Overall, MAMO's design actively engages learners in the development of analytical skills, collaborative learning, independent language usage, and contextual application, fostering a well-rounded and effective language learning experience.

4. Conclusion

In conclusion, the MAMO language learning application represents a harmonious integration of microlearning principles with the structured proficiency levels of the CEFR. It is thoughtfully tailored to accommodate the unique pace and style of each learner, adhering to the A1 to B2 proficiency framework. By breaking down complex language skills into manageable and engaging micro-activities, MAMO facilitates a mastery-based approach to language learning that is both flexible and autonomous.

The application's focus on language skills development—particularly oral comprehension and production—is evident throughout the design, ensuring that learners are not only absorbing information but also applying it in practical, real-world contexts. The step-by-step progression through the activities fosters a deep understanding of the language, enhancing the learner's ability to communicate effectively and with confidence.

Moreover, the microlearning approach adopted by MAMO caters to the preferences of modern learners, notably Generation Z, by offering quick, impactful learning experiences that align with their digital fluency and shorter attention spans. This educational strategy emphasizes the importance of learner autonomy, allowing for a personalized and adaptive learning journey. Overall, MAMO exemplifies an innovative educational model that prepares learners to achieve their language learning goals efficiently, making it a valuable tool for anyone seeking to improve their language proficiency in line with CEFR standards.

Future research on the MAMO language learning application could explore several key areas to further its development and impact. First, studies could investigate the inclusion of advanced proficiency levels, such as C1 and C2, to assess their effectiveness in meeting the needs of advanced learners. Additionally, exploring the integration of artificial intelligence for adaptive and personalized learning paths could provide insights into enhancing learner engagement and outcomes. Research could also examine the impact of collaborative tools within the app to understand how cooperative learning influences language acquisition. Expanding the scope of research to include multilingual support would help evaluate the application's adaptability across diverse linguistic and cultural contexts. Furthermore, embedding culturally relevant contexts in procedural text learning materials could be examined to determine their effect on learner engagement and comprehension. Longitudinal studies are recommended to evaluate the app's long-term effectiveness in knowledge retention and practical language proficiency. Finally, comparative studies assessing MAMO's efficacy against other language learning platforms would provide valuable insights for further refinement. These research directions would help position MAMO as a cutting-edge tool in the field of language education.

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Authors' contributions

Imam Santosa took primary responsibility for drafting the manuscript, ensuring that the document accurately reflected the research objectives and findings. Ifan Iskandar was instrumental in conceptualizing and designing the study, providing strategic direction to ensure the research framework aligned with the objectives. Samsi Setiadi contributed significantly by conducting the data analysis, offering critical insights into the interpretation of results. All authors have reviewed and approved the final manuscript, fully agreeing to their respective roles and responsibilities. Moreover, they collectively accept accountability for the entirety of the work and have contributed equally to the research process and the preparation of the manuscript.

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Competing interests

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