

AMANAKU: A Gamified Mobile Application for Kapampangan Language Learning and Cultural Education

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ABSTRACT

Kapampangan, one of the Philippines' major languages, has been classified as "highly threatened" despite having two to three million speakers, largely due to declining use among younger generations influenced by Tagalog and other dominant languages. Existing Kapampangan digital resources remain limited to dictionaries, with no gamified, structured learning tool available. This study presents AMANAKU, a gamified mobile application that teaches beginner-level Kapampangan vocabulary, phrases, and pronunciation alongside selected cultural content through interactive activities, real-life language missions, and gamification features such as points, levels, badges, streaks, and character customization. Developed using Flutter, Dart, Firebase, and GitHub through a developmental research design following the ADDIE model, the application underwent a one-month pilot test with beginner learners to evaluate its functionality, usability, reliability, and user experience. AMANAKU aims to provide an accessible, engaging tool that helps younger Kapampangans reconnect with their language and culture.

Keywords: Kapampangan, gamification, mobile-assisted language learning, language revitalization, heritage language, cultural education, mobile application

SECTION I — INTRODUCTION (THE PROBLEM AND ITS SETTING)

1.1 Introduction

Given the ubiquitous presence of technology nowadays, gamification appeared as a promising approach to learn a language. Gamification is the process of integrating game-based elements such as points, levels, challenges, and rewards into educational activities to make learning more interactive and motivating. (Al-Khresheh, 2025). Gamification can play an important role in encouraging learners because teaching a new language is complicated and it will be a strenuous process that's why learners usually need to be more motivated (Al-Dosakee & Ozdamli, 2021). In language learning, where perseverance and dedication are essential, gamification offers a practical strategy to lower attrition rates and foster proficiency development (Shen et al., 2024). Additionally, learners now have greater access to gamification thanks to the advancement of mobile technology.

Mobile applications allow users to learn at their own pace by combining interactive game elements with educational activities. This gives students an easy and interesting way to practice their language skills outside of the conventional classroom. Local languages can be learned and preserved using the same method. Users can increase their interest in learning vocabulary, phrases, and expressions in an interactive manner by integrating game-based activities into local language learning. This can give younger generations a more interesting way to learn about the language and culture of their community. Recent research measured student's engagement, motivation and linguistic outcomes. The result shows that integrating culture into language learning has significantly improved the student's linguistic proficiency, engagement, motivation and intercultural competence (*The Role of Cultural Integration in Learning Foreign Languages*, 2025).

Despite the potential of gamification in language learning, the preservation and learning of local languages remains a concern, particularly among younger generations. Philippine languages were among the first languages in Asia to be the subject of western linguistic study (Zorc et al., 2023), one example is Kapampangan, a local language spoken in Central Luzon. The younger generation plays an important role in preserving the local languages and the culture associated

with them because the active use of the local language may increase the probability that the language will be passed down. However, as the exposure of younger generations into English, Filipino, and other prevalent languages increases, that leaves a question about the continuation and learning of the local languages such as Kapampangan. This may create challenges in maintaining the language and passing it on to future generations.

Therefore, there is a need for innovative and engaging approaches that can encourage younger individuals to learn and use Kapampangan while also developing their appreciation of the culture associated with it. A lot of teens and kids are on smartphones and tablets everyday, with that in mind, digital and interactive approaches may provide new opportunities for making local language learning more accessible and engaging.

1.2 Background of the Study

The Philippines is home to over a hundred languages (*Mga Wika Ng Pilipinas – KWF Repositoryo*, n.d.). Language, together with the culture it carries, is central to how a person's identity is formed — it shapes the way individuals see themselves, relate to their communities, and understand their place in a shared history. When a language weakens, that sense of identity is put at risk along with it, particularly for younger generations who grow up with less exposure to their own mother tongue (Gutierrez, 2022).

Kapampangan, the language of the Kapampangan people of Pampanga and surrounding areas, is one of the eight major languages of the Philippines and is spoken natively by roughly two to three million people concentrated in Pampanga, southern Tarlac, northeastern Bataan, and neighboring parts of Bulacan and Nueva Ecija, making it the seventh most-spoken native language in the country (*Kapampangan – KWF Repositoryo*, n.d.; Philippine Consulate General in Chongqing, 2024). Despite this sizable speaker base, local ordinances and language advocates have explicitly classified Kapampangan as a "highly threatened" language even though it remains among the country's major languages (Orejas, 2021).

This is where technology offers a meaningful opportunity. Mobile applications, in particular, have become useful tools for language learning precisely because they are accessible, personal, and habitual — the same qualities that make everyday language use possible in the first place (Ulya et al., 2025; Boiko et al., 2026). For a language like Kapampangan, whose greatest vulnerability lies in the shrinking exposure among younger generations, a well-designed digital tool could help close that gap by making the language easy to encounter, practice, and enjoy in daily life.

The AMANAKU application aims to support this revitalization effort by giving Kapampangans an engaging, accessible way to reconnect with their mother tongue — through interactive vocabulary building, everyday conversational practice, and cultural content that ties language learning to the stories, values, and identity of the Kapampangan people. In doing so, AMANAKU hopes to become more than just a learning tool: a small but meaningful bridge between generations, helping ensure that Kapampangan continues not just to survive, but to thrive.

1.3 Objectives of the Study

The general objective of the study is to develop and validate AMANAKU, a gamified mobile application for beginner-level Kapampangan language learning and selected cultural content. The application is intended to provide beginners with a structured and interactive mobile learning environment where they can learn basic Kapampangan vocabulary and common phrases, practice pronunciation, engage in interactive language activities, apply language in everyday communication situations, and explore selected aspects of Kapampangan culture. The application incorporates mobile-assisted language learning and gamification approaches to support an engaging and accessible learning experience.

The specific objectives of the study are the following:

1. To design and develop AMANAKU as a beginner-oriented mobile application for Kapampangan language learning and selected cultural content, with the following key features:

- **Beginner-Level Kapampangan Lessons:** Provide lessons covering basic Kapampangan vocabulary, common phrases, and everyday communication situations appropriate for beginners.
- **Recorded Pronunciation Practice:** Provide recorded pronunciation resources that allow learners to listen to Kapampangan words and phrases and practice their pronunciation.
- **Interactive Language Activities:** Include interactive activities such as listen-and-match, meaning matching, sentence arrangement, and appropriate-response activities to allow learners to practice the language.
- **Character Customization:** Allow learners to customize their characters by using earned points to purchase available clothing items. Clothing options are organized according to the learner's level and become available as learners complete the required level and earn its corresponding badge.
- **Gamified Learning Progression:** Integrate gamified elements such as points, levels, badges, progress tracking, and rewards to encourage learner engagement and progression.
- **Everyday Language Application:** Provide real-life language missions and communication situations that allow learners to apply basic Kapampangan in common interactions.
- **Kapampangan Cultural Content:** Incorporate selected Kapampangan cultural content through culture cards and culture challenges to introduce learners to aspects of Kapampangan culture.

2. To develop the AMANAKU mobile application using the following software and development technologies:

- **Flutter:** Used for developing the mobile application and implementing its user interface and features.
- **Dart:** Used as the main programming language for implementing the application's functions and features.
- **Android Studio:** Used as the development environment for coding, testing, debugging, and running the application on Android devices or emulators.

- **Firestore:** Used for managing application data, user accounts, and learner progress.
- **GitHub:** Used for source code management, version control, and collaboration among the developers.

3. To evaluate the functionality, usability, reliability, and overall user experience of AMANAKU as a gamified mobile application for beginner-level Kapampangan language learning and selected cultural content.

- **Specific Objectives:** System design features, technology stack choices, testing procedures, and evaluation criteria.

1.4 Scope and Limitation of the Study

This research focuses on the development and pilot evaluation of AMANAKU, a gamified mobile application designed to help beginners learn the Kapampangan language and selected parts of Kapampangan culture. The study is intended for beginner learners who want to learn basic Kapampangan words, phrases, pronunciation, and everyday communication.

The major components of the system are two:

1. A mobile application for learners to study and practice basic Kapampangan.
2. A gamified learning system that provides interactive activities, pronunciation practice, rewards, and progress tracking.

The system covers basic vocabulary, common phrases, and everyday communication. Its main features include recorded pronunciation, listen-and-choose activities, meaning matching, sentence arrangement, appropriate-response activities, points, levels, badges, streaks, unlockable lessons, progress tracking, culture cards, culture challenges, and real-life language missions. These features are included to make learning Kapampangan more interactive and engaging. (Roy & Gandhimathi, 2025; Zhang & Hasim, 2023; Liu et al., 2025). The study covers system development, functional testing, usability evaluation, and the learners' experience while using the application. It will focus on how the participants use the lessons, pronunciation activities, interactive exercises, gamified features, and cultural content.

The participants of the study will be beginner learners who are interested in learning Kapampangan. The study is limited to beginner-level learning and will not include advanced grammar, full language fluency, or all Kapampangan words and cultural practices. Only selected cultural topics will be included in the application. AMANAKU will also serve as a supplementary learning tool and is not intended to replace formal language education. The inclusion of cultural content is supported by studies that discuss the importance of culture in language learning (Ji & Shapii, 2024).

1.5 Significance of the Study

Kapampangan is being reshaped by the influence of Tagalog, especially among younger speakers, and social media and technological change have contributed to this shift (Gutierrez, 2024). At the same time, learners have few interactive and easily

accessible materials for studying the language and its culture. To address this need, the researchers propose AMANAKU, a gamified mobile application that provides Kapampangan vocabulary, expressions, cultural information, quizzes, and interactive activities. The application is meant to make learning Kapampangan more engaging and convenient, letting users study at their own pace through game elements such as points, levels, challenges, and rewards.

This research is significant because it offers a practical, easy-to-access digital tool built around the language and culture of Kapampangan. Mobile game-based applications can combine gamification with cultural content to spark interest in the heritage of ethnic communities (Isa et al., 2022). Gamified regional-language applications can also serve as models for learning tools that draw on local cultural knowledge and renew interest in regional languages (Yudhananta et al., 2025). The study also fits the wider use of technology in education, where gamification is applied to make e-learning more engaging (Domingo et al., 2025).

The study will be beneficial to the following stakeholders:

To Learners and Language Enthusiasts

Students, casual learners, and anyone curious about Kapampangan may use AMANAKU to study the language and its culture on their mobile devices. Kapampangan individuals who have lost fluency, or never learned the language fully, may also use it to reconnect with it. Through lessons, vocabulary activities, quizzes, challenges, and rewards, users can practice independently and grow more familiar with Kapampangan. Gamified language applications can combine lessons, cultural elements, interactive storytelling, and quizzes into engaging learning experiences (Yudhananta et al., 2025).

To Language Instructors and Cultural Facilitators

Language instructors, mentors, and cultural program facilitators may use AMANAKU as a supplementary resource for teaching Kapampangan language and culture. It can support vocabulary practice, cultural discussions, review activities, and interactive assessments. Community organizations and cultural groups may also use it in language programs, workshops, and heritage activities. Gamification can make technology-based learning more engaging (Domingo et al., 2025), provided the content remains culturally accurate and accessible to different users.

To Kapampangan Speakers and Heritage Advocates

The application gives native speakers and heritage advocates an additional digital platform for promoting their language and culture. AMANAKU presents Kapampangan words, phrases, traditions, and cultural information in a format that is accessible and appealing to different users. Interactive mobile applications can help connect younger generations with cultural knowledge and support cultural preservation (Isa et al., 2022). This matters because younger speakers are the ones drifting toward Tagalog-influenced usage (Gutierrez, 2024).

To the Kapampangan Community

The study may contribute to promoting and preserving Kapampangan linguistic and cultural identity. By delivering language and cultural content through a mobile application, it may raise awareness, appreciation, and interest in learning and using Kapampangan.

To Future Researchers and Application Developers

This study can serve as a reference for future work on gamified learning, regional-language preservation, and cultural education. It may also offer ideas for building similar applications for other Philippine languages and cultural communities. Gamification-based regional-language applications can serve as models for learning tools that include local cultural knowledge (Yudhananta et al., 2025).

1.6 Definition of Terms

For clarity and common understanding, the following terms are defined as they are used in this study:

AMANAKU. The gamified mobile application developed in this study for beginner-level Kapampangan language learning and selected Kapampangan cultural education.

Badge. A digital reward icon granted to a learner upon completing a specific level or set of requirements within the application, serving as a visual marker of achievement and progress.

Character Customization. A feature of AMANAKU that allows learners to personalize their in-app avatar by purchasing clothing items using points earned through completed lessons and activities.

Culture Card. A short, illustrated piece of cultural content within AMANAKU that introduces learners to selected aspects of Kapampangan traditions, values, or practices.

Culture Challenge. An interactive activity in AMANAKU that tests or reinforces a learner's understanding of Kapampangan cultural content presented through the culture cards.

Functionality. The extent to which AMANAKU's features and functions operate correctly and as intended, as evaluated during system testing.

Gamification. The integration of game-design elements—such as points, levels, badges, challenges, and rewards—into a non-game context, in this case Kapampangan language learning, to increase learner engagement and motivation.

Gamified Learning Progression. The system within AMANAKU that tracks and visually represents a learner's advancement through the application by means of points, levels, badges, and unlockable content.

Heritage Language. A language, such as Kapampangan, that holds cultural and ancestral significance to a community and that speakers or their descendants may seek to learn, reconnect with, or preserve.

Interactive Language Activities. Exercises embedded in AMANAKU—including listen-and-match, meaning matching, sentence arrangement, and appropriate-response activities—that allow learners to actively practice Kapampangan vocabulary and phrases.

Kapampangan. One of the major languages of the Philippines, natively spoken by the Kapampangan people primarily in Pampanga and neighboring provinces in Central Luzon; the language that serves as the primary subject of instruction in AMANAKU.

Language Attrition. The gradual loss of proficiency or active use of a language, in this study referring to the declining use of Kapampangan among younger generations.

Language Revitalization. Efforts and strategies aimed at increasing the use, learning, and transmission of a language that is at risk of decline, such as the development of AMANAKU for Kapampangan.

Level. A stage of progression within AMANAKU that a learner must complete before advancing to subsequent lessons, activities, or rewards.

Mobile-Assisted Language Learning (MALL). An approach to language education that uses mobile devices and applications, such as AMANAKU, to support learning outside of the traditional classroom setting.

Points. Numerical values awarded to learners within AMANAKU for completing lessons, activities, or challenges, which may be used to unlock features such as character customization items.

Pronunciation Practice. A feature of AMANAKU that provides recorded audio of Kapampangan words and phrases to allow learners to listen to and practice correct pronunciation.

Real-Life Language Mission. A task or scenario within AMANAKU that simulates everyday communication situations, allowing learners to apply basic Kapampangan in practical, real-world contexts.

Reliability. The consistency and dependability of AMANAKU's performance across repeated use, as assessed during system evaluation.

Streak. A gamification feature that tracks the number of consecutive days a learner has used AMANAKU or completed a learning activity, intended to encourage regular practice.

Usability. The degree to which AMANAKU is easy to learn, navigate, and use effectively by its intended learners, as measured during user evaluation.

User Experience. The overall impression, satisfaction, and ease of interaction that learners have while using AMANAKU, encompassing both functional and emotional responses to the application.

SECTION II — LITERATURE REVIEW

2.1 Introduction to the Review

This chapter presents a review of related literature and studies relevant to the development of AMANAKU. It examines existing research on gamification in education, mobile-assisted language learning, gamified language learning applications, Kapampangan language and cultural education, and digital language preservation efforts for Philippine languages. The chapter also presents the conceptual framework guiding the study and a synthesis highlighting the gaps that AMANAKU aims to address.

2.2 Review of Related Literature and Studies

2.2.1 Gamification in Education

Gamification has been widely used to improve educational systems with the goal of improving students' focus, motivation, engagement, flow experience, and other positive experiences (Oliveira et al., 2022). As the use of technology becomes more common in classrooms, teachers are considering different ways to better engage their students. One solution that has become popular is gamification. The deliberate incorporation of game design elements, mechanics, and principles into non-gaming contexts is known as gamification (Christopoulos & Mystakidis, 2023).

In order to find out how these mechanisms can be implemented in practice, a number of researchers have undertaken an in-depth analysis of the literature. As a result, they were able to identify specific tools that are used by educators. After identifying 548 articles, 40 studies were selected according to the established criteria and examined, revealing that elements of gamification like points, badges, and rankings are commonly employed to motivate students (Ratinho & Martins, 2023). When effectively applied in educational settings and training programs, gamification may enhance learners' engagement and motivation, encouraging them to modify certain behaviors to facilitate learning (Triantafyllou et al., 2025).

Beyond these general benefits, another aspect worth considering is the effectiveness of gamification in terms of increasing student engagement, as opposed to its use among adults or in corporate environments. Specifically, while students successfully solve the challenges and problems presented by the game, they struggle to effectively apply the acquired learning and skills in other contexts. Researchers recommend more immersive and diverse educational programs that involve teacher training to foster student interest in their academic journey (Ramírez Ruiz et al., 2024).

To address these challenges, particularly for skills requiring continuous practice like local language acquisition, mobile gamification offers engaging learning activities outside the traditional classroom setting. Mobile devices and technologies have spread widely and are now deeply embedded in modern daily life and education. Mobile Assisted Language Learning (MALL) is an emerging field of research that leverages these technological advancements, utilizing smartphones and tablets to facilitate learning (Karakaya & Bozkurt, 2022).

Therefore, developing gamified mobile tools specifically tailored for local language instruction can keep learners actively engaged while enhancing their practical communication skills.

2.2.2 Mobile-Assisted Language Learning

Gamified language learning applications have become increasingly popular as they merge educational content with interactive game mechanics to sustain learner motivation. Zhang and Hasim (2023) reviewed 40 empirical studies on gamification in English as a Foreign Language (EFL) and English as a Second Language (ESL) instruction, finding that points, badges, rewards, and progress indicators significantly enhanced learner

engagement and emotional responses, though challenges such as technical issues and novelty effects were noted.

Liu et al. (2025) conducted a meta-analysis of 38 studies on mobile games for language learning, reporting positive effects on vocabulary and pronunciation acquisition. However, outcomes varied depending on learner level, intervention length, and game genre, suggesting that gamified applications must be carefully tailored to specific learning contexts.

Widely used applications such as Duolingo and Memrise exemplify gamified learning by integrating streaks, unlockable lessons, and progress tracking. These features encourage consistent practice and self-directed learning behaviors. Similarly, Busuu incorporates social interaction by allowing learners to practice with native speakers, while LingQ emphasizes immersion through gamified reading and listening activities. These global examples demonstrate how gamification can be adapted to different language learning approaches.

In the Philippine context, Pangandoyon (2025) emphasized the importance of culturally relevant gamified content, noting that digital platforms can safeguard local languages while making learning more interactive. This aligns with Oda and Vizconde's (2021) findings that Kapampangan continues to coexist with Filipinos in educational settings, highlighting the need for tools that integrate both language and culture.

The proposed AMANAKU application builds on these insights by combining beginner-level Kapampangan lessons with gamified progression systems. Unlike general-purpose apps, AMANAKU integrates cultural challenges and real-life language missions, offering learners both linguistic and cultural immersion. This approach addresses the gap in existing resources, where language learning activities are often separated from cultural education, and positions gamified applications as effective tools for regional language preservation.

2.2.3 Gamified Language Learning Applications

Gamification — the use of game design elements such as points, badges, levels, leaderboards, and feedback loops in non-game contexts — has become one of the most visible trends in language education technology, driven largely by the popularity of applications such as Duolingo and classroom-response tools such as Kahoot! (Zolfaghari et al., 2025).

Al-Dosakee and Ozdamli (2021) note that gamification is not synonymous with game-based instruction but rather the application of game-derived components and principles to a non-game context in order to increase learner engagement and retention. The theoretical mechanism most often invoked to explain gamification's effect on language learners is Self-Determination Theory, which holds that motivation strengthens when an activity supports a learner's sense of autonomy and competence. Zeng and Fisher (2024) developed this idea into a model of "motivational transfer," showing in a qualitative case study of Chinese junior high school students that the autonomy and competence learners felt while using Duolingo could generalize into stronger intrinsic motivation

for learning English more broadly, offering an empirically grounded account of how gamified design might produce durable motivational change rather than momentary engagement.

Zolfaghari et al. (2025) conducted a scoping review across seven databases, identifying 33 intervention studies published between 2010 and 2024 involving over 2,500 students; feedback and challenge-based mechanics were the most frequently used gamification elements, and most studies reported positive effects on motivation and engagement, though quasi-experimental designs predominated. Zhang and Hasim (2023) reviewed forty journal articles on gamification in EFL and ESL instruction and found it had been used across more than ten non-English-speaking countries to improve language skills and learner attitudes, while also identifying recurring drawbacks such as technical problems, effects that faded over time, and negative consequences arising from gamified competition. At the meta-analytic level, Lee and Baek (2023) found that specific elements — points, scores, badges, and rewards — produced statistically significant gains in English proficiency, while the sheer number of gamification elements used showed no significant relationship with outcomes, suggesting that design quality matters more than quantity.

Because of its scale, Duolingo is the most studied gamified language application. Shortt et al. (2021) synthesized the Duolingo literature from its 2012 release through early 2020, concluding that while research consistently shows positive learner perceptions and motivational effects, methodological limitations constrain confidence in claims about actual proficiency gains

In formal classroom settings, Anane (2024) tracked student perceptions of Kahoot! across three academic terms in an online French course and found consistently high engagement and largely positive perceptions throughout, though some students showed variation in competitive motivation and minor technical issues arose.

2.2.4 Kapampangan Language and Cultural Education

The Kapampangan language is still used in home and education domains, but its occurrence may depend on the context. Oda and Vizconde (2021) conducted a study on language use and language attitudes of 238 Grade 5 pupils attending three public elementary schools in Bacolor, Pampanga. The paper revealed that the pupils used the Filipino and Kapampangan languages for the home and education domains and had generally positive attitudes towards the languages. The findings paint a picture of Kapampangan language use for the learners in an educational context showcasing its occurrence alongside the Filipino language in their communication.

The form and vocabulary of the Kapampangan language have undergone various transformations over time. In his work, Gutierrez (2024) explores the observed changes in Kapampangan vocabulary through an investigation of historical documents, thesauruses, questionnaires, and interviews with 62 participants in 31 towns

in the Kapampangan linguistic region of Pampanga, Tarlac, Nueva Ecija, Bulacan, and Bataan. As a result of the study, Gutierrez (2024) identified shifts in Kapampangan vocabulary and found that the language had been influenced by Tagalog terms and had incorporated many of them, especially by younger generations of Kapampangans. The author also highlighted Kapampangan transformations triggered by social media and technological progress. The research findings are significant for Kapampangan language teaching because they demonstrate that the modern form of Kapampangan that is used by younger generations may differ substantially from the language several decades ago and can represent a unique sociolinguistic phenomenon.

Language education can also be related to the learning of culture. Shadiev and Yu (2022) conducted a review of studies on computer-assisted language learning focused on intercultural education. Their analysis revealed that participants in the reviewed research engaged in activities such as presenting their own cultural background, interacting with individuals from different cultural contexts, creating collaborative outcomes, and reflecting on their learning experiences. The reviewed articles generally demonstrated positive effects for participants' language abilities and intercultural skills. Therefore, the authors proposed technology-assisted language learning as a way to combine both language and cultural learning rather than treat them as separate issues.

A similar connection between language and cultural context can be seen when examining the Cross-Cultural Intelligent Language Learning System created by Xia et al (2024). Designed as a tool for language acquisition, this piece of technology considers both the language and cultural backgrounds of the users. While the study explores a concept of learning a foreign language within a cross-cultural context, not specific to the Kapampangan language and area, it displays an approach which can be used in language learning, where cultural context is considered as a part of communication and learning. Therefore, the statement that language-learning material can incorporate cultural information with linguistic information for the purpose of learning communication within a given cultural context is also supported by this article.

In the Kapampangan context, language is also one of the practices through which the cultural identity may be expressed. Cruz and Demeterio III (2024) conducted an in-depth study of the language use and maintenance of the five Kapampangan participants who migrated to Winnipeg, Manitoba, Canada, to understand how they could maintain their cultural and ethnic identities while living outside the Philippines. The participants used their native language and cultural practices incorporating Kapampangan cuisine, festivities, and community gatherings. The study suggests that the Kapampangan cultural identity may be expressed through many related practices such as the language, food, and social activities. Though the study was conducted among the Kapampangans living abroad, its findings present examples of cultural elements which the members of the community associated with maintaining Kapampangan identity.

Kapampangan food practices also incorporate cultural meanings which extend beyond the food itself. Antonio et al. (2026) studied the meal fellowship and hospitality in Kapampangan culture, particularly the concept of *abe*. The study described the sharing of food as a social and relational practice associated with hospitality, inclusion, accommodation, and welcoming others. The authors discussed how the Kapampangan gastronomy and meal fellowship illustrate cultural meanings and values in the community. This literature is relevant to cultural education as it presents documented cultural context which can be used for introducing learners to selected aspects of Kapampangan culture, particularly food, hospitality, and social interaction.

Cultural education might involve activities allowing learners to experience cultural heritage in an educational environment. Daenos and Punsalan (2021) described 38 cultural promotion activities performed at the City College of Angeles between 2017 and 2020. These activities were focused on cultural promotion and appreciation and were found to be highly experiential compared to being only about appreciating material cultural heritage. The authors evaluated participants' impressions of the activities and concluded by stating their overall positive view while also identifying areas for improvement in the organization and execution of the activities. Their research demonstrated how cultural heritage and appreciation might be involved in educational activities in Angeles City.

In general, the discussed articles and research works confirm the possibility to investigate the Kapampangan language and culture through the lens of language use, lexical features, cultural identity, cultural practices, and educational events. The work of Oda and Vizconde (2021) offers some research findings related to the Kapampangan language use among the population of Pampanga. Gutierrez (2024) has identified several changes in the Kapampangan language's lexicon. In turn, Cruz and Demeterio III (2024), Antonio et al. (2026), and Daenos and Punsalan (2021) have presented particular cultural practices and Kapampangan cultural identity elements with the use of the Kapampangan language, cuisine, and interpersonal communication. Besides, Shadiev and Yu (2022) and Xia et al. (2024) offer the relevant literature concerning the possibility to introduce the language learning process through the lens of culture. Altogether, the discussed works offer sufficient literary data for further research into Kapampangan language and culture, although the current article does not claim to cover all the available data on Kapampangan language and cultural practices.

2.2.5 Digital Language Preservation and Philippine Languages

In the Philippines, technology can be utilized for the preservation of the local and indigenous languages. Abingosa et al. (2025) developed a mobile dictionary of the Higaonon language with pronunciation, translation, and offline access. This can help people learn and use their language more conveniently. The Department of Science and Technology made a mobile dictionary for the Hanunoo-Mangyan language in 2022 to help document and preserve the local language. Similarly, DOST-PCIEERD (2021) mentioned that Project Marayum provides

electronic dictionaries for different Philippine languages and promotes community members' contribution and editing of the data. The Philippine Language Corpora Project provides digital resources for languages such as Kapampangan, Cebuano, and Ilokano, which are helpful in educational and other language-related activities. Pasandalan et al. (2026) also showed how technology can help communities preserve their culture and language. Sarmiento et al (2022), created AMANU, an android Kapampangan dictionary application to help people learn the language. Other efforts, such as the Singing literacy application, use digital tools to help the youth learn and value the Kapampangan language.

2.2.6 Related Systems and Applications

Mobile applications have become popular tools for language learning since they provide learners with access to lessons and exercises. (Sarmiento et al., 2022) created Amanu, a mobile dictionary application that features Kapampangan words, English definitions, pronunciation, and classifications of words and phrases. The link between Amanu and AMANAKU is because both utilize mobile technology for Kapampangan learning. Nevertheless, whereas Amanu is mostly used as a dictionary and reference application, AMANAKU is a gamified learning app that offers beginner lessons, interactive activities, pronunciation practice, and cultural materials.

Mobile-oriented app meant for heritage learners of the Gubatnon dialect of the Bikol language (Lim-Cheng et al., 2026), developed by BikoLearn. It consists of fundamental lessons, fun quizzes, and progress-keeping features. This is very similar to AMANAKU in the sense both emphasize beginner learners, regional Philippines languages, gamification, and cultural studies. The only difference is that AMANAKU puts emphasis on Kapampangan language and culture.

Exam gamified instruction for Filipino language learning among grade 10 students. (Mangulian 2025) The study Results indicate that there was an improvement in the students' academic performance and engagement through gamified activities. While it primarily focused on Filipino rather than Kapampangan and it did not produce a mobile application, it provides a local background on the use of elements of game-based learning to make language learning more interactive.

Reviewed duolingo and examined how gamification is used in mobile-assisted language learning. (Shortt et al., 2023) The study provided insights into various features-including challenges, rewards, levels, and achievements ranking. These features seem applicable to AMANAKU's suggested points-measuring scheme with levels/badges, streak, and reward system. Still, unlike duolingo which covers various languages, AMANAKU is a developed application focusing on Kapampangan beginners and cultural education.

A meta-analysis of 38 studies carried out on mobile games in relation to language learning was performed by the researchers. Positive results were obtained in learning vocabulary and pronunciation (Liu et al.,

2025c). However, results varied by target language, level of learners, and learning outcomes. Findings emphasize AMANAKU's inclusion of vocabulary, pronunciation, and games-based interactive game-based activities.

2.3 Conceptual Framework

The conceptual framework of this study is anchored on the Input-Process-Output (IPO) model, which illustrates the logical flow of resources, activities, and results involved in the development of AMANAKU.

Input. The input phase consists of the knowledge and resource requirements needed to build the system. This includes Kapampangan language content (basic vocabulary, common phrases, pronunciation, and grammar appropriate for beginners), selected Kapampangan cultural content (traditions, values, and practices to be presented through culture cards and challenges), learner requirements (the needs, characteristics, and skill level of beginner Kapampangan learners), and the software and development tools to be used, namely Flutter, Dart, Android Studio, Firebase, and GitHub.

Process. The process phase covers the activities undertaken to transform these inputs into the finished application. It begins with requirements gathering and analysis, followed by system design (including the design of lessons, interactive activities, gamification mechanics, and character customization features), and development/coding of the mobile application using the chosen technology stack. This is followed by system testing (functionality and reliability testing) and usability evaluation, where the application is assessed by target users. Feedback gathered during evaluation is used to refine the system iteratively.

Output. The output of the study is AMANAKU, a gamified mobile application for beginner-level Kapampangan language learning and selected cultural education, featuring beginner lessons, recorded pronunciation practice, interactive language activities, character customization, gamified learning progression (points, levels, badges, streaks), real-life language missions, and Kapampangan cultural content — evaluated in terms of its functionality, usability, reliability, and overall user experience.

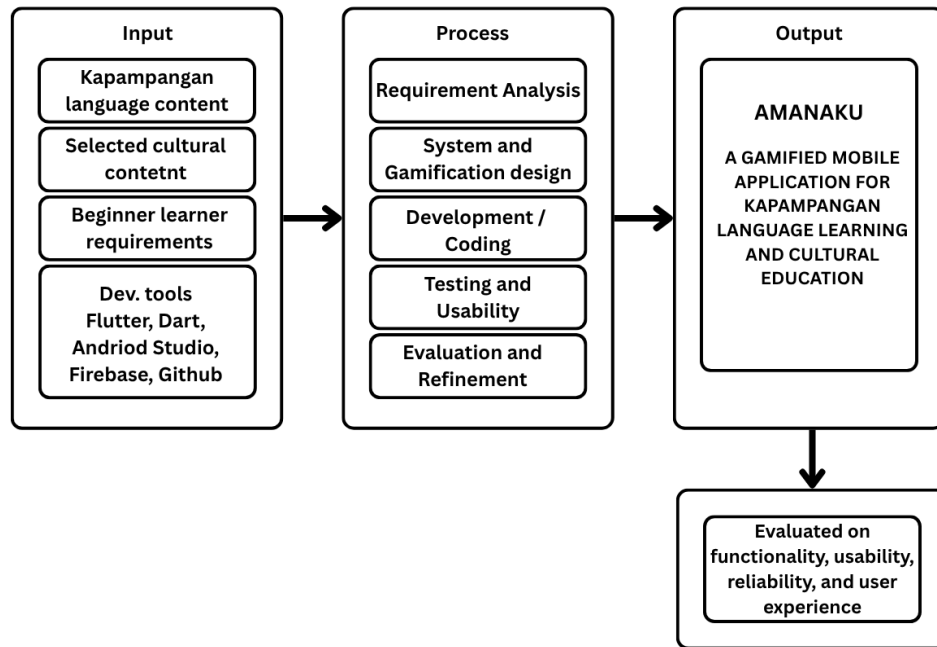


Figure 1 Conceptual Framework of the Study Showing the Input-Process-Output Model for AMANAKU

This Input–Process–Output model shows how the study moves from raw materials (language content, cultural content, learner needs, dev tools) through design, development, and testing, into the finished AMANAKU application — with evaluation feeding back into refinement.

2.4 Synthesis

The literature reviewed points to three consistent findings. First, gamification reliably improves learner engagement and motivation when it is thoughtfully designed rather than simply loaded with points, badges, and rewards — effects can fade with novelty, and design quality matters more than the number of gamified elements used (Ratinho & Martins, 2023; Zhang & Hasim, 2023; Lee & Baek, 2023; Zolfaghari et al., 2025). Second, mobile-assisted language learning (MALL) is a proven, low-barrier way to reach learners outside the classroom, and this extends to regional and heritage languages specifically — as shown by existing Philippine efforts such as the Higaonon mobile dictionary (Abingosa et al., 2025), Project Marayum (DOST-PCIEERD, 2021), and the Kapampangan-focused Amanu dictionary (Sarmiento et al., 2022). Third, culture and language are shown to be inseparable in effective instruction, and culturally grounded gamified applications can renew younger generations' interest in regional languages (Ji & Shapii, 2024; Isa et al., 2022; Pangandoyon, 2025; Yudhananta et al., 2025).

However, existing Kapampangan resources remain largely reference tools — dictionaries rather than structured, gamified learning systems — and while comparable regional-language apps like BikoLearn (Lim-Cheng et al., 2026) validate combining lessons, gamification, and culture, no reviewed study or application applies this model to Kapampangan. AMANAKU is positioned to close this gap by uniting beginner-level Kapampangan lessons, gamified learning progression, and dedicated cultural content within a single mobile application.

SECTION III — METHODOLOGY

3.1 Research Design

This study will adopt a developmental research design because it focuses on developing AMANAKU and assessing its efficacy in teaching beginner's Kapampangan language and selected cultural content gamified in a mobile application. A developmental study is appropriate to this research because it addresses the need to develop and evaluate the educational technology products. For instance, in their study, Oh and Song (2021) adopted a developmental research design to develop a language learning application and evaluated the functions and design of the product (Oh & Song, 2021). The developmental study was conducted by performing both expert and learner evaluation to test the effectiveness of the designed application in meeting the objectives and developing working application prototypes. Both quantitative and qualitative procedures were used to review the initial version of the product, make modifications, and perform final tests (Oh & Song, 2021).

The AMANAKU developmental process will be done using the waterfall-based development process with iterative refinement during the development and testing stages of the project. Waterfall-based will be an organized procedure that will focus on identifying requirements, designing the application, developing its features, testing the system, and preparing the final version. Iterative refinement will be used if the testing process discovers errors, usability problems, or places where a feature needs to be improved. The iterative refinement method will help the researchers sustain the development process in an organized manner while making the required improvement according to the test results. Studies on iterative software development explain that iterative refinement of developing processes happens as development progresses (Sangeeta et al., 2021).

During the developmental stage, the researchers will first determine and organize the functional requirements of AMANAKU according to its identified intended purpose as a beginner's Kapampangan language learning application. This includes lessons tailored to fit the needs of a beginner speaker, lessons that would entail the basic words, phrases, and conversational structures needed to communicate with another person, lessons that could be accessed to acquire pronunciation resources, and activities that would include listen and match, identify meaning, rearrange, and appropriate responses. The AMANAKU gamified language learning application will be designed to include points, levels, badges,

streaks, progress tracking and rewards, character and tree customization, and upgrades. The application will also host selected cultural content that would be presented through culture cards and culture challenges with real-life language missions.

The application will be designed using Flutter and Dart. Further, the software will be coded, tested, debugged, and run in Android Studio, with Firebase being used to store data, users' information, and learners' progress. GitHub will be utilized to manage the source code repository, track changes, and collaborate efficiently with the researchers. The developers will test the product during the development stage; the detected issues will be resolved, retested, and incorporated into the final version of the application.

After the initial stage, the researchers will perform a pilot testing procedure among the target audience, that is, the Pampanga people willing to learn the language. The respondents should be those who have a certain interest in learning Kapampangan and either have no knowledge about it or have only beginner skills. Through the application, every participant will be able to explore the software's content and tools (lessons, activities, gamified elements, language missions, and cultural practices) within a month. It is necessary to mention that the current step is appropriate for revealing the product's weaknesses as only the pilot testing and revision stage precedes the final evaluation. Notably, developmental studies of language-learning software also include learner testing and multiple iterations of revisions (Oh & Song, 2021).

The study will employ both quantitative and qualitative data. The quantitative data will be generated using a questionnaire that will have statements agreeable on a Likert scale. The questionnaire will focus on evaluating the application's functions, usability, efficiency, gamification features, and the learners' progress. The items will be used to develop a quantitative analysis of the functions and features of the designed application that will be operational after the pilot-testing period. The quantitative data will be presented using percentages and frequencies of responses indicating participants' perspectives on the items.

The qualitative information will be gathered from open-ended comments and suggestions of the participants. The comments will help obtain more information on participants' experiences with the application and what changes they would like to see in the future. The suggestions and additional comments will be sorted out to identify common themes or issues that could be used for further improvement of the application. Additionally, qualitative data will supplement the quantitative information retrieved from the survey by providing more detailed and extensive information on the issues identified in the quantitative results.

In addition, the study will also consider the application's functionality, usability, performance, gamification, and progress during testing. Functionality testing will determine whether the application's features operate according to their intended functions, including lessons, activities, navigation, rewards, progress tracking, and account-related functions. Usability testing will examine whether the participants can understand and use the application's interface and features with ease. Performance testing will examine the application's responsiveness and proper operation during use. Gamification

testing will verify the proper operation of points, badges, levels, streaks, rewards, character customization, and tree progression. Progress testing will determine whether the learner's progress and completed activities are properly recorded and reflected in the application.

Ethical considerations will also be taken into account during the study. Participants will be informed of the study's objectives and give informed consent to participate. Participation will be voluntary, and participants will be reminded that they are free to not participate or withdraw their consent at any time. The researchers will keep the information received from participants confidential. Only the information necessary for the application's use and the study will be collected. Participants may put their nicknames in the application while an email address may be used to create an account and save progress if necessary. Passwords will be handled by the application's authentication system and will not be considered data collected by the researchers.

Overall, the developmental research design will enable the researchers to develop, test, evaluate, and revise the AMANAKU mobile learning application. The combination of the developmental process, iteration, one-month pilot study, quantitative assessment, and qualitative feedback from participants will help in assessing the application's functioning and the user's experience and contribute to the necessary improvement and adjustment of the product. This approach is aligned with developmental research in educational technology, where the application is designed alongside the evaluation and revision process to improve the learning technology product (Oh & Song, 2021).

3.2 System Development Methodology

The ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) will be used as the framework for the proposed mobile app. This model was chosen because of its instructional design specifically appropriate for creating educational resources, guaranteeing that the gamification techniques and the pedagogical content (language lessons, cultural modules) are methodically created, evaluated, and improved. The development team will be divided into 5 sections where they can focus on a specific aspect of the development of the proposed application.

1. Analysis – this phase involves identifying the needs of the users and the gaps AMANAKU would like to address. In this phase, we will assess existing kapampangan language learning resources and check their short-comings (e.g., outdated materials, lack interactivity). We will also determine the learning objectives of the users like grammar, vocabulary acquisition, cultural knowledge and history. Lastly, we will gather requirements through surveys, interviews or literature review on gamification in language learning.
2. Design – this phase involves planning the structure of both learning content and the app itself. This involves designing the learning framework of the proposed app such as leveled modules and quizzes progressing from beginner to advanced kapampangan, as well as designing the gamification features of the app like points, badges, streaks, leaderboards and challenges that aligns with the known learning objectives. The layout and user flow of

the application will be visualized using storyboards, wireframes, and UI/UX mockups. At this point, the cultural education components such as folklore, historical sites, celebrations, and customs will also be created, and it will be decided how to incorporate them into the game. The technical architecture of the app, including its database structure, platform, and the tools and technologies to be used during development, is finally defined during this phase.

3. Development – the development phase involves building the application based on its specification that has been established during the design phase. This includes the development of the front and back end components of the application, as well as implementing the gamification features such as achievement badges, scoring systems and progress tracking. Populating the app with language learning content and cultural materials in the form of text, audio, images, and video will also happen during the development phase, and in order to find and fix bugs and technical issues before the app is made available to users, internal testing, including unit and functionality testing, will also be carried out during this phase.
4. Implementation – the implementation phase involves deploying the application to its intended users for real-world use and feedback. The application will be released to a pilot group of target users such as students or people from the kapampangan community, who will receive training or instructions on how to utilize the application. During this phase, the researchers will keep an eye on how the app is being used and gather information about user interaction, such as the amount of time spent using it, completion rates, and interaction with its gamified features.
5. Evaluation – during the evaluation phase developers will assess the application whether AMANAKU meets its objective with both formative and summative evaluation. Throughout the Design and Development phases, formative evaluation is carried out, including usability testing of prototypes and expert review of content accuracy. On the other hand, summative evaluation is carried out after the implementation phase and uses surveys and usability testing tools, like ISO 25010 or a specially designed evaluation tool, to gauge how well the app facilitates language learning, promotes user engagement, and guarantees overall user satisfaction. Recommendations for upcoming iterations of the application will be informed by the evaluation phase's findings.

Through the five phases of ADDIE, we can say that AMANAKU will be produced as an application that not only serves its purpose but also meets the expected quality of performance. The initial step is Analysis, where the requirements are determined. The design and development stages produce a working prototype with the desired features. From there, Implementation enables the application to be used and collected data to determine its usefulness, and Evaluation takes that data and uses it to improve the product. All of these phases contribute to the application being functional and fulfilling its role as a tool for learning the Kapampangan language and the culture associated with it.

3.3 Requirement Specification and Analysis

This section presents the functional requirements and system processes of the proposed AMANAKU gamified mobile application for beginner-level Kapampangan language learning and selected cultural education.

The requirement analysis focuses on the functions needed to deliver beginner-level Kapampangan lessons, pronunciation practice, interactive language activities, gamified learning progression, character customization, real-life language missions, and selected cultural content.

The system processes and data relationships are represented through the Data Flow Diagram (DFD) and Entity-Relationship Diagram (ERD). The DFD illustrates how information moves between the learner, the mobile application, and the Firebase backend. The ERD presents the main entities and their relationships within the application's data structure. A flowchart is also used to illustrate the learner's journey through a lesson, from selection to completion, reward, and progression.

3.3.1 Functional Requirements

This section outlines the functional requirements for AMANAKU, derived from the objectives stated in Chapter 1 and the system components described in Section 3.4. The application's functionalities include:

Table 1 *Functional Requirements of AMANAKU*

Requirement	Description
Account Management	Allow learners to register and log in using an email and password via Firebase Authentication, with a nickname used to identify them within the application.
Beginner-Level Lessons	Provide structured lessons covering basic Kapampangan vocabulary, common phrases, and everyday communication, unlocked progressively as learners complete required levels.
Pronunciation Practice	Provide recorded audio of Kapampangan words and phrases that learners can listen to and use as a pronunciation guide
Interactive Language Activities	Provide listen-and-match, meaning matching, sentence arrangement, and appropriate-response

activities, as well as mini-games (Listen-and-Match, Word Builder, Word Hunt, Memory Match) as an alternative practice mode.

Real-Life Language Missions

Provide mission-based tasks that simulate everyday communication situations, unlocked in progression as the learner advances through levels.

Gamified Learning Progression

Track and award points, levels, badges, streaks, and progress for completed lessons, activities, missions, and Daily Challenges.

Character Customization

Allow learners to use earned points to unlock and equip clothing items, with certain sets gated behind specific levels and badges.

Tree Progression

Allow learners to use accumulated progress to "water" an in-app tree that yields point rewards upon reaching its final growth stage, after which the cycle resets.

Cultural Content Delivery

Provide culture cards and culture challenges that introduce learners to selected aspects of Kapampangan traditions, values, and practices.

Progress Storage and Sync

Save and retrieve the learner's lessons completed, points, badges, levels, streaks, mission status, and customization data via Cloud Firestore, so progress persists across sessions.

3.3.2 Data Flow Diagram

Figure 2 Data Flow Diagram Level 0 of the Proposed System

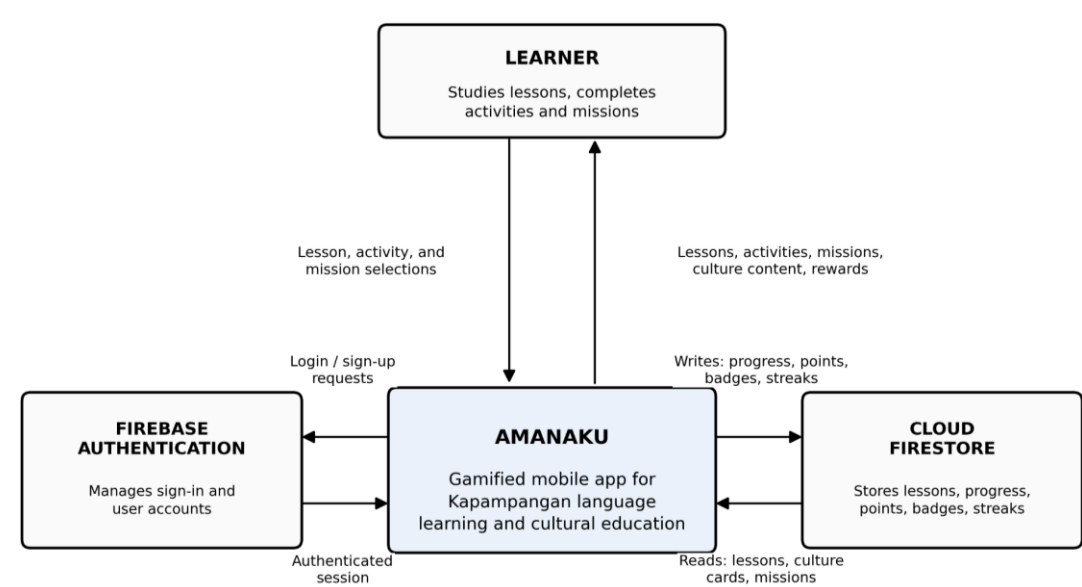
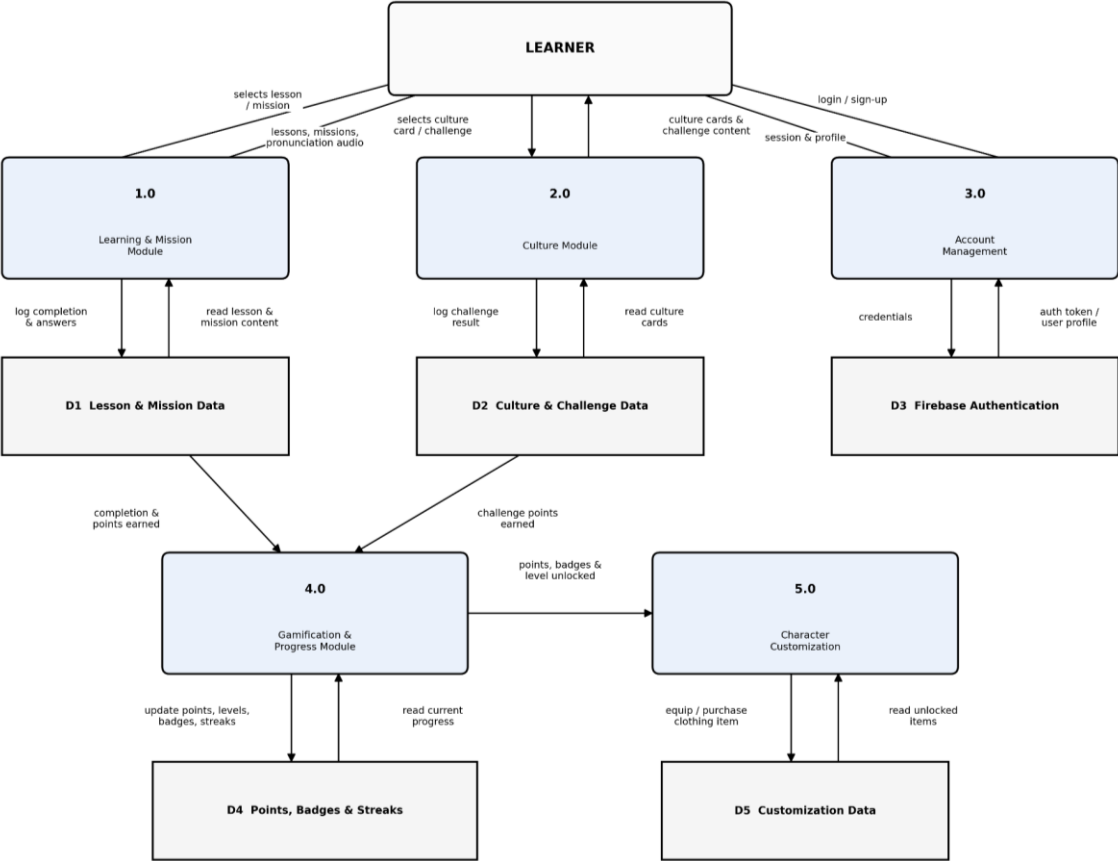
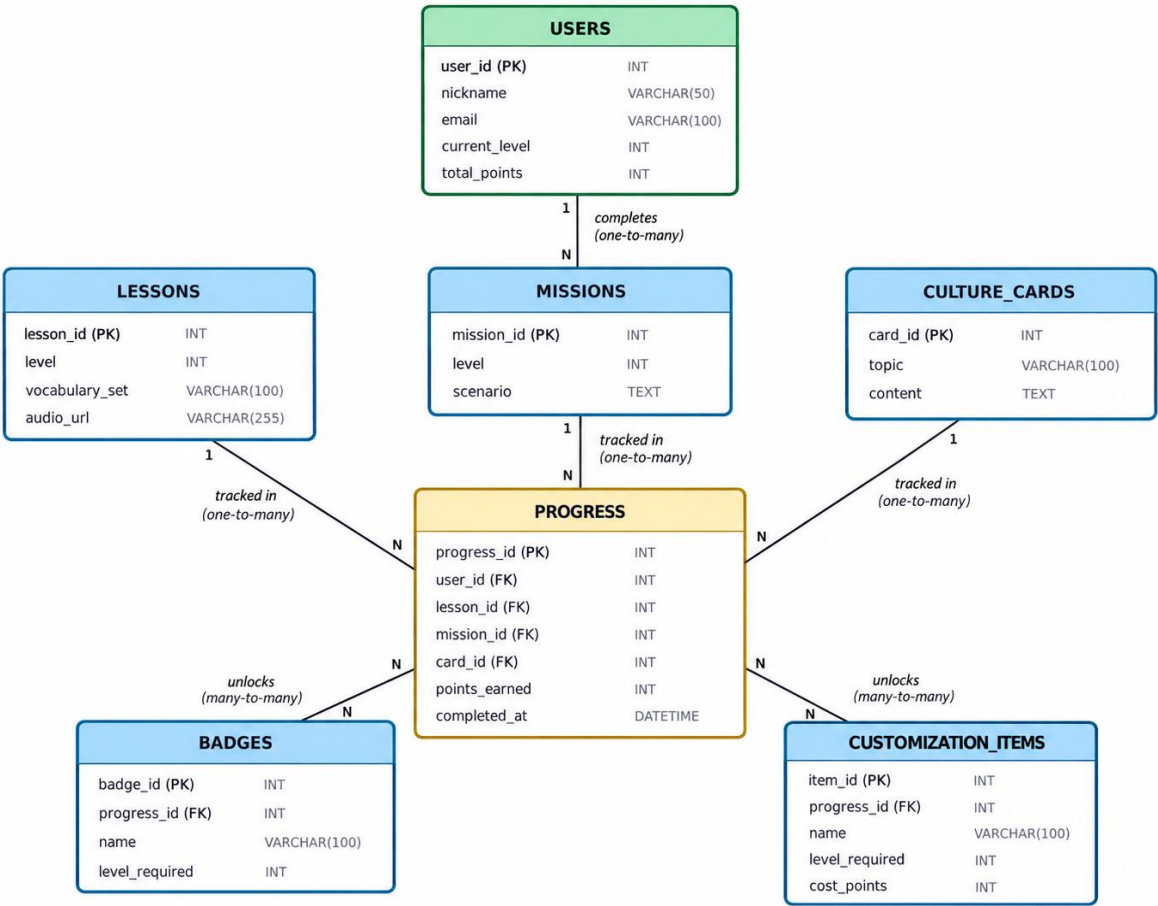


Figure 3 Data Flow Diagram Level 1 of the Proposed System



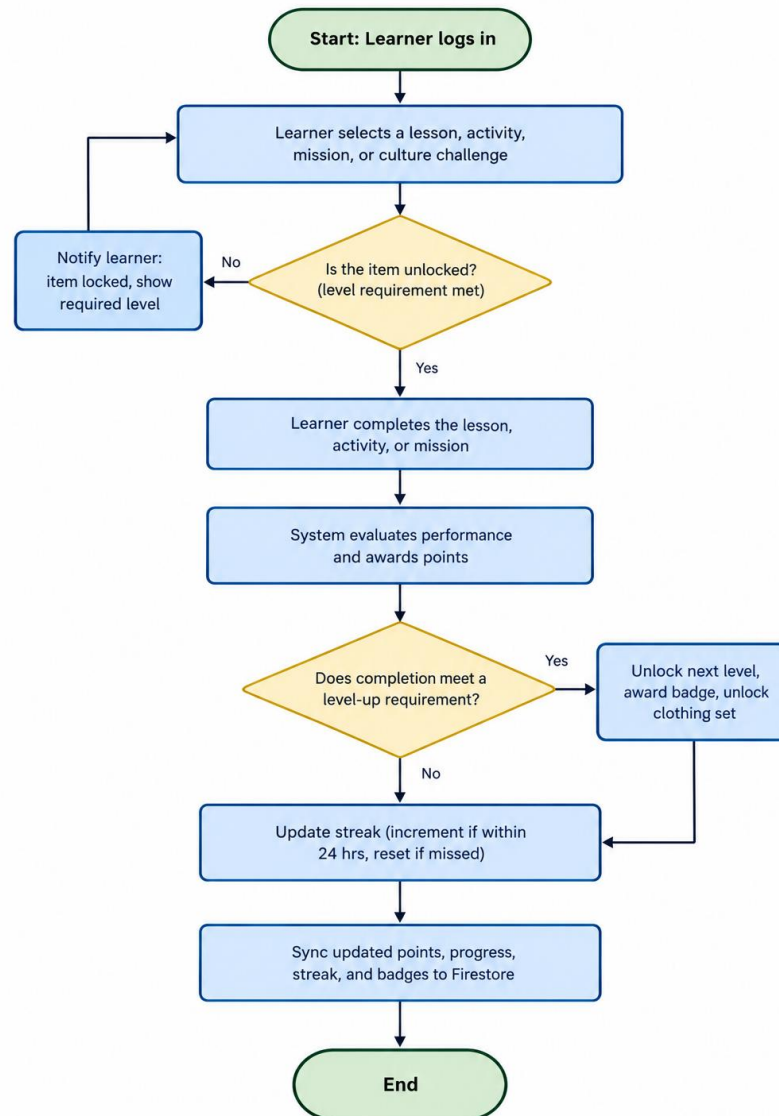
3.3.3 Entity-Relationship Diagram

Figure 4 Data Flow Diagram Level 1 of the Proposed System



3.3.4 Flowchart

Figure 5 System Flowchart of the Proposed Lesson/Activity Progression Process



3.4 System Design Specification

The system employs a mobile and cloud-based architecture. The mobile application which is developed using the Flutter framework acts as a client side where the learners interact with lessons, activities, and progress. Furthermore, the application utilizes Dart programming language to implement the application's features and elements. Android Studio is used as an integrated development environment (IDE) to write, test, debug, and run the application code on android mobile devices or emulators. Firebase is utilized as the backend system that stores the application data and manages the app's user accounts, learners' progress, points, badges, and other related data. GitHub is used as a platform to manage codes, versions, and collaboration. The mobile application writes into the Firebase database whenever an action or event is

triggered, such as completing an activity, mission, or challenge . The mobile app reads the lessons, culture cards, and culture challenges from the Firebase database every time the app is opened or when a lesson or module is accessed.

Major Components

1. Mobile Application – This component hosts the application's interface in providing the AMANAKU service. The application enables the users to access lessons, pronunciation practice, language activities, culture cards, culture challenges, missions, and progress.
2. Learning Module – It offers foundational Kapampangan vocabulary, phrases, and language lessons for the learners. The component consists of:
 - a. Pronunciation Practice sub-component that delivers audio recordings of Kapampangan words and phrases, and an Interactive Activities sub-component that covers listen and match, meaning matching, arranging sentences, and appropriate response activities.
3. Mission Module – It supplies real-life language learning missions that involve using the target language to communicate actual-life conversations. These missions enable the learners to engage in experiential learning of the target language. The missions are offered in progression as the learners advance through the levels and earn points and rewards.
4. Gamification Module – It manages the points, levels, badges, streaks, and rewards. The gamification component enables the learners to earn points, levels, and badges while learning Kapampangan language. The points can be redeemed to unlock character customization. The levels and badges are rewarded upon fulfilling requirements and serve as gates to character clothing and missions. Streaks are tracked and updated based on consecutive days of app interaction or activity completion. When a streak day is lost, data is retrieved from timestamps of the last completed activity by the learner and is synced with Firebase.
5. Culture Module – It provides culture cards and culture challenges that offer insights into Kapampangan culture and tradition. It enables the learners to learn the target culture alongside the target language.
6. Firebase Database – It stores the account details of the app's users, lesson and activity data, progress, points, badges, levels, streak timestamps, rewards, and mission details.
7. Character Customization – It unlocks character clothing based on points earned by the learners. Some character clothing is gated by the level and badge requirements. The learner has to reach a particular level and earn a badge to unlock the required clothing.

System Flow – The user logs in and opens the app → the learner goes to theMainMenu and selects a lesson, activity, culture challenge, or mission → the learner studies or performs the selected module → the system evaluates the

learner's performance and updates points, streak, and progress → unlocks rewards, badges, and levels if requirements are met. The updated performance data, streak, points, and progress are synced and saved in the Firebase database.

3.5 Implementation

Development Environment

The development of AMANAKU will involve the use of various software tools and technologies that will enable the research team to design, test, and manage the proposed mobile application. Firstly, Flutter will be used as a framework for building the mobile application while Dart will be the programming language used to code the application features and functions. Secondly, Android Studio will be the coding platform where tests, debugging, coding, and running of the application will be done using an emulator and android devices.

Firebase Authentication will be used to manage the sign-in procedures and account management system of the mobile application. At the same time, Cloud Firestore will be the database used to develop the application and store the progress of the learner which includes achievements, lessons completed, badges earned and customisation progress. Lastly, the GitHub application will be used to manage the application repository. In this case, the research team will use the tool to manage and control changes made to the application during the research process.

Application

Development

The AMANAKU mobile application will be a beginner-friendly learning platform that will provide Kapampangan lessons, activity, gamified features, and cultural content. The application will provide lessons that will introduce the users to basic Kapampangan words, phrases, and communication needed for a beginner. The lessons will be dependent on the level of the learner wherein the next lessons can only be unlocked when a certain level is reached.

In addition, the application will also have Daily Challenges and mini-games that will provide alternative ways for the users to master the Kapampangan language. The mini-games will consist of Listen-and-Match, Word Builder, Word Hunt, Memory Match, and other similar word games. Through the games, the users will have an option to play as an alternative to mastering the language through lessons. Furthermore, recorded resources will also be available as a guide for the learners to ensure that they will correctly pronounce the Kapampangan words, phrases, and sentences. In this feature, the learners can use the recorded resources to master the language by practicing their diction.

AMANAKU will also be a medium that will incorporate cultural content about the Kapampangan. This will be achieved by introducing the culture cards and culture challenges that will highlight the important cultural facts

about the Kapampangan. Moreover, the application will also have real-life language missions that will task the learners to accomplish certain communication activities that will allow them to apply the language skills they have gained from the lessons and missions. All of these features will be dependent on the level of the learner in the game, which will provide an avenue for them to engage in language practice and learn cultural content about Kapampangan.

Lastly, the application will also allow the learners to customize their characters based on their preference. This can be achieved as the learner progresses in the game wherein they can earn rewards that can be used to alter the appearance of their character. To begin, the learner will gain access to a closed clothing set every time they finish a lesson. This implies that the learner will be given a reward in terms of clothing every time they reach a certain level by finishing the prerequisite lesson.

User Account and Progress Management

AMANAKU will make use of Firebase Authentication to handle the user's accounts. The user will be able to set up an account and access the application by means of their email and password, however, a nickname will be used throughout the application to identify the learner. The password will be handled by the Firebase authentication system and will not be collected or be seen as research data by the researchers.

Cloud Firestore will be employed to store the learner's application data and progress. The information will consist of the completed lessons, badges, progress, and character customization along with other progression-related information needed by the application. This will guarantee that the learner's progression will be saved for when they access the application again.

The application will update the learner's progression as they complete lessons and other activities. The completed lessons will contribute to the learner's progression which will unlock succeeding lessons, badges, and other available features. The learner's customization progression will be stored for the earned and unlocked items to be available for use when the application is accessed again.

Gamification Implementation

AMANAKU will have various gamification features to aid the learners' progress and involvement in the application. Points will be given to learners upon finishing lessons and Daily Challenges. The points earned will be used as in-application rewards for the learners to be able to get all available clothing sets.

Levels will also be incorporated into the application. By clearing the lessons provided within the level, it will clear the next set of lessons, and will reward the learner with badges. Sets of clothing will also be incorporated into the level system. Upon clearing the level, the set of clothing will be unlocked, and the learners can equip the clothing they have acquired by using the points they have earned.

AMANAKU will also have a tree progression feature that is linked to the learner's progress. Upon

completion of lessons and progression within the application, the learner can use the progress to water the tree. Once the tree has progressed up to its ending phase, it will bear fruits for the learner to collect, which will also reward them with points. Once the learner has claimed all rewards from the tree, the cycle will then reset to allow the learner to continue progressing within the application by continuing to learn Kapampangan language lessons and activities.

Lastly, streaks and progress will be added to show the learners' progress as they learn Kapampangan language and activities. Streaks and progress will also be added as a reward system so that the learners can earn rewards and see their progress as they achieve new streaks or progress in the game.

Testing and Refinement

The AMANAKU application will be tested multiple times during the development process to spot errors, difficulties, or other possible flaws. The application will be run using an android emulator and several actual android devices to see how it operates in different settings. The researchers will confirm if its features perform as intended and if it operates smoothly when in use.

The application will be tested to spot problems and difficulties with its features, including accounts, lessons, Daily Challenges, mini-games, pronunciation resources, learner progress, badges, points, character customization, and tree features. The researchers will also confirm that all achievements, scores, and learner progress are stored correctly in the Cloud Firestore and expressed in the application properly.

If any flaws or problems are detected during the testing process, the researchers will make changes to the application and test it again to spot other flaws or problems. The recommendations and comments gathered during the evaluation will also be considered. These changes will be made to enhance the application's performance and features to create a better product that satisfies the end-users.

3.6 Testing and Evaluation

3.6.1 Validation and Testing

The validation and testing process will be done to make sure that AMANAKU works properly and meets its intended purpose. After developing the mobile application, different tests will be performed to check its functions, usability, and overall performance before it is used by the participants. Unit testing will be done on the main features of the application to make sure that each part works properly. The lessons will be tested to check if the Kapampangan words, phrases, and activities are shown correctly. The pronunciation feature will also be tested to make sure that the recorded audio plays properly. The different activities, such as listen-and-choose, meaning matching, sentence arrangement, and appropriate-response activities, will also be tested. The game features will be tested to make sure that points, levels, badges, streaks, unlockable lessons, progress tracking,

and rewards work correctly. The culture cards and culture challenges will also be checked to make sure that the selected cultural information is displayed properly. The real-life language missions will be tested to make sure that users can access and complete them. Usability testing will be done with the selected beginner learners. They will use the application and give their feedback about its design, navigation, instructions, activities, and overall experience. The feedback and test results will be used to find errors and make improvements to the application before its final implementation.

3.6.2 Readability, Validity, and Security Measure

Readability and validity will be ensured through systematic procedures to assess the clarity, accuracy, appropriateness, and consistency of the AmanaKu application. The various materials, including Kapampangan vocabulary, common phrases, pronunciation, interactive exercises, and cultural materials will be analyzed to ensure they can be understood and suitable for beginners. Evaluation will also include the interface and instruction for easy understanding and navigation. All of these procedures contribute to the objective of the study. That is, providing the Kapampangan learners with structured and interactive education.

For content validity, the learning materials and selected cultural content will be reviewed by specialists who have knowledge about Kampangan culture and language. Their reviews will be used to correct the unclear and unsuitable contents before the final implementation of the application.

For security, measures will be applied to protect user-related information and system data. Access to administrative functions and stored data will be limited to authorized researchers, while collected information will be kept confidential and used only for research purposes. The application will also avoid collecting unnecessary personal information to help maintain the confidentiality, integrity, and security of user data.

Overall, these measures will help ensure that AmanaKu provides clear, accurate, and appropriate Kapampangan learning content while protecting user information. They support the application's purpose of providing beginner learners with language activities and selected cultural content through a gamified mobile environment.

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