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# Pre-Learning and Integral Units in Language Teaching: A Survey

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## Abstract

This survey explores the integration of pre-learning and integral units in language teaching, focusing on educational strategies that enhance student engagement and understanding. Organized into key sections, the survey first introduces core concepts and historical evolution in curriculum development, emphasizing the significance of pre-learning and pre-homework tasks. It delves into the benefits and challenges of pre-learning strategies, supported by case studies that demonstrate their effectiveness in fostering student readiness and comprehension. The role of integral units in curriculum development is examined, highlighting interdisciplinary collaboration as essential for creating cohesive learning experiences. The survey also analyzes pre-homework strategies, their theoretical foundations, and their impact on student learning, underscoring the importance of technology-enhanced approaches. Innovative educational strategies, including AI-driven tools and flipped learning models, are discussed for their potential to personalize learning experiences and improve language proficiency. The conclusion synthesizes findings, suggesting areas for future research, such as refining AI technologies, enhancing curriculum sustainability, and fostering inter-university collaborations. This survey provides a comprehensive roadmap for understanding the multifaceted aspects of pre-learning and integral units in language education, offering insights into enhancing student engagement and outcomes.

## 1 Introduction

### 1.1 Structure of the Survey

This survey systematically explores the integration of pre-learning and integral units in language teaching, focusing on innovative educational strategies that enhance student engagement and understanding. The **Introduction** establishes the context, highlighting the significance of pre-learning and pre-homework in curriculum development. The subsequent section, **Background and Definitions**, clarifies core concepts such as pre-learning, integral units, language teaching, and educational strategies, tracing their historical evolution.

In **Pre-Learning in Language Teaching**, we examine pre-learning activities, discussing their benefits and challenges through case studies and examples from literature. This section underscores the advantages of pre-learning strategies in fostering student readiness, as evidenced by Santosa's study on student-centered learning at Esa Unggul University [1].

The survey then transitions to **Integral Units and Curriculum Development**, where we analyze the role of integral units in creating cohesive learning experiences. We explore various curriculum development models, emphasizing interdisciplinary collaboration and community engagement as essential for developing effective educational units that cater to the diverse needs of students, educators, and society. Insights from recent studies illustrate how collaborative efforts among stakeholders—students, faculty, and community members—enhance curriculum quality and relevance, ultimately improving educational outcomes [2, 3, 4, 5].

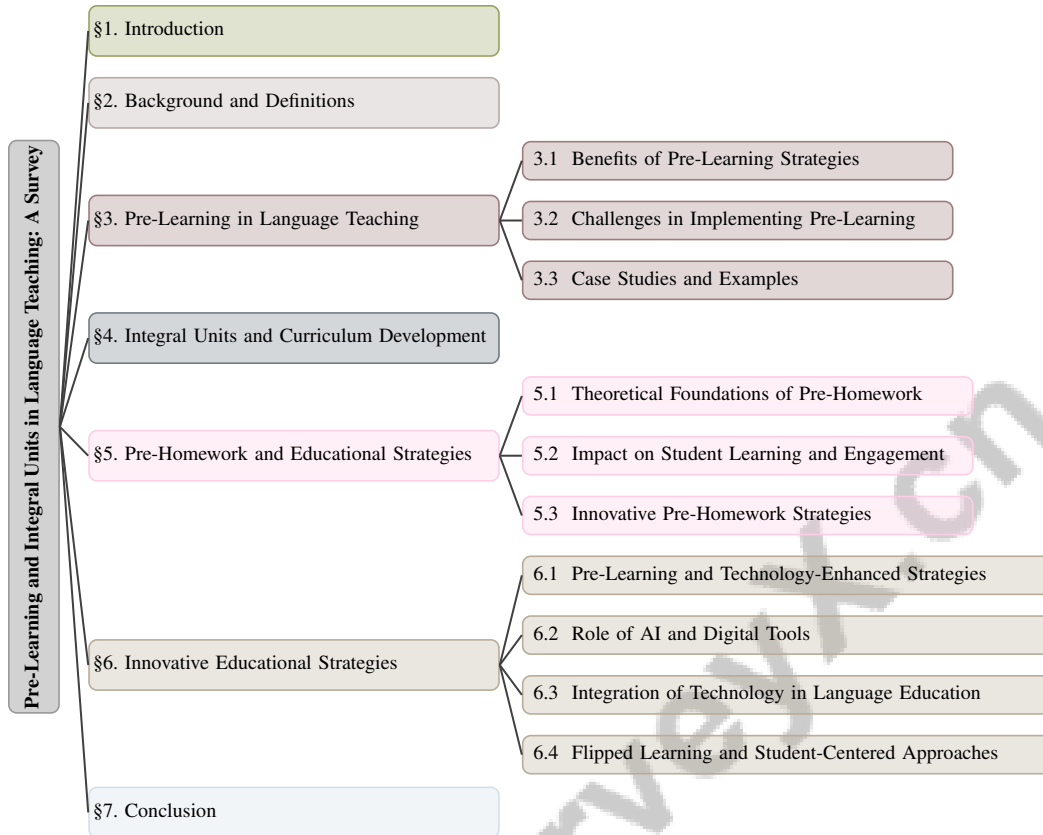


Figure 1: chapter structure

In **Pre-Homework and Educational Strategies**, we investigate the theoretical foundations of pre-homework and its impact on student learning outcomes, offering innovative strategies for its integration into curricula.

The section on **Innovative Educational Strategies** discusses transformative approaches that incorporate pre-learning and integral units. We highlight technology-enhanced strategies, the role of AI and digital tools, and the integration of technology in language education. Additionally, we explore flipped learning and other student-centered approaches, addressing the demands on teachers for language and literacy development, as noted by Adger et al. [6].

Finally, the **Conclusion** synthesizes the key findings of the survey, reflecting on the implications of pre-learning and integral units, while suggesting areas for future research. This structured approach provides a comprehensive framework for exploring the complex dimensions of pre-learning and integral units in language teaching, emphasizing the integration of Artificial Intelligence (AI) tools to enhance personalized education and improve learning outcomes, alongside addressing challenges in curriculum development, teacher training, and ethical considerations in the evolving landscape of language education [7, 8, 9, 5]. The following sections are organized as shown in Figure 1.

## 2 Background and Definitions

### 2.1 Core Concepts in Language Teaching and Curriculum Development

The foundation of language teaching and curriculum development lies in concepts such as pre-learning, integral units, and educational strategies, which are pivotal for designing effective curricula. Pre-learning involves preparatory activities that enhance student engagement and comprehension, often facilitated by technology, such as serious games [10]. Evaluating pre-learning is crucial for understanding student readiness [11]. Integral units, which are cohesive educational modules, foster interdisciplinary learning and integrate community perspectives, bridging educational practices with

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local cultures [3]. The use of AI in language education offers personalized learning experiences tailored to individual needs.

Language teaching has evolved to incorporate strategies that promote cultural competence and effective communication, especially in contexts where Global Englishes challenge traditional models. Effective assessment methods are essential to adapt teaching strategies to students' initial competencies [12]. However, there is a persistent issue of inadequate teacher preparation to address the diverse linguistic and literacy needs of students [6].

Pre-homework tasks prepare students for lessons, reducing cognitive load and improving classroom readiness by addressing common barriers such as vocabulary and grammar [13]. Innovative assessment methods, like pre- and post-quizzes, are vital for accurately measuring learning outcomes and teaching effectiveness [14].

Educational strategies leveraging pre-learning and integral units increasingly utilize technology for enhanced effectiveness. AI-driven tools, such as collaborative platforms, exemplify this trend, offering new avenues for content generation and proficiency evaluation [9]. Crafting example sentences that match students' complexity levels and generating contextually relevant educational content, like Italian crossword puzzles, illustrate the integration of language learning with educational content [15, 16].

These core concepts are evolving to incorporate innovative strategies and technologies, addressing learners' diverse needs in a globalized world. As educational environments adapt, AI-driven tools and interdisciplinary approaches will be crucial for creating effective and inclusive learning experiences. The ongoing refinement of language learning strategies highlights the importance of addressing challenges in curriculum recommendations, such as content conflicts and complexities from language translation [17].

## **2.2 Historical Context and Evolution of Educational Strategies**

The evolution of educational strategies, particularly those involving pre-learning and integral units, has been shaped by historical, cultural, and technological advancements. Historical curriculum development practices have undergone significant transformations, as analyzed in diverse educational settings over the past two decades [2]. In the United States, the history of integrated curriculum (IC) from the progressive era to the late 20th century reflects a shift towards holistic educational approaches, mirrored by similar movements in Europe [18].

In Indonesia, curriculum changes illustrate how educational strategies are influenced by socio-political and educational needs, emphasizing the importance of contextual factors in shaping curriculum processes [19]. This evolution underscores the need for cultural sensitivity and responsiveness in curriculum development, especially in diverse settings.

Technological advancements have significantly impacted educational strategies, offering new possibilities for content generation and delivery. The integration of AI in language education, exemplified by large language models, addresses limitations in traditional engagement methods, such as generating crossword clues [16]. Despite these advancements, challenges persist in preparing teachers to meet the linguistic and literacy needs of diverse students, as teacher education programs often lack coverage in essential areas like linguistic knowledge and cultural awareness [6].

The historical development and evolution of educational strategies reveal a complex interplay among technological innovations, cultural influences, and pedagogical advancements. This is particularly evident in the shift towards integrated curricula addressing 21st-century competencies and the incorporation of AI in language education, enhancing teaching methodologies and personalizing learning experiences [20, 2, 18, 7, 5]. The ongoing refinement of pre-learning and integral units emphasizes the need for adaptable, culturally responsive, and technologically integrated approaches to meet learners' diverse needs.

## **3 Pre-Learning in Language Teaching**

Pre-learning is pivotal in language teaching, employing strategies that enhance educational experiences by fostering student engagement and comprehension. This section explores the transformative potential of pre-learning methodologies in modern education, establishing a foundation for effective

language acquisition. As illustrated in Figure 2, the hierarchical structure of pre-learning strategies in language teaching is depicted, highlighting their benefits, challenges, and relevant case studies. The figure categorizes key aspects such as the enhancement of engagement and comprehension, technological advancements, content alignment, and assessment challenges, while also showcasing innovative strategies and effective applications within educational settings. This visual representation not only complements the discussion but also underscores the multifaceted nature of pre-learning in fostering an enriched learning environment.

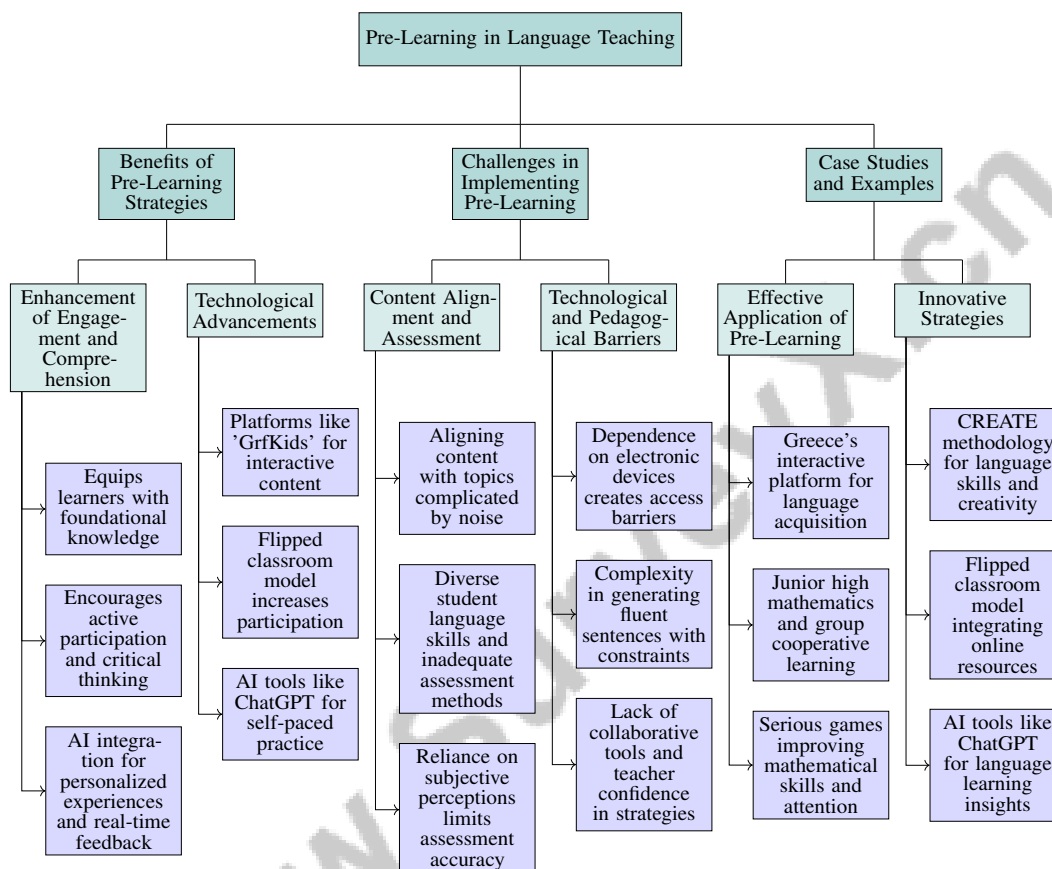


Figure 2: This figure illustrates the hierarchical structure of pre-learning strategies in language teaching, highlighting their benefits, challenges, and case studies. It categorizes the enhancement of engagement and comprehension, technological advancements, content alignment, and assessment challenges, along with innovative strategies and effective applications in educational settings.

### 3.1 Benefits of Pre-Learning Strategies

Pre-learning strategies enhance student engagement and comprehension by equipping learners with foundational knowledge prior to formal instruction. This preparatory phase encourages active participation and critical thinking, enriching classroom interactions. Advanced language models, as discussed by Zeinalipour et al., generate contextually relevant content, enhancing student engagement [16]. AI integration in language learning facilitates personalized experiences and real-time feedback, promoting adaptive learning environments.

As illustrated in Figure 3, the key benefits of pre-learning strategies can be categorized into three main areas: AI integration, personalized learning, and assessment and feedback. This figure highlights specific implementations such as advanced language models, the GrfKids platform, and the use of pre- and post-quizzes, which collectively enhance student engagement and learning outcomes. Platforms like 'GrfKids' showcase pre-learning's effectiveness by providing immediate access to interactive content and automated assessments, allowing personalized learning experiences [21]. This adaptability fosters a student-centered environment, accommodating diverse learning paces and

enhancing communication and problem-solving skills [22]. The flipped classroom model exemplifies pre-learning benefits by increasing participation and personalizing learning experiences [23], while integrating metacognitive skills within pre-learning frameworks empowers students, improving academic outcomes and fostering learner autonomy [24, 25].

Creating educational environments prioritizing student needs and promoting active learning is fundamental to effective pre-learning strategies [26]. AI tools like ChatGPT enable self-paced language practice with immediate feedback, enhancing accessibility [27]. Functional Analytics Document Ordering (FADO) customizes document sequences to individual needs, improving comprehension based on cognitive principles [5]. Pre-learning interventions enhance learning from errors, improving educational outcomes [28].

Integrating pre- and post-quizzes into curriculum design aligns assessments with learning objectives, enhancing student outcomes and teaching strategies [14]. Interactive Process Visualizations (PVs) provide feedback on writing and coding processes, supporting pre-learning benefits [29]. Serious games improve children’s mathematical skills and attention during learning activities [10]. Technological advancements in pre-learning, such as Xu et al.’s method, refine strategies by improving content alignment predictions and computational efficiency, tailoring educational content to learner needs [17].

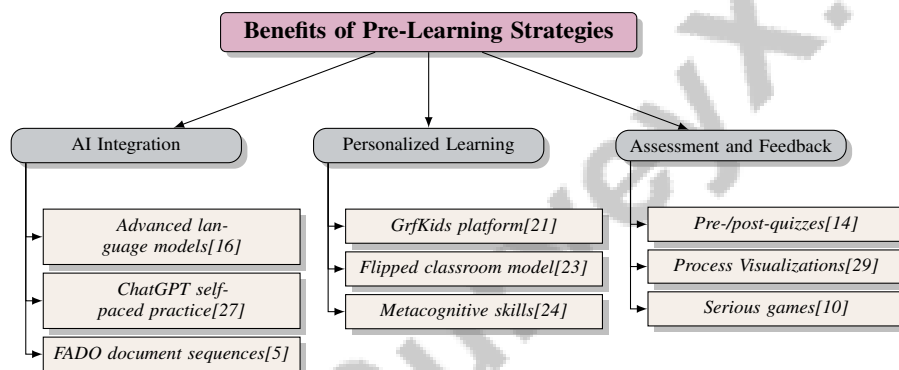


Figure 3: This figure illustrates the key benefits of pre-learning strategies, categorized into AI integration, personalized learning, and assessment and feedback, highlighting specific implementations such as advanced language models, GrfKids platform, and pre-/post-quizzes, which collectively enhance student engagement and learning outcomes.

### 3.2 Challenges in Implementing Pre-Learning

Implementing pre-learning strategies in language education poses challenges that educators and institutions must address for effective adoption. Aligning educational content with specific topics is complicated by noise and ambiguities from language translation [17]. This highlights the broader issue of integrating pre-learning with advanced technologies like AI and NLP to enhance language acquisition.

Diverse student language skills complicate adaptable pre-learning strategies, compounded by inadequate assessment methods and difficulties in identifying individual learning requirements. Educators struggle to meet diverse linguistic needs due to outdated training, underscoring the need for comprehensive professional development integrating contemporary pedagogical approaches and AI advancements [20, 30, 7, 6, 8].

Reliance on subjective perceptions rather than objective measures limits accurate assessment of pre-class learning modalities. Dependence on electronic devices for pre-learning may create access barriers for disadvantaged students, exacerbating educational inequalities. Mobile pre-learning systems improve academic achievement and attitudes among those with access, widening the gap between students with and without technological resources [25, 11, 31].

Generating fluent sentences adhering to complexity constraints poses challenges in language processing, complicating vocabulary selection for pre-learning. Lexical complexity controlled sentence generation requires balancing fluency and lexical constraints, necessitating advanced methods like

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complexity embedding to enhance sentence quality [15, 30]. The absence of robust AI use policies and potential misuse by students emphasize the need for comprehensive teacher development in AI applications. Lack of collaborative tools supporting language learning and insufficient teacher confidence in active learning strategies further impede pre-learning adoption.

Addressing AI integration challenges in language education requires comprehensive strategies tackling technological and pedagogical barriers. Effective pre-learning incorporation enhances student engagement and learning outcomes, necessitating robust teacher training, AI tool alignment with curricular goals, and ethical considerations to balance technological innovation with essential classroom interaction [7, 8].

### 3.3 Case Studies and Examples

The practical benefits of pre-learning strategies in language education are illustrated through various case studies. In Greece, an interactive language teaching platform for primary pupils demonstrated pre-learning modules' potential in enhancing language acquisition, providing immediate access to interactive content and assessments for personalized engagement [21].

In junior high mathematics, integrating pre-assignment design and group cooperative learning fosters a collaborative environment, enhancing comprehension and retention [22]. At SMPN 5 Kendari, metacognitive strategies in narrative writing showed significant score improvements following pre-learning activities [24].

Serious games in pre-learning strategies effectively reinforce educational concepts. Experiments with children in Caracas showed significant improvements in mathematical skills and attention during learning activities [10]. The CREATE methodology, involving humorous subtitle and dubbing track creation, enhances language skills while fostering creativity and engagement [32].

The flipped classroom model, widely adopted and assessed in various settings, integrates online resources with classroom activities, enhancing participation and personalizing learning [23]. Pre-class learning modalities, categorized into frameworks like reading assignments and interactive modules, provide insights into their effectiveness [25].

AI tools like ChatGPT in language learning, explored through EFL learner interviews, offer insights into learner experiences with AI for language practice, highlighting technology-enhanced pre-learning potential [27]. Evaluating Process Visualizations (PVs) with educators and learners through a web application exemplifies innovative technology use in pre-learning environments [29].

These case studies underscore pre-learning strategies' multifaceted applications and advantages in language education. Enhancing student engagement and comprehension, these strategies facilitate skill acquisition across diverse environments. Research indicates pre-learning activities, like reading assignments and varied materials, effectively prepare students for active participation, reducing cognitive overload and improving retention. Technology integration, particularly AI-driven tools, personalizes learning, promoting autonomy and enhancing language proficiency, especially in speaking and reading skills [24, 33, 34, 35, 25].

## 4 Integral Units and Curriculum Development

### 4.1 Curriculum Development Models and Approaches

Integrating integral units into curriculum development models is crucial for building comprehensive educational frameworks that enhance student engagement and learning outcomes. These models, encompassing stages such as teacher agency, learning resources, assessment, and pedagogical strategies, ensure alignment with learner needs and institutional goals [36]. The Functional Analytics Document Ordering (FADO) method exemplifies innovative curriculum development by optimizing document sequences through algorithms that analyze similarities and entropy, thereby refining content delivery [5].

Human-AI collaboration frameworks are vital for curriculum development, as they clearly define roles to leverage human expertise and AI capabilities [37]. This collaboration enables dynamic curricula that adapt to the evolving educational landscape. Large language models (LLMs) further transform curriculum development by facilitating dynamic topic generation, enriching educational processes

[9]. Robotic systems utilizing LSTM neural networks provide personalized learning experiences for English language learners, highlighting AI's role in enhancing language acquisition [38].

Historical perspectives on curriculum development, such as those by Abidin [19], trace the evolution from character education to competency-based frameworks, offering insights into the foundational principles shaping contemporary curriculum models. By employing advanced techniques like functional analytics and natural language processing, educators can craft cohesive curricula that engage students and improve learning outcomes. This systematic approach incorporates diverse stakeholder perspectives, fostering inclusive educational frameworks. Strategies for needs assessment and evaluation further refine curricula, enhancing comprehension and learning environments [2, 5, 4].

## 4.2 Interdisciplinary Collaboration in Integral Units

Interdisciplinary collaboration is essential for developing integral units in language education, enriching learning experiences by integrating diverse perspectives and methodologies. Byram highlights the importance of such efforts in enhancing language education effectiveness [39]. By merging insights from various fields, educators can create comprehensive curricula that address language learning complexities.

Palupi advocates for eclectic curricula that accommodate diverse contexts and foster student-centered learning [40]. An interdisciplinary approach incorporates various pedagogical strategies and content areas, tailoring learning experiences to meet students' unique needs. This adaptability is crucial in language education, where cultural, social, and cognitive factors significantly influence outcomes.

As illustrated in Figure 4, the key components of interdisciplinary collaboration in language education include curriculum development, pedagogical strategies, and the cultivation of 21st-century skills, all supported by various scholarly contributions. This visual representation underscores how interdisciplinary collaboration fosters innovative educational strategies by integrating methodologies from different fields, enhancing curriculum development through natural language processing and AI tools. These strategies personalize education to suit diverse learning styles and address complex global challenges, fostering 21st-century competencies and transdisciplinary skills [8, 5, 18, 4]. By leveraging expertise from cognitive science, linguistics, and technology, educators can design integral units that enhance language proficiency and cultivate critical thinking, problem-solving, and intercultural communication skills, aligning with contemporary educational goals prioritizing globally competent learners.

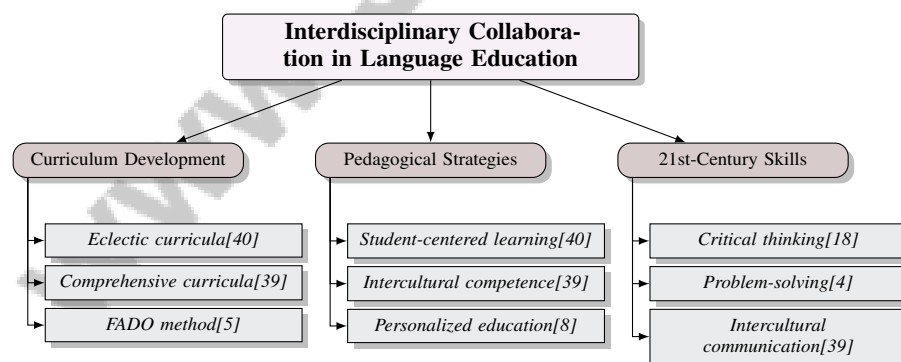


Figure 4: This figure illustrates the key components of interdisciplinary collaboration in language education, highlighting curriculum development, pedagogical strategies, and the cultivation of 21st-century skills, supported by various scholarly contributions.

## 5 Pre-Homework and Educational Strategies

### 5.1 Theoretical Foundations of Pre-Homework

Pre-homework strategies are grounded in active engagement, personalized learning, and strategic technology use to boost student motivation and outcomes. Aligning with the flipped classroom model, these strategies utilize pre-class activities to prime students for deeper engagement during



Method Name	Active Engagement	Personalized Learning	Technology Integration
FADO[5]	-	Individual Learning Needs	AI Technologies
C-W[41]	Student Engagement	Personalized Feedback	AI-enhanced Collaborative
HRSELL[38]	Engaging Learning Experience	Personalized Tutoring Experiences	Humanoid Robotic System
TS-PLE[11]	Pre-learning Evaluation	Differentiated Learning Strategies	Test Software

Table 1: Comparison of Pre-Homework Methodologies in Terms of Active Engagement, Personalized Learning, and Technology Integration. This table provides an overview of the distinct approaches employed by various methods to enhance educational outcomes through active student participation, tailored learning experiences, and the incorporation of advanced technologies.

instructional time [25]. Algorithms that optimize reading sequences further enhance learning through structured methodologies [5].

As illustrated in Figure 5, the theoretical foundations of pre-homework strategies underscore the pivotal roles of active engagement, AI personalization, and differentiated learning in enhancing educational outcomes. Table 1 presents a comparative analysis of different pre-homework methodologies, highlighting their emphasis on active engagement, personalized learning, and technology integration, which are crucial for enhancing student motivation and learning outcomes. AI technologies significantly personalize language learning within pre-homework frameworks. However, a lack of digital competencies among educators poses a challenge to effective AI integration [42]. Addressing this involves developing frameworks that define AI’s role in English Language Teaching (ELT), emphasizing personalization, engagement, and a balance between technology and human interaction [8].

AI-driven tools like Collabowrite demonstrate technology’s role in fostering active learning and collaboration through grammar checks and creative prompts [41]. Additionally, LSTM networks in robotic systems predict and generate coherent text, offering learners contextual language exposure and practice, thus reinforcing language skills [38].

Differentiated learning approaches are central to pre-homework strategies. For instance, Maulana’s method uses software to assess student mastery and recommend personalized learning strategies, ensuring pre-homework tasks align with individual needs [11]. The theoretical underpinnings of these strategies highlight the necessity of integrating advanced technologies and personalized learning frameworks to create engaging educational environments. By navigating AI’s opportunities and challenges in language education, educators can significantly enhance pre-homework activities’ effectiveness, leveraging AI tools for personalized learning and interactive engagement while addressing ethical considerations and preserving teachers’ essential role [43, 37, 8, 7].

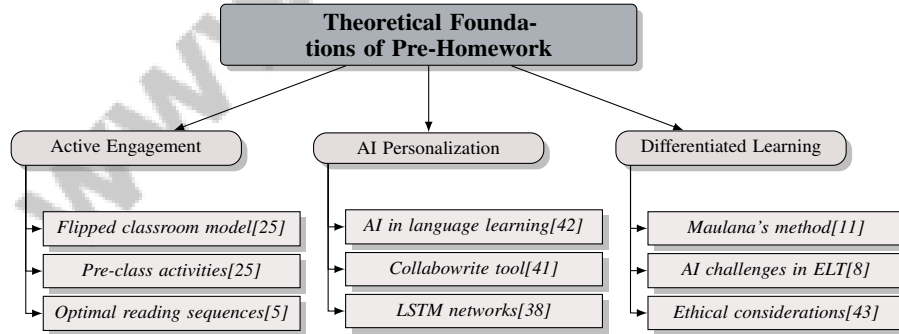


Figure 5: This figure illustrates the theoretical foundations of pre-homework strategies, highlighting the roles of active engagement, AI personalization, and differentiated learning in enhancing educational outcomes.

## 5.2 Impact on Student Learning and Engagement

Pre-homework strategies in language education significantly affect student learning and engagement, often enhanced by AI-driven tools that offer personalized and interactive experiences tailored to individual needs [20]. AI applications within task-based language teaching frameworks enhance engagement and proficiency through dynamic, contextually relevant interactions [33]. However,



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the effectiveness of AI tools varies across proficiency levels, leading to inconsistent outcomes [44]. This underscores the need for well-structured prompts and activities to maintain interest and deliver consistent benefits [45].

The evolving role of teachers in AI-enhanced environments presents opportunities and challenges. While AI democratizes language learning by providing equitable access to resources, it requires balancing technological and traditional methods to maximize outcomes. Concerns about reduced human interaction and impacts on learner autonomy must be addressed to ensure AI complements rather than replaces educators' critical role in fostering engagement [43].

Empirical studies show that pre-homework programs enhance teaching effectiveness and improve language learning, evidenced by gains in grammatical range, accuracy, and fluency through pre- and post-interaction evaluations. AI integration in pre-homework activities also enhances digital literacy and language proficiency, offering more engaging and effective learning experiences [46].

### **5.3 Innovative Pre-Homework Strategies**

Innovative pre-homework strategies in language teaching leverage AI-driven tools to create dynamic, personalized learning environments that enhance proficiency and critical thinking. The integration of language learning applications, chatbots, and virtual reality environments illustrates AI's transformative potential in education [47]. These technologies facilitate interactive and immersive experiences, enabling novel engagement with language content.

The AI-TBLT (Task-Based Language Teaching) framework uses AI applications to provide personalized feedback and adaptive learning pathways, enriching the learning process [33]. This approach emphasizes tailoring content to individual needs, ensuring necessary support for effective skill development.

A shift in teaching methodologies is essential to harness AI and digital tools in pre-homework strategies. Integrating these technologies into curricula fosters environments that promote proficiency and critical thinking [46]. This shift requires reevaluating traditional practices, encouraging flexible, technology-enhanced approaches.

Future research should focus on developing inclusive AI tools for diverse populations, enhancing teacher training for effective AI implementation, and ensuring ethical AI use in education [8]. These efforts are crucial for overcoming challenges and maximizing AI-driven pre-homework strategies' benefits in language education.

The integration of innovative pre-homework strategies, particularly through AI-driven applications within the TBLT framework, shows considerable potential for enhancing language education by fostering personalized pathways, increasing engagement, and improving proficiency, especially in writing, speaking, and reading [24, 33]. Embracing AI and digital tools enables educators to create engaging, personalized, and effective experiences that prepare students for a rapidly evolving world.

## **6 Innovative Educational Strategies**

Innovative educational strategies are pivotal in enhancing learning by integrating pre-learning and technology-enhanced methodologies. These approaches utilize digital tools to prepare students for active engagement, facilitating foundational knowledge acquisition and fostering interactive, personalized learning environments. The following subsections explore these strategies' various aspects and their significance in contemporary educational practices.

### **6.1 Pre-Learning and Technology-Enhanced Strategies**

The incorporation of technology into pre-learning strategies has transformed educational practices, offering new methods to enhance student engagement and learning outcomes. Tools like the Italian Crossword Puzzle Generator exemplify large language models (LLMs) by merging learning with entertainment, aligning with the flipped classroom model to facilitate independent access to foundational content [16]. AI tools enhance learning experiences by personalizing content and monitoring student progress, as demonstrated by frameworks categorizing chatbot interactions based on user

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characteristics and educational objectives [45]. These tools enable the development of dynamic learning environments tailored to diverse learner profiles.

Innovative strategies such as digital interactive platforms for serious games combine learning with entertainment to create engaging educational experiences [10]. Methods like Complexity Embedding ensure content is appropriately challenging by tailoring sentence complexity to learners' levels [15]. Additionally, techniques for reducing noise in training data align content with topics, ensuring educational content effectively meets learner needs [17]. These strategies enhance learning efficiency by providing tailored educational experiences.

The adoption of technology-enhanced pre-learning strategies, including AI and adaptive learning systems, offers significant opportunities to personalize experiences, improve knowledge retention, and facilitate effective classroom engagement [7, 25, 20, 35]. By embracing these tools, educators can create engaging learning experiences that prepare students for the demands of a rapidly evolving educational landscape.

## **6.2 Role of AI and Digital Tools**

AI and digital tools have significantly transformed language education by enhancing personalization, engagement, and learning outcomes. Automated writing evaluation and intelligent tutoring systems offer data-driven insights that facilitate tailored learning experiences [44]. These tools empower educators to adapt content to individual student needs, optimizing the educational process and fostering interactive learning environments.

Chatbots and AI applications create personalized learning experiences that enhance student engagement by promoting active participation and providing immediate feedback [45]. Integrating AI-driven tools, such as Chat GPT with voice assistants, further enhances communicative competence among EFL learners by offering practice opportunities and personalized feedback [27]. AI supports educators in delivering personalized learning while balancing technological and human interaction, ensuring educational strategies remain effective and human-centric [42].

However, AI implementation in education presents challenges, including the need for robust infrastructure, internet connectivity, and addressing ethical concerns related to data privacy and bias [8]. Developing formal policies on AI integration and comprehensive teacher training programs is essential to equip educators with the necessary skills to effectively utilize AI tools in the classroom [7].

## **6.3 Integration of Technology in Language Education**

The integration of technology in language education has introduced novel approaches to enhance learning experiences and outcomes. AI-driven tools and platforms provide personalized and adaptive learning environments, as exemplified by Revita, which tailors instructional strategies to individual learner needs based on linguistic constructs [48]. Frameworks like AutoLEX utilize NLP-based systems to extract and present teachable grammar points, broadening the accessibility of language learning resources [30].

Incorporating AI tools necessitates reevaluating traditional assessment methods to maintain effectiveness in an AI-enhanced learning environment [46]. This reevaluation ensures assessment integrity and accurately reflects student learning and progress. Additionally, integrating physiological synchrony analysis offers insights into student engagement patterns, informing the development of innovative educational strategies [49].

Technological advancements like Collabowrite highlight AI's potential to support collaborative learning experiences, enhancing student engagement and fostering interactive learning environments [41]. Advanced language models further enhance the relevance and educational value of generated content, providing learners with contextually rich and engaging materials [16].

## **6.4 Flipped Learning and Student-Centered Approaches**

Flipped learning and student-centered approaches have reshaped educational paradigms by prioritizing active learning and personalized instruction. Flipped learning enhances student engagement by delivering lecture content outside the classroom, allowing in-class time for interactive and collabora-

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tive activities [50]. This approach provides individualized learning opportunities, enabling students to engage with material at their own pace, accommodating diverse learning styles and fostering self-directed learning.

Understanding students' readiness across physical, mental, and cognitive dimensions is crucial for successful student-centered learning (SCL). Studies indicate strengths in reflective practices and collaborative skills while identifying gaps in learning autonomy [1, 5]. Promoting flexibility in learning environments supports varied preferences and enhances students' readiness to engage in authentic tasks, contributing to a more effective student-centered educational framework. The emphasis on active participation and critical thinking in flipped classrooms aligns with contemporary educational goals prioritizing autonomous, lifelong learners.

Integrating technology in flipped learning environments facilitates the use of innovative tools that enhance the educational experience. For instance, Functional Analytics Document Ordering (FADO) improves the organization and predictability of educational materials, supporting structured content delivery in flipped classrooms [5]. This method ensures learners access well-organized and coherent resources, essential for effective learning.

Student-centered approaches in language education emphasize tailoring instruction to meet unique learner needs. By integrating pedagogical strategies such as pre-class reading assignments, technology-enhanced learning tools, and moderated interactions with AI, educators can enhance engagement, promote active participation, and foster collaboration among diverse learners. This multifaceted approach addresses different learning styles and ensures the educational experience is tailored to individual needs, leading to improved outcomes and a more equitable classroom dynamic [8, 25, 51]. These strategies align with flipped learning principles, empowering students by granting them greater control over their learning journey.

## 7 Conclusion

Integrating pre-learning and integral units into language education presents a transformative opportunity to enhance student engagement and learning outcomes. The strategic use of AI-driven tools and large language models (LLMs) is pivotal in personalizing educational experiences and supporting educators, while maintaining a focus on ethical considerations and bias management is crucial. Platforms like 'GrfKids' effectively demonstrate the synergy of functionality and engaging content in language instruction, underscoring the advantages of pre-learning frameworks.

Pre-learning assessments enable tailored teaching strategies that address specific learner needs, thereby improving educational quality and outcomes. Differentiated learning, supported by advanced pre-learning evaluation tools, empowers educators to adapt their methods for diverse student populations. The integration of serious games in early education further emphasizes the potential of interactive tools to reinforce learning concepts, suggesting a need for continued research and development in this area.

This survey highlights the importance of aligning curricular aspirations with practical teaching methodologies, advocating for a balance between language competence and cultural understanding. Future research should focus on sustainable curriculum development, enhancing faculty training, and fostering inter-university collaborations to elevate educational standards. The rise of mobile pre-learning systems is a key factor in boosting academic achievement and fostering positive attitudes toward mobile learning.

The flipped classroom model has shown efficacy in increasing student engagement and learning outcomes, especially in language instruction within independent colleges. However, it remains essential to preserve human involvement in education to ensure AI serves as an enhancement rather than a replacement for traditional teaching methods. Further research should explore the long-term impacts of pre-learning and integral units on language proficiency, with an emphasis on refining AI technologies for improved accuracy and applicability across various language skills. Additionally, initiatives aimed at enhancing student autonomy and cooperative learning skills are necessary, as students exhibit moderate readiness for student-centered learning approaches.

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