Unveiling the Link Between Multilingualism and Classroom Learning Outcomes: A Cognitive Approach

Muhammad Nawaz

English Lecturer, Instructor, Tutor & Evaluator-Allama Iqbal Open University, Islamabad, Pakistan, rajabnawaz2014@gmail.com

Abstracts

This study investigates the relationship between classroom learning outcomes and multilingualism through the lens of writing proficiency among multilingual learners in an ESL context. Utilizing an error analysis framework, the research examines writing samples from 30 elementary students to identify and categorize common errors, including grammatical, lexical, mechanical, interlingual, and intralingual mistakes. The findings reveal that multilingual learners often struggle with subject-verb agreement, tense consistency, and vocabulary usage, reflecting the cognitive complexities of navigating multiple languages. Interlingual interference and intralingual overgeneralization were identified as significant contributors to these errors, underscoring the dual influence of learners' first languages and incomplete knowledge of English. The study highlights the importance of targeted instructional approaches, such as specific grammar instruction, vocabulary enrichment, and translanguaging practices, to address these challenges. Additionally, the research emphasizes the need for inclusive pedagogical approaches that validate students' linguistic identities and foster emotionally supportive environments conducive to learning. By bridging the gap between error analysis and practical teaching strategies, this study provides empirical evidence to inform multilingual education, offering insights that enhance writing proficiency and overall academic outcomes.

Keywords: Multilingualism, Writing Proficiency, Translanguaging, Linguistic Challenges, Cognitive Processes, Error Analysis Framework.

1. Introduction

With the rise of multilingualism in the learning context, improved insight into its effects within learning settings, especially from the learning aspects, remains an ongoing concern. Multiple language users' benefits include increased attention, control, problem-solving, and linguistic awareness, all of which positively affect learning outcomes (Usanova & Schnoor, 2022). Translanguaging strategies in multilingual classrooms are also useful in enhancing students' emotional safety and identity features that will enhance their learning, participation, and time on task (Makalela, 2015; Krulatz et al., 2017). Yet, such benefits with bilingual or multilingual learners are observed at the same time, they meet challenges in their written language proficiency especially when dealing with a second or third language (TL).

Consequently, the present research concentrates on exploring the multiple dimension connection between multilingualism and academic performance in context with an error analysis framework. As such, the research aims to elucidate some misconceptions/pre-occupational pitfalls that crop up in written English, hence shedding light on the processes that learners undergo when making these easily identifiable grammatical errors in their writing samples, eventually combining the findings to offer a focused instructional intervention that may help improve multilingual learners' writing and, consequently, their general academic achievement. Furthermore, this study also investigates feedback operations and technology appliances for enhancing error self-correcting abilities and enhanced writing skills performance (Garcia & Schleppegrell, 2021; Чайка, 2023; Zhang-Wu, 2022).

1.1 Background of the Study

With the enhancement of globalization, the educational systems across the world have changed and the classrooms are more and more becoming linguistically diverse. Bilingualism is acknowledged to have a major impact on learning outcomes and brains are enhanced by multicompetence and higher order cognitive processes like superior executive control and metalinguistic awareness for learning purposes (Usanova & Schnoor, 2022; Wieschen & Sert, 2018). Nevertheless, there are issues concerning the writing competence of multilingual learners, particularly in monolingual paradigm settings (Zhang-Wu, 2022).

The use of strategies of Translanguaging has turned out to be an effective way of dealing with these challenges. These strategies enable students to use all their language resources, and effectively increase learning participation and retention (Ingrid, 2019, Williamson & Clemons 2022). Fostering a multicultural language environment that embraces cultural and linguistic learner's academic achievement will improve since learners' cognitive and psychological requirements are satisfied (Deng et al., 2020). Furthermore, using the error analysis frameworks in analyzing the grammatical mistakes made by multilingual learners fulfils the purpose of understanding their writing process to offering specific teaching techniques that might be required (Al-Athwary, 2017; Yang & Sun, 2015).

1.2 Purpose of the Study

The purpose of the current work consists in further understanding the complex connection between multilingualism and academic performance, with an emphasis on writing achievement. Implementing the error analysis approach, the study finds out the most frequent grammatical mistakes in compositions of multilingual learners and explores the mental skills underlying such mistakes. These findings provide an enriched insight into difficulties encountered by multilingual writers thereby giving useful information on intervention approaches to improve learners' writing skills and academic achievement.

Moreover, the present research aims to lay a foundation on how the concept of translanguaging practices can be combined into the teaching and learning process regarding multilingual learners. In both cases, the research shows how the discussed strategies of language and literacy education contribute to the identification of students' linguistic identity and support creation of welcoming classrooms where students' linguistic resources can be used to augment learning (Makalela, 2015, Krulatz et al., 2017). Finally, the results must contribute to the multiple literatures on

Multilingual Education; the scope of realising empirical data as the foundation for successful practices that respond to the multilingual learning processing, and which would enhance the key learning achievements of the multilingual learners.

1.3 Research Objectives

1. To identify and categorize common linguistic errors in the writing of multilingual learners in an ESL classroom.

2. To examine the role of interlingual interference from learners' first languages in shaping their English writing errors.

3. To propose instructional strategies that address the linguistic challenges and improve writing proficiency in multilingual learners.

1.4 Research Questions

1. What are the most frequent linguistic errors made by multilingual learners in an ESL classroom?

2. How does interlingual interference from learners' first languages contribute to their English writing errors?

3. What teaching strategies can effectively address these errors and enhance multilingual learners' writing skills?

1.5 Significance of the study

This study is important in highlighting the language and learning concerns of multilingual learners in ESL classes. They advance the body of knowledge in second language acquisition by revealing frequently made mistakes and the effects of interlanguage on learners' English writing. It improves error analysis pragmatics, profiles of grammar, syntax, vocabulary and spelling difficulties, and the relationship between first languages an L2 acquisition focus. It in turn expands the theoretical base of language education and helps better develop the teaching models.

On the practical level, the study provides educators with knowledge of concrete content domains in which MLEs fail or experience difficulties and offers certain suggestions, including the use of scaffolding, rules and patterns, and cultural sensitivity in the classroom. The conclusions are also relevant to generating theories for educational curricula and guidelines to support institutions in developing individual teaching content and distributing funds for preparing teachers. To this end, this study aims to address the identified difficulties to enhance multilingual learners' writing skills, and their achievement rates, and promote a learning community that embraces multiculturalism.

2. Literature Review

The cross-sectional between multilingualism and classroom learning outcomes has received increased interest in educational research. The present literature review goes after to provide an understanding of how learners' multilingual practices in and out of the classroom impact their

learning especially as informed by translanguaging approaches and error analysis. It also looks at the cognitive, emotional, and social aspects of multilingualism, the teacher, and considerations about error analysis.

2.1 Cognitive and Emotional Learning

The evidence presented confirms that teachers should build on the student's linguistic assets to promote participation and equity. Makalela (2015) has pointed out that through translanguaging learners' identities are affirmed and safe emotionally charged learning spaces are constructed. Using students' multiple languages, Wagner (2021) has highlighted that their identities impose a validation that encourages inclusiveness, engagement, and critical thinking. According to Durán & Palmer(2013), the creation of classrooms that are inclusive and support multifaceted communication leads to positive educational processes that improve cognitive and emotional activity.

2.2 Teacher's Role in Multilingual Classrooms

Teachers have a critical role in undertaking the processes of implementing the use of multiple languages. Omidire, (2020) explores complexities in low-resource contexts such as poor preparation for learning in multiple languages. Likewise, Myklevold and Speitz (2021) encourage future research to investigate exclusively teachers' attitudes and practices. These findings reveal the existing policy/practice chasm, with a focus on professional learning needs to support teachers to apply innovative approaches for teaching students in multiple languages.

2.3 Cognitive Benefits of Multilingualism

Bilingual and multilingual students also have better executive functions as managing two or more languages benefit different cognitive control tasks such as attention control and task completion control (Bialystok et al., 2012; Antoniou, 2019). As pointed out by Adesope et al. (2010) and Greve et al. (2021) It is argued that bilingual learners perform significantly better when challenged in tasks that require conflict-solving and thinking in different ways. The benefits of using ESL in attendees' learning process go also to metalinguistic awareness, a factor that aids in language learning and achievement.

Besides the language component, the research identified that multilingualism impacts both feelings and social behaviours. Social and academic situations amongst multilingual learners are effectively managed with more flexibility according to Koch (2024) and Dewaele & Botes (2019). This holistic approach reestablishes the more general advantages associated with ME, and developmental perspectives regarding cognition and emotions.

2.4 Error Analysis as a Methodological Framework

This learning approach of identifying the linguistic difficulty of Multilingual Learners is systematically achieved through the process of error analysis. In this case, Odxacıoğlu et al. (2017) article confirms that various writing errors are caused by interlingual interference, confusion of grammatical rules, and overload of cognition, while in the Catabay (2023) article similar findings were found. These mistakes offer an understanding of learners' thought

procedures and phases that can inform instruction modifications (Catabay, 2023; Hidayat et al., 2020).

Teaching practices are improved via error analysis since this reveals aspects of language which might require enhancement, for example; Grammar, syntax and lexical choice. Javanmiri and Bdaiwi (2021) recommend that formative feedback and peer review be used for working on the mistakes together. Bahari (2024) encourages the utilisation of every aspect of technology such as grammar-checking software for instant feedback, which protects the individuated learner.

2.5 Social and Emotional Dimensions of Multilingualism

Multilingual students should be welcome in the classroom since their multilingualism is recognised and affirmed in classrooms. Makalela and Manik (2024) and Zhou and Mann (2021) believe that the settings improve emotional safety and engagement, and therefore, result in higher engagement. Peer relationships in such environments affect the diffusion of culture and the formation of an effective community, which fosters achievement.

Translanguaging is the ability to use languages as a resource when teaching and learning, this paper explores teachers' perceptions and practices of translanguaging. In this context, translanguaging is a subprocess through which teachers facilitate the development of cultural sensitivity in classrooms. Yüzlü and Dikilitaş (2021) discuss the difficulties of which teachers experience in changing practices, whereas Silalahi (2023) notes the significance of professional learning for efficient MTE. Translanguaging lets the students use all their languages which improves interpretation and analyzing skills (Leonet et al., 2019; Gufron, 2024).

The present literature highlights the multiple Facets of the opportunities that arise from multilingualism and their effects on learning outcomes, such as cognitive, psychological, or social. Research highlights show that multilingual students show improvements in the desirable or higher order cognitive processes, awareness which is meta-linguistic, and flexibility in social skills (Cockcroft et al., 2017; Boumeester et al., 2019). These advantages are accompanied by the implementation of the inclusion of instructional practices that recognize the students' linguistic self-identity and participation, like translanguaging, (Tsimpli et al., 2019; Koch, 2024).

The identification of errors constitutes an essential component in the assessment of the needs of multilingual learners. With an organized pattern for categorizing errors, these educators can enhance learners' writing skills and academic performance significantly (Chung-Fat-Yim et al., 2022; Beaudin & Poulin-Dubois, 2022). Further research ought to expand on learning and multilingualism addressing more uniform error analysis as a way of enhancing education practices in multilingual classrooms (Langeloo et al., 2019).

2.6 Error Analysis Framework

The error analysis framework is a systematic approach used to identify, categorize, and analyze errors made by language learners. This method helps educators and researchers understand the cognitive and linguistic challenges learners face and informs targeted strategies for improvement. The framework categorizes errors into the following types:

1.   Grammatical Errors: Problems with tense usage, subject-verb agreement, article use, and sentence structure.

2.   Lexical Errors: Issues with vocabulary, such as incorrect word choice, spelling mistakes, and misuse of terms.

3.   Mechanical Errors: Mistakes in punctuation, capitalization, and general writing conventions.

4.   Interlingual Errors: Errors caused by the influence of the learner's first language, such as direct translation or non-standard word order.

5.   Intralingual Errors: Errors due to incomplete knowledge of the second language, including overgeneralization of grammatical rules.

Error Analysis Framework Flowchart
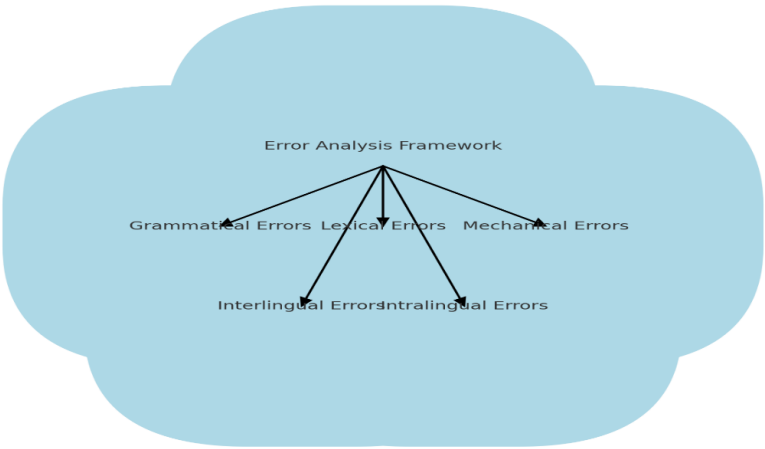
3. Methodology

To fill this knowledge gap, this study adopts an error analysis perspective to examine the interface between multilingualism and classroom learning to ascertain the writing ability of ESMEs as multilingual learners in ESL classrooms. This paper aims to understand the nature of the writing errors commonplace among students and the cognitive processes that predispose learners to such errors, and further, as well as offer practical solutions to teachers on how best to avoid these errors.

3.1 Research Design

The study employs a multiple case research design that allows for the explication of the written samples of multilingual learners in an authentic naturalistic context namely an ESL class. The

study includes the objective to extract patterns of errors and to research the effects of L1 on the English writing process of students.

3.2 Participants

There were 30 multilingual students of age from 8 to 11 years old from Elementary School who attended ESL classes. The participants were selected based on the following criteria:

3.3 Data Collection

Students were asked to write the summary of the poem " Very Far Away" that they had recently studied. These inputs were developed with age suitability and in line with the students' English language learning abilities. Samples of the writing were obtained via one class lesson to reduce variations arising from differing instructions and conditions.

3.4 Data Analysis

The writing samples were analyzed using a structured error analysis framework to identify and categorize errors into the following types:

➤   Grammatical Errors: A carriage feature set of subject-verb agreement, tense usage, word order in sentences, and article usage is all important.

➤   Lexical Errors: Wrong use of words, wrong spelling, and the right use of some words.

➤   Mechanical Errors: Spelling, punctuation and capital letters errors.

➤   Interlingual Errors: This includes any errors such as direct translation or phenomena which create non-standard word order, due to preserved from the first language.

➤   Intralingual Errors: Some of the mistakes that learners make due to lack of adequate knowledge of English include the following Generalizations such as applying the general grammatical rules onto cases.

3.5 Procedure

Sample essays were evaluated for mistakes as per the mistake types mentioned above. Mistakes were also counted before assigning them to their respective density and recurrence. Pattern effects based on the student's language orientation were analyzed by comparing them. The predominant error kinds and the possible sources of the errors in cognitive processes were distinguished and elaborated.

4. Analysis

4.1 General Linguistic Issues Encountered

The writing samples from the ESL classroom presented below reveal several common linguistic issues of multilingual students. These challenges fall into distinct categories based on the error analysis framework:

1. Grammatical Errors

➤ Tense Issues: Most of the students make mistakes in the correct usage of verb tenses and often use wrong tenses for a verb, for example, converting a past tense verb to present tense ("He still remember" instead of 'He still remembers').

➤ Subject-Verb Agreement: Those such as: "His house is now a poor condition," instead of "His house is in a poor condition," indicate the subject's inability to construct correct English sentences.

➤ Article Usage: There is special injustice in using or omitting articles: for instance, such a phrase as "He used to study in dim of light of lanterns" is far from being correct, though very close to "He used to study in the dim light of lanterns."

2. Syntax Errors

It's also advisable to touch on the numerous problems in developing sentence structure which include the following; very many of the constructed sentences in the texts fail to have sound coherence and flow from one to the other without some form of transition needed at some point. For example, 'The sound of floor mills the sound of bells of horses and flight of birds' is broken and the construction is not quite clear' it is not quite discernable what the author meant.

3. Spelling Mistakes

These clumsy and blended words are difficult to remember and this causes people to place wrong spellings such as; "larntens' for lanterns, 'fighthing' for flight, and 'pupeels' for peepul. The account drawn from herein indicates phoneme-grapheme dyslexia, in other words, orthographic and phonological decoding difficulties in English.

4. Lexical and Semantic errors

This lack of appropriate words or translating from L1 puts into question the quality of the coming wording; indeed, such misused words like "fire flights" for "fireflies" or "floor mills" for "flourmills."

5. Mechanics

There was also an obvious lack of necessary punctuation and capitalization: The usage of the so-called ''jotting down'' format (with unnecessary capital letters) and the absence of punctuation (''dim light'' etc.).

6. Interlingual Interference

Some of them indicate, beyond doubt, the interference of the L1 or L1s in the learners' interlanguage. For instance, the use of direct translation of such phrases and the use of localized terms such as 'peepul trees' without a proper word explanation raises the concern of cross-linguistic interference.

This error analysis shows that there are not only signs that there are areas of language deficit but also signals that there is a need to intervene. A number of these mistakes can be brought under control through concentrated correction of grammar, lexical expansion and the use of techniques

to improve the cohesiveness of the student's writing skills that will enhance their academic and career performance skills. The results also underscore the need to create language-positive learning settings where multilingual children's language resources are appreciated and utilized.

5. Discussion

In particular, the results of the present study of errors committed on the writing prompts suggest that multilingual learners in ESL classrooms encounter profound linguistic difficulties. These difficulties are familiar to any learner of a second language and give additional clues to the process of language learning both inside and outside the learner's mind. This section develops these ideas further and reflects on the general importance of these insights for MLAs and pedagogy in the classroom.

5.1 Linguistic Issues and Mental Operations

The need to clarify meaning, as well as many grammatical mistakes including occasional inconsistencies in tense choice and failures to agree on subject and verb in number point to an impaired acquisition of the structure of the English language. This is highly suggestive of a very complex process going on in the mind of multilingual learners, as they switch between L1 and English. The many mistakes made in article use and sentence construction also point to difficulties in the mastery of English as a syntactically different language from those the students are used to in their first languages. These findings are in concordance with previous studies where grammar has emerged as one of the major causes of difficulty in second language acquisition, due to interlingual transfer.

Real and imaginary spelling such as "larntens" for "lanterns" show literacy difficulties in English, less phonemic than in phonographic languages. To discuss all these errors, difficulties in phoneme and grapheme relations may require learning strategies other than phonics-based instruction.

The lexical deficit comes in the form of failure to use appropriate language such that the word fire flights when they are understanding fireflies in the text. They may arise from translating directly from the learners' L1, or a lack of contact with other contextualized English words. This has underlined the importance of approaches to promote usage and effective learning of vocabulary.

5.2 Interlingual influence and cultural aspects

Interference from the first language can also be observed in several examples: the learners transfer linguistic patterns or phrases directly from the first language into English. For instance, literal interpretations of English words and phrases and cultural specificities 'embedded' into the English language, like 'peepul trees' or 'fire beetles,' reflect the learners' cultural and linguistic background. Such influences generally give rise to mistakes, but learners use them to give insights or expressions about their ideas in English. Identifying and combating these factors can facilitate the learners' transition from their L1 to English reducing transmission, hence improving their learning.

5.3 Educational Implications

In the analysis above, these challenges bear important meaning for teaching multilingual learners. The implications of the study suggest teaching strategies that target some areas considered as issues including grammar, syntax, vocabulary, etc. Learner errors include a lack of structure, and therefore, the use of tools like writing frames and drop-down lists eases the organization of learning at this level.

Further, the often-occurring mechanical errors, which comprise punctuation and capitalization, prove the necessity for direct teaching of writing rules. Although these are relatively small mistakes, the effect of all of them is in how coherent and correct the writing of the learners is. The use of peer editing and guided proofreading in the classroom can enhance attention and therefore writing quality.

5.4 Broader Impacts on the Learning Outcomes

The cognitive demands that affect multilingual learners not only concern language development but also concern achievement. Lack of good writing skills can negatively affect the performance of learners in that they are unable to put down their thoughts and views, interact with the material being presented in class and make interactions in class. In this case, intervention can be made to address the challenges to ensure that learners succeed in their learning endeavours in all fields of learning.

The following also highlights the necessity of accepting multiple language learners within a specific classroom setting. Thus, by getting acquainted with the content that is culturally significant and acknowledging the valuable individual language components each learner possesses, teachers can design a more appropriate and thus constructive approach to learning.

5.5 Strengths and Weaknesses

However, the study is less generalizable due to the restricted availability of the data source used with only a limited selection of writing produced within one specific class. It is possible that future developments could broaden the focus by including a pluralistic approach to the essays and to study the effect of various instructional methods on the learners' writing prowess. Furthermore, the analysis of the use of information technologies in overcoming language barriers might bring new ideas on practices of teaching languages effectively.

The discussion underlines complex mutual relationships between language difficulties, mental functioning and educational interventions for MLLs. From analyzing these issues, educators will be in a better position to find solutions on how best to help the learners become better in their language and performance in academic work.

5.6 Educational Implications

The nature of the difficulties evidenced by writing mini-essays is exactly the essential information about the cognitive and instructional profiles of multilingual learners. Solving these issues becomes essential to enhance language learning and academic achievement.

1. Specific grammar teaching

Finally, issues such as tense, subject-verb agreement, and pre and post- articles demonstrate that definite areas of grammar need to be addressed. Such topics should also be explained to the students along with delivering the correct feedback during writing assignment Five, thus ensuring that the students grasp English grammar rules better.

2. Improved Thinking Skills

These points raised concerning the misuse of certain words indicate that learners require programmes for vocabulary development. This might include contextualized word learning, the use of semantic maps, and the reading of vast numbers of texts that would increase students' size of usable vocabulary.

3. Writing Integrated Promotion

More often syntax errors and the existence of short one- or two-sentence paragraphs suggest that the student requires direction regarding writing coherence and cohesion. There is an impact on how teachers manage to direct learners on how to align their ideas logically, use correct conjunctions and even build lengthy sentences.

4. Orthography and Phonetics

This paper aims to seek evidence on the following research questions: What and where spelling errors are, and how spelling errors reflect gaps in understanding English spelling patterns? This is true because undertakings like phonics-based learning and word analysis exercises are likely to serve these interests.

5. Inter-Cultural Sensitivity

From Transfer and Interference, a close unit of the learners' L1 can be observed in their written English. The direct translation is avoided due to the contrastive analysis which helps teachers make the learners perform a better comparison between English and first language.

6. Presentation and Mechanics

Grammar mistakes are one of the reasons for pointing out the importance of direct teaching of specific writing conventions. Self-generated and peer-generated proofreading and editing tasks should also promote the focus on care for details.

5.7 Lesson Suggestions

1. Differentiated Teaching

Aware of the fact that most of the multilingual learners come from different language backgrounds, learning should be individualized. Diagnostic tests then assist the teacher in pointing out the aspects that require improvement in detail.

2. Writing Probes or Writing Frames

Giving students sentence prompts as well as graphic aids and templates to use while writing will assist them minimize mistakes made through improper organization of their ideas.

3. Integrated Feedback

Voicing written output from time to time and highlighting the positives together with the negatives will help to encourage students and to direct the learning process.

4. Technology Integration

Programs like spell checkers, grammar check software, and language learning software can always give the correct usage patterns once unnoticed and rectify them.

5. Cultural Context Integration

Integrating culturally sensitive content in writing prompts can help the students relate to their first language and English making learning easier.

6. Conclusion

This study discusses the interconnection between multilingualism and classroom learning and presents cognitive and linguistic demanding aspects for multilingual learners within an ESL setting. Applying an error analysis perspective, the research categorized all the errors in grammar, vocabulary, mechanics and syntax of the second language (L2) and noticed patterns that are interlingual and intralingual. Such insights into the cognitive processes that lie behind learners' writing can be hailed as valuable and may include the systematic transfer of L1 syntactic patterns and the overgeneralization of grammatical rules in English.

The results emphasize the duality of multilingualism: though it provides students with several learning benefits, including improved organizational and problem-solving skills and better language awareness, it poses several instructional issues in academic writing. These findings reflect the nature of the syntactic and lexical errors regularly made and support the need for direct teaching of grammar, and vocabulary development, as well as the provision of appropriate learning supports. In this regard, the study emphasizes the need for teachers to use instructional strategies like translanguaging, in recognition of the linguistic resources, learners bring to the classroom and to promote an emotionally safe learning climate.

Mitigation of these linguistic difficulties will enable educators not only to help multilingual learners write better but also perform better in general. It brings empirical evidence to the research on multilingual education and highlights the need to pay attention to the needs of multilingual learners. It is recommended that students and teachers carry out further research emphasizing the relationship between multilingualism and cognitive factors as well as instructional practices in heterogeneous learning environments, to promote effective learning.

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