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PROGRESS QUANTIFIERS AS A DIGITAL TOOL FOR ACADEMIC SUCCESS IN ADVANCED SPANISH EDUCATION

CUANTIFICADORES DE PROGRESO COMO HERRAMIENTA DIGITAL PARA EL ÉXITO ACADÉMICO EN LA EDUCACIÓN DE ESPAÑOL AVANZADO

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Progress Quantifiers as a Digital Tool for Academic Success in Advanced Spanish Education

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ABSTRACT

This study examined the impact of Progress Quantifiers, a digital tool designed by the researcher, to foster self-regulated learning on students' academic performance in an advanced Spanish course. Conducted at South Mecklenburg High School, located in Charlotte, North Carolina, United States, the research compared pretest and posttest results to assess the effectiveness of this tool in improving students' autonomy and linguistic skills. Grounded in self-regulation and motivation theories, the study highlighted the role of structured self-assessment in enhancing student engagement, organization, and academic achievement. A quasi-experimental design was used, with a quantitative approach, collecting data from pretest and posttest assessments. The findings revealed a statistically significant improvement in students' performance across four language skills—listening, speaking, reading and writing—while demonstrating the efficacy of Progress Quantifiers in fostering metacognitive awareness and self-directed learning. The study underscored the importance of digital educational tools in modern language instruction and their role in supporting autonomy and motivation. It also emphasized the necessity of continuous feedback from educators to guide student learning. These findings contribute to the broader discussion on integrating technology into educational settings to promote academic success and lifelong learning strategies.

Keywords: self-regulated learning, academic performance, progress quantifiers, digital assessment tools, motivation

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Cuantificadores de Progreso como Herramienta Digital para el Éxito Académico en la Educación de Español Avanzado

RESUMEN

Este estudio examinó el impacto de los Cuantificadores de Progreso, una herramienta digital diseñada por la investigadora para fomentar el aprendizaje autorregulado en el rendimiento académico de los estudiantes de un curso avanzado de español. La investigación se llevó a cabo en la escuela secundaria South Mecklenburg, en Charlotte, Carolina del Norte, Estados Unidos, comparó los resultados de pretest y postest para evaluar la efectividad de esta herramienta en la mejora de la autonomía y las habilidades lingüísticas de los estudiantes. Basado en teorías de autorregulación y motivación, el estudio resaltó el papel de la autoevaluación estructurada en la mejora del compromiso, la organización y el éxito académico de los alumnos. Se utilizó un diseño cuasiexperimental con un enfoque cuantitativo, recopilando datos a partir de evaluaciones de pretest y postest. Los hallazgos revelaron una mejora estadísticamente significativa en el desempeño de los estudiantes en cuatro habilidades lingüísticas—escuchar, leer, hablar y escribir—demostrando la eficacia de los Cuantificadores de Progreso en el desarrollo de la conciencia metacognitiva y el aprendizaje autodirigido. El estudio subrayó la importancia de las herramientas educativas digitales en la enseñanza moderna de idiomas y su papel en el fomento de la autonomía y la motivación. También enfatizó la necesidad de una retroalimentación continua por parte de los educadores para guiar el aprendizaje de los estudiantes. Estos hallazgos contribuyen a la discusión sobre la integración de la tecnología en los entornos educativos para promover el éxito académico y estrategias de aprendizaje a lo largo de la vida.

Palabras clave: aprendizaje autorregulado, rendimiento académico, cuantificadores de progreso, herramientas de evaluación digital, motivación

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INTRODUCTION

Education in the 21st century demands new approaches to teaching and learning that align with the realities of a fast-evolving, technology-driven world. In particular, Generation Z (Gen Z) students, those born in the last two decades and into an era of digital connectivity, can present unprecedented challenges for educators. These students, often referred to as “Thumbelinas” due to their reliance on mobile technology, have immediate access to vast amounts of information yet struggle with time management, organization, and setting academic goals (Serres, 2013). Gen Z students require educational methodologies that integrate technology with structured yet flexible learning frameworks (Garrido et al., 2022).

Traditional pedagogical models, which emphasize rigid structures and external motivation, often fail to engage these learners effectively. Consequently, it is crucial to explore innovative strategies that foster autonomous learning, allowing students to take ownership of their educational process while sustaining motivation and long-term academic achievement. The need for a structured but flexible tool to guide their progress, encourage self-reflection, and develop goal-setting behaviors is evident. Research suggests that self-assessment strategies play a vital role in fostering academic resilience and self-regulation (Garay et al., 2023), yet there is a gap in practical, digital tools that systematically support this process.

The lack of autonomy in students has been linked to low academic performance, increased anxiety, and lack of motivation in educational settings (Han, 2012). The challenge for educators, therefore, lies in developing tools that not only track academic progress, but also empower students to take control of their learning journey. Garay et al. (2023) highlight that fostering self-efficacy and motivation in students is essential for academic success. Their study emphasizes that when students are actively engaged in monitoring their own progress—through tools that allow reflection, self-assessment, and goal setting—they develop higher levels of self-regulation.

Similarly, Han (2012) argues that the stress of constant performance evaluation in modern education can hinder motivation, unless students are given the ability to track and understand their own learning process in a meaningful way. Pintrich and Schunk (2006), as cited by Valiente Barroso et al. (2020), indicate that there is a reciprocal relationship between motivation, learning, and performance, as

motivation has a direct influence on learning and task execution. In this way, what students learn and perform tends to either increase or decrease their motivation, thereby affecting it.

The central objective of this research was to determine the influence of Progress Quantifiers, a digital tool designed by the researcher, on the development of autonomous learning and academic performance among Advanced Placement (AP) Spanish students at South Mecklenburg High School in Charlotte, North Carolina, United States. This article analyzes the preliminary research findings, focusing on the comparison of the changes in academic performance of AP Spanish students before and after the intervention with Progress Quantifiers. The tool aims to optimize academic performance, as well as to empower students by enabling them to reflect on their learning process, identify strengths, and work on areas of improvement. As a result, this approach contributes to both their immediate academic success and their ability to proactively address future educational challenges.

Throughout history, education has undergone multiple transformations, integrating tools aimed at measuring and improving autonomous learning and academic performance. The origins of such tools date back to the early 20th century, when educators began utilizing quantitative data collection methods to assess student performance. Over time, these instruments have evolved, incorporating various didactic tools and research methodologies such as surveys, observations, and intervention-based assessments. Their implementation, as seen in Progress Quantifiers, has had a significant impact on fostering students' ability to self-assess progress, identify strengths and weaknesses, set and improve academic performance and goals.

The proposed tool, Progress Quantifiers, is a self-assessment tool that allows students to track their academic development in real time, enabling them to reflect on their strengths, weaknesses, and areas for growth. While similar tools exist in fields such as health and business—tracking progress in fitness or personal productivity—their implementation in education is still underdeveloped. This study aimed to fill this gap by introducing Progress Quantifiers, which is designed to provide real-time feedback, personalized goal-setting mechanisms, and a simple interactive interface that facilitates student reflection on their academic progress. Given the increasing demand for holistic academic profiles in higher education—where students are expected to demonstrate excellence not only in grades but also in extracurricular activities, leadership, and self-management—it becomes imperative to provide this new

generation with effective strategies for self-assessment and academic progress tracking (Garay et al., 2023).

This study highlights the impact that the implementation of these kinds of tools can have on the final academic performance of high school students. These tools can be designed by teachers in the language classroom and can integrate technology and pedagogy to personalize learning and facilitate self-assessment to various levels of language learning. They aim to optimize academic performance and to empower students by enabling them to reflect on their learning process, identify strengths, and work on areas that require more development. As a result, this approach contributes to their immediate academic success and, at the same time, their ability to proactively address future educational challenges.

Zimmerman and Kitsantas (2005), as cited by Admiraal et al. (2024), outline a four-stage progression essential for the effective development of self-regulated learning strategies: observation, emulation, self-control, and self-regulation. In the observation stage, students acquire knowledge by observing a model and receiving verbal guidance. The emulation stage involves skill development through practice and feedback, allowing students to refine their abilities and correct errors. During the self-control stage, learners set goals and independently monitor their performance. Finally, in the self-regulation stage, students demonstrate the ability to apply self-regulation strategies autonomously across various learning activities.

Aligned with this theoretical framework, the integration of Progress Quantifiers in this study followed a structured, progressive approach. The researcher initially designed the digital tool using Google Slides, ensuring that each component was tailored based on data collected from student and teacher surveys, as well as direct classroom observations. This process aimed to reinforce identified strengths while addressing challenges related to the incorporation of self-assessment tools within the AP Spanish curriculum. The customized design of the tool sought to enhance student engagement with self-regulated learning strategies and facilitate the effective integration of formative assessment practices in the language learning environment.

Advanced language learning involves more than acquiring technical knowledge, such as vocabulary or grammar; it also requires students to develop higher-order skills such as critical expression, analytical thinking, and problem-solving in real communicative contexts. These challenges affect both students,

who must adapt to the demands of deeper learning, and teachers, who need to design innovative strategies that go beyond traditional methodologies. Based on constructivist principles, such as those proposed by Vygotsky (1978), this study addresses the immediate benefits of these strategies in the improvement of academic performance as well as their potential to equip students with transferable skills for academic and professional contexts.

Language learning at advanced levels can present significant challenges for both students and educators. In this context, the development of contemporary pedagogical strategies becomes essential to ensuring meaningful and sustainable learning. Through the implementation of this tool, the study sought to transform traditional classroom dynamics by centering learning on the student, promoting self-awareness, while enhancing linguistic and cognitive skills. As noted by Panadero (2017), self-regulated learning involves students planning, monitoring, and evaluating their own progress through a process that seeks advancement in their immediate academic performance and at the same time prepares them to face future challenges autonomously and effectively.

A systematic review by Duarte et al. (2024) at the University of London analyzed self-regulated learning strategies in students from elementary to high school. Their findings indicated that self-regulation is predominantly studied in English-speaking countries, with a higher acceptance rate among upper secondary and higher education students. The study underscored the relevance of self-regulation in reading comprehension and second language acquisition, reinforcing the role of tools such as the one presented in this article for fostering these competencies.

Covarrubias et al. (2024) conducted a joint study between the Central University of Chile and the University of San Sebastián in Spain, exploring the influence of self-efficacy on academic goals and the mediating role of self-regulated learning. Using a quantitative, non-experimental, cross-sectional design with 231 university students, their findings demonstrated a direct relationship between self-efficacy and academic goal setting. The study highlighted that student with higher self-efficacy exhibited stronger self-regulation, supporting the notion that self-regulated learning fosters academic achievement.

Han (2012) argues that the contemporary academic environment, often burdened by performance-driven pressures, risks undermining genuine learning experiences. To counteract this, educators must design learning experiences that challenge students intellectually and which also promote a sense of control

and self-efficacy in their educational journey. This perspective aligns with Garrido et al. (2022), who assert that personalized learning opportunities afforded by digital tools can significantly enhance student engagement and foster metacognitive awareness.

In the context of language acquisition, research has demonstrated that self-assessment and metacognitive reflection significantly improves student outcomes. Wang & He (2020) highlight the lack of research on portfolio-based evaluations beyond writing proficiency, underscoring the need for holistic, multimodal tools that support language learners in multiple skills. Additionally, Garrido et al. (2022) note that the integration of digital resources into daily learning routines enhances both motivation and retention by aligning with students' existing digital habits.

The integration of digital self-assessment tools has the potential to bridge the gap between structured academic requirements and the flexible, immediate feedback that Gen Z learners seek. When students are given control over decisions related to instruction and curriculum design, they are provided with opportunities to engage in experiences that foster self-regulated learning. Pérez-Robles et al. (2023) further emphasize that the implementation of self-assessment as an evaluative method should be gradually integrated into the language teaching-learning process and sustained across subsequent years of study. This progressive incorporation ensures that students develop the necessary skills to critically evaluate their own learning, enhancing their autonomy and engagement in the educational process.

METHOD

This study followed a quantitative approach and was grounded in the positivism paradigm, as it aimed to describe and explain phenomena through the collection and analysis of quantitative data. The research sought to gather information on students' academic performance by examining the development of autonomy through the use of Progress Quantifiers. The study employed a deductive method which allows the researcher to draw conclusions based on theoretical foundations and empirical data.

The study follows a correlational approach, measuring and analyzing the relationships between two key variables: autonomy (independent variable) and academic performance (dependent variable). A quasi-experimental design was applied, featuring a pre-test and posttest structure to evaluate the effectiveness of Progress Quantifiers in enhancing students' language skills – speaking, writing, listening, reading.

The study was conducted with 50 students from the AP Spanish Language and Culture course at South Mecklenburg High School, divided into two class groups.

Table 1. Equivalency between Communicative Skills and AP Spanish Language and Culture exam Questions

Communicative Skill	AP Question Type
Oral	- Simulated Conversation - Cultural Comparison
Writing	- Email Response - Argumentative Essay
Listening	- Interpretation of Combined Texts (Printed & Audio) - Interpretation of Audio only texts
Reading	- Interpretation of Printed Texts - Interpretation of Combined Texts (Printed & Audio)

Note: Own construction based on Collegeboard.org (2024)

Data was collected through direct classroom observations, structured questionnaires, and standardized academic assessments. This article focuses on the results of the pre- and post-tests, which were designed to measure students' academic language skills before and after using the Progress Quantifiers tool. The collected data from the direct observation tool was analyzed using Atlas Ti software, which enabled the visualization of results through comparative tables and graphical representations. This method ensures that the study maintains rigor and objectivity, providing valuable insights into the impact of self-regulated learning tools on student performance in AP Spanish education.

Ethical Considerations

This study adhered to strict ethical guidelines, ensuring that confidentiality protocols were upheld, the role of the teacher-researcher remained clearly defined, and all collected information and data were used exclusively for research purposes. Prior to their participation, individuals received a detailed explanation of the study, allowing them to make an informed decision. Participants provided written informed consent, which outlined key aspects such as the nature of the research, the expected duration of involvement, potential risks and benefits, and, most importantly, their voluntary participation.

RESULTS AND DISCUSSION

The following section presents the preliminary results obtained from the pretest and posttest conducted as part of the evaluation process for the implementation of Progress Quantifiers and their impact on the

academic performance of the students under study. As previously explained, both assessments were designed to measure students' communicative skills across four main areas: listening comprehension, oral expression, reading comprehension, and written expression.

The data analysis aimed to identify students' strengths and areas for improvement before and after the educational intervention with Progress Quantifiers, as well as to assess their impact throughout the study. The results are presented comparatively, highlighting changes in overall performance between both assessments, with a particular focus on the average scores achieved for each skill. Through this analysis, the study sought to demonstrate students' progress in their communicative competencies and provide a comprehensive perspective on learning, identifying areas that require a more targeted pedagogical approach to further support their academic and personal development.

Table 2. Results obtained in the pretest and posttest assessments and the average score per language skill

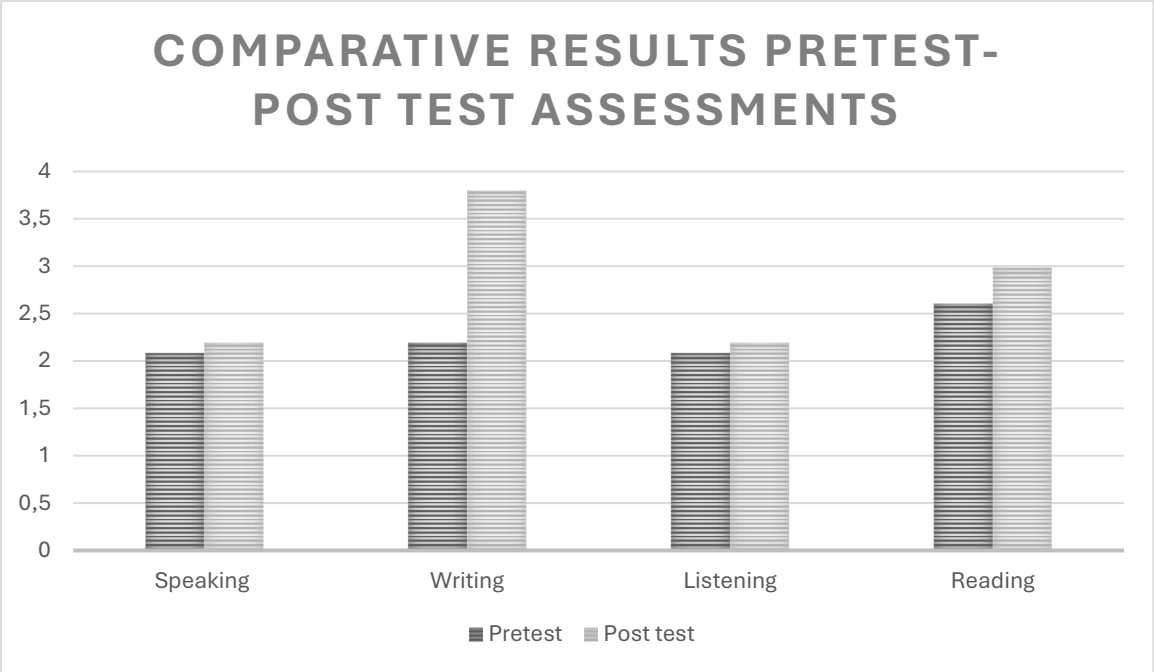
Comparative results between the Pretest & Post Test assessments														
Total number of students: 50														
Skill	**Pretest Score/Number of students who obtained the score**						**Average**	**Post test Score/Number of students who obtained the score**						**Average**
	0	**1**	**2**	**3**	**4**	**5**		**0**	**1**	**2**	**3**	**4**	**5**	
Speaking	7	2	2	5	14	20	2.08	0	1	7	19	16	7	2.19
Writing	19	3	1	5	6	16	2.19	4	10	4	11	10	11	3.79
Listening	2	3	7	12	20	7	2.08	5	3	19	16	6	1	2.19
Reading	4	3	12	16	8	7	2.60	1	5	12	8	14	10	2.98

Note: Own construction

The comparison of pretest and post test scores highlights the significance of structured self-assessment in improving students' performance and engagement.

The above table is accompanied by a bar graph, which complements the presentation of the results from the pretest and posttest. This allows for a clear and comparative visualization of the data, facilitating its interpretation and enriching the analysis by providing a more precise representation of the obtained data.

Table 3. Comparative results obtained in the pretest and posttest assessments per language skill



Note: Own construction

The comparison of the overall average scores in the pretest and posttest in the oral proficiency reveals an increase of 0.11 points (from 2.08 in the pretest to 2.19 in the posttest). While this change is modest, it indicates a growth in students' oral skills following the implementation of the Progress Quantifiers and throughout the evaluated learning period. The rise in the average score also reflects a positive trajectory in oral proficiency, which can be attributed to the adaptation of strategies embedded in the design of the Progress Quantifiers. These strategies were adjusted based on the findings from pre-intervention assessment tools, enabling a more tailored and effective implementation of the tool.

Although the 0.11-point climb suggests a limited impact, it may also indicate that students require a more intensive or extended approach to achieve more substantial amelioration. It is essential to consider that students at the beginning of the study presented a mid-to-low proficiency level, which may have resulted in slower progression. According to Figueroa-Vidal and Intriago-Macías (2022), one of the challenges in oral proficiency development lies in the methodologies employed in the classroom, which may create deficiencies and restrict language learning to less-explored areas. Consequently, it is crucial to design pedagogical strategies and integrate technological tools that facilitate the enhancement of linguistic skills, not only in oral production but also in listening comprehension, writing, and reading.

Additionally, the results suggest that incorporating more opportunities for oral practice in authentic and diverse contexts could support the overall class average along with benefiting students who require additional learning support or have individualized learning plans. While the observed increase indicates a positive trend in oral proficiency, there is a clear need to further refine and enhance practice strategies, reflective support, and progress-tracking mechanisms to maximize the impact and foster more significant advancements in students' oral abilities.

In contrast, the pretest and posttest results for writing proficiency show a substantial improvement in the overall group average, rising from 2.19 in the pretest to 3.79 in the posttest. This 1.60-point change signifies a remarkable growth in students' writing skills after using the Progress Quantifiers. Moreover, this data suggests that the pedagogical strategies implemented were effective in fostering writing development. The better performance observed may be linked to a well-structured instructional approach that placed greater emphasis on writing proficiency.

Additionally, the feedback process, facilitated through the Progress Quantifiers, appears to have played a crucial role in students' ability to identify, reflect upon, and subsequently overcome their areas for advancement more efficiently. These findings further suggest that students enhanced their writing skills and also achieved significantly higher levels of performance compared to their initial proficiency, which in turn contributed to the boost in their confidence and motivation as they recognized their own progress. The substantial increase in the overall group average underscores the effectiveness of the pedagogical practices implemented through the Progress Quantifiers, reinforcing their role in optimizing the teaching-learning process. These results also highlight the necessity of continuously strengthening educational strategies that promote similar progress in other language skill areas. As Boscán (2023) explains, given that each language has unique codes and stylistic conventions, developing writing proficiency in a target language can be a complex and demanding process. This highlights the importance of implementing practical strategies that facilitate amplification and foster the production of high-quality written work.

Regarding the pretest and posttest results for listening comprehension, the group's overall average rose slightly from 2.08 in the pretest to 2.19 in the posttest. This 0.11-point difference reflects a marginal growth in listening comprehension following the intervention with Progress Quantifiers. Although this

progress appears limited, the overall better performance remains a positive indicator. Nevertheless, the relatively smaller impact suggests that listening comprehension presented specific challenges that were not fully addressed during the instructional period or the implementation of the tool.

Several factors may have influenced the limited progress in listening comprehension. One notable challenge relates to students' familiarity with different accents and speech rates. It is likely that students struggled with understanding various accents or the speed of speech in the listening materials. Another key consideration involves the nature of listening skill development, as students may require more exposure to authentic and diverse listening exercises. Ros Cócera (2024) highlights that research over the past decades has emphasized the importance of providing students with materials that reflect real-life language use. This includes integrating diverse dialects, linguistic registers, and varied topics into listening comprehension exercises.

Additionally, some students may have experienced anxiety or a lack of confidence when engaging with listening tasks, which could have hindered their overall performance. While the observed positive change in the overall average suggests some progress in listening comprehension, the results indicate the need for more targeted and structured strategies to ensure more significant skill development in this area.

Finally, the pretest and posttest results for reading comprehension reveal a notable improvement in student performance. The overall average increased from 2.60 in the pretest to 2.98 in the posttest, reflecting a 0.38-point rise in the scores. While this change is not dramatic, it demonstrates a consistent and positive trend in students' reading abilities following the implementation of the Progress Quantifiers. The growth observed suggests that the instructional strategies applied during the study period had a meaningful impact on reading proficiency.

The data further indicates that the strategies integrated into the Progress Quantifiers effectively contributed to students' reading development. The advance in the overall average suggests amelioration in key areas such as identifying main ideas, understanding specific details, interpreting meaning, and engaging in critical text analysis. This level of progress can likely be attributed to various factors, including frequent exposure to reading materials, effective feedback mechanisms—such as personal reflection, detailed reviews of final products, and structured corrections—clear and concrete rubrics,

specific feedback on areas that need to be amplified, and thorough tracking mechanisms that enabled students to adjust their reading approaches accordingly.

Additionally, the selection of engaging, relevant, and level-appropriate reading materials may have contributed to higher student participation and effort in reading activities. Paucar et al. (2024) emphasize that fostering reading habits should not be based on coercion or external obligations imposed by parents or educational institutions. Instead, it is essential to guide students toward developing autonomy by encouraging them to cultivate reading habits aligned with their personal interests and aspirations rather than restricting them to predetermined influences from schools or families.

The observed boost in the overall reading comprehension average, from 2.60 to 2.98, serves as a positive indicator of the Progress Quantifiers' impact. While the progress is significant, there remains room to reinforce reading strategies and achieve more profound skill development. This analysis highlights the effectiveness of the implemented pedagogical approaches and underscores the importance of continuously strengthening reading competencies in future instructional cycles.

Speaking Performance

A modest increase was observed in speaking proficiency, with the average score increasing from 2.08 to 2.19. While the progress was slight, it suggests that the structured use of Progress Quantifiers contributed to a more reflective approach to oral communication. However, further integration of real-life conversational practice and feedback mechanisms may be needed to achieve a more significant impact.

Writing Performance

The most significant growth was noted in writing, where the average score increased from 2.19 to 3.79. This substantial gain suggests that the ability to self-monitor, track progress, and apply structured reflection strategies greatly enhanced students' written proficiency. The findings align with research on self-regulation and metacognition, which emphasizes the importance of frequent practice and feedback in writing development (Panadero, 2017; Boscán, 2023).

Listening Performance

The listening section showed a slight improvement, with the average score rising from 2.08 to 2.19. While this raise was limited, it underscores the challenges students face in auditory comprehension,

particularly regarding accent variation and speech rate. These results highlight the need for additional exposure to diverse audio materials and active listening exercises (Martínez et al., 2020).

Reading Performance

Reading scores demonstrated a positive trend, with the average increasing from 2.60 to 2.98. The amelioration suggests that structured reading strategies, integrated into the Progress Quantifiers, supported comprehension and critical analysis skills. However, further reinforcement through engaging texts and personalized reading strategies could enhance outcomes further.

The study supports previous research indicating that self-regulated learning strategies improve academic performance (Zimmerman, 2002; Panadero, 2017). The findings reveal that tools like Progress Quantifiers not only aid in tracking progress but also play a role in motivating students to take ownership of their learning. Furthermore, the study underscores the need for ongoing teacher guidance, as students benefit most when provided with structured feedback alongside self-assessment tools. Moreover, the findings suggest that integrating technology into language education can enhance both student engagement and long-term retention of language skills.

CONCLUSIONS

Digital self-assessment tools enhance autonomy and motivation. Progress Quantifiers helped students take ownership of their learning, promoting self-awareness and active engagement in their academic progress. Academic improvements were evident across all language skills, particularly in writing. The most substantial gains were observed in written proficiency, emphasizing the role of structured reflection in enhancing literacy skills. The self-regulation process requires consistency and adaptation. While some skills improved significantly, others, such as listening, require additional reinforcement and practice. Educators play a critical role in fostering autonomy. While digital tools support self-assessment, teacher feedback remains essential to help students refine their learning strategies. Personalized learning strategies should be expanded. The integration of interactive reading, listening exercises, and contextualized writing tasks can further enhance the impact of Progress Quantifiers. The study demonstrates that integrating digital self-assessment tools into language education has the potential to enhance learning autonomy and academic success, paving the way for more student-centered, technology-integrated pedagogical approaches in the future.

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