Exploring the efficacy of writing comics as a tool for enhancing EFL writing skills of undergraduate Ecuadorian polytechnic students

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Abstract

Purpose – This paper aims to identify the effectiveness, student perceptions and impacts of integrating comics into the English as a foreign language (EFL) writing curriculum for undergraduate Ecuadorian polytechnic students.

Design/methodology/approach – This research followed a mixed method design to obtain quantitative information through a researcher-made survey and paired T-test, which would be corroborated by the qualitative data obtained from semistructured interviews.

Findings – From the descriptive and T-test results and the interview answers, it is concluded that students have a favorable view of the effectiveness of using comics to improve their writing skills. They also expressed their engagement and motivation to work with comics.

Research limitations/implications – First, the research sample, comprised of 109 students, may restrict the generalizability of the findings beyond the specific context of this study. This constraint suggests caution in extrapolating these findings to broader student cohorts, emphasizing the need for larger-scale studies to validate the robustness and applicability of the outcomes. Second, the study's focus solely on students from a polytechnic state university introduces a potential limitation concerning the diversity and representativeness of the participant pool. Consequently, the findings might be limited in their applicability and may not fully encompass students' varied responses and attitudes from other educational backgrounds.

Practical implications – The scaffolding afforded by comics aligns with genre-based literacy perspectives, valuing instruction in textual genres and social purposes. From a practical pedagogical point of view, this paper's results suggest the potential of comic narratives and storyboarding. Comics writing could be added to classroom activities to vibrantly aboard brainstorming, drafting and peer reviewing before dealing with higher-stakes assignments. Legitimizing alternative mediums like comics for academic writing tasks has social implications for promoting literacies in a multimedia world.

Social implications – Writing comics nurtures multiliteracies aligned with participatory digital cultures by expanding traditional linguistic-centric norms. This multimodal composing can potentially increase access and representation and amplify voices across identities and cultures.

Originality/value – Although the paper addresses a topic that is not entirely novel in research, its originality lies in its focus on data originating from Ecuador, where specific cultural nuances and educational

contexts may influence the effectiveness of using comics to enhance EFL writing skills. Thus, it fills a gap in the existing literature on this subject.

1. Introduction

The acquisition of English for speakers of other languages is essential for its status as a lingua franca (Baker, 2021; Zeng *et al.*, 2022). Through English, individuals from diverse linguistic and cultural backgrounds can be connected. English proficiency bridges education, business, science, technology and international communication opportunities to access information, academic resources and professional networks (Abbas *et al.*, 2021). It eases cross-cultural communication and global collaboration and actively allows people to participate in today's worldwide economy and society. For Sinaga and Pustika (2021), for many people, learning English has become a gateway to higher education opportunities, better job prospects and mobility in an interconnected world. Thus, acquiring English as a foreign language (EFL) skill is relevant in attaining individual growth and facilitating people's presence in the global community.

Moses and Mohamad (2019) ascertain that students face multiple challenges while learning a foreign language in their pursuit of proficiency in writing. The scholars continue saying that among the challenges students face is the struggle with vocabulary and grammar. Unfamiliarity with English grammar rules and a limited lexicon often hinder students' attempts to articulate their thoughts cohesively (Labicane, 2021). The intricacies of drafting grammatically accurate sentences using adequate vocabulary to convey nuanced ideas present students with significant barriers. These disparities hinder the clarity and cultural appropriateness of learners' writing pieces.

Moreover, students' fear of making mistakes (Rahmat, 2019) and the scarcity of practice opportunities (Chien *et al.*, 2020) make them hesitant to express their ideas freely on paper, hindering the necessary exploration and experimentation fundamental to honing writing skills. Additionally, meager feedback and direction increase these obstacles, making learners work independently to rectify them (Tian and Zhou, 2020). The limitations of time, primarily when writing is taught as part of the text used and not in a separate class, usually become a restriction on the depth of the writing practice, notwithstanding, the required time for revision and redrafting learners' compositions impede them to deliver a polished work (Toba *et al.*, 2019).

The adequate use of writing skills highly influences language acquisition and communication since they impact cognitive, linguistic and social development (Selvaraj and Aziz, 2019; Bailey *et al.*, 2020). Competent writers need a deep understanding of language structure, grammar, vocabulary and syntax. Kurniasih *et al.* (2020) ascertained that correctly using the above can aid students in reinforcing their linguistic proficiency.

Through writing, learners internalize linguistic patterns and refine their understanding of a language, improving receptive and productive skills alike Atmowardoyo and Sakkir (2021). Furthermore, writing aids learners in their cognitive development as it fosters critical thinking (Wale and Bishaw, 2020), analytical reasoning (Cullen *et al.*, 2018) and problem-solving abilities (Sari *et al.*, 2021). Regular writing practice encourages students to be coherent when organizing their thoughts, articulate complex ideas and convey information effectively. Therefore, fostering writing skills will improve communication skills (Estrella, 2018).

1.1 Research questions

The following research questions delve into the effectiveness, student perceptions, challenges and impacts of integrating comics into the EFL writing curriculum for undergraduate Ecuadorian polytechnic students:

RQ1. To what extent do Ecuadorian undergraduate polytechnic students perceive comics' usefulness in enhancing their writing skills?

RQ2. What are Ecuadorian undergraduate polytechnic students' attitudes and motivations toward this teaching approach?

RQ3. How does writing comics as a teaching tool impact Ecuadorian undergraduate polytechnic students' writing proficiency?

RQ4. What specific linguistic aspects show improvement among Ecuadorian undergraduate polytechnic students who write comics?

To answer the above research questions, the researcher managed to recruit the cooperation of 109 respondents.

2. Literature review

According to Cohn *et al.* (2023), writing comic books is an art form that combines linguistic and cognitive elements to produce a story for a visual audience. Various cognitive processes and language factors shape character, plot, dialogue development and storytelling throughout the comic writing process (Cohn *et al.*, 2020).

2.1 Cognitive and linguistic aspects involved in comic book writing

Writing comic books requires an interplay of cognitive and linguistic aspects. Laubrock and Dunst (2019) ascertain that creating comic books comprises a fusion of visual and textual elements, which requires understanding cognitive processes and linguistic techniques to convey the story effectively. Moreover, comic book writing depends on perception, attention and memory, which are significant cognitive processes (Cohn, 2019). Furthermore, comic book writers must rely on various cognitive functions, including mental imagery, crafting narratives that evoke mental images and exploiting the reader's ability to visualize the events portrayed in the comic in their minds (Alqadi, 2023).

Dialogue, narration and sound effects are some linguistic aspects of comic book writing. According to Jones (2019), the comic book writer uses dialogue as the primary means to develop characters and plots. Writers must be proficient in dialogue techniques to effectively transmit emotions, personalities and relationships (Wijaya *et al.*, 2021). Comic book writers must understand how to use speech patterns, idiomatic expressions and colloquial language to create authentic and relatable characters. The way writers narrate their comics bridges visual and textual elements (Rivo-López *et al.*, 2022), catering to the context, background information and inner thoughts of the book's characters.

Writing comic books implicates a distinct form of storytelling, using sequential and nonlinear narrative techniques. Klaehn (2020) explains that writers use the concept of panel-to-panel storytelling to effectively structure the progression of events, ensuring a coherent flow of the story from one panel to the next. Within their writing, according to Jones (2019), comic book writers use techniques like visual transitions, splash pages and page layout to control the reader's emotional engagement. They must also be aware of space limitations as each panel has a finite area to convey the required information. Thus, balancing concise

storytelling with depth and complexity demands the knowledge to maximize the story's impact within those limitations.

2.2 Psychological theories behind comic book writing

Several psychological theories play a central role in creating compelling narratives, developing characters and engaging audiences.

Understanding human cognition, emotions and behavior is critical when writing stories that resonate with readers. Williams (2017) mentions the concept of the hero's journey, a phrase coined by Joseph Campbell. This theory outlines a universal pattern found in myths, legends and narratives (Grice, 2019). It details the protagonist's life-changing journey, facing adventures, trials and triumphs. It is this structure that comic book writers most commonly use to develop superhero characters (Kabir, 2021), having them confront personal challenges, grow in the face of adversity and eventually become victorious, allowing readers to relate to their adventures and triumphs.

Another theory that applies to character development within comic book writing is the attachment theory (Saez de Adana, 2018; Fitzmaurice, 2020), which focuses on creating long-term relationships and suggests that people are born with a need to forge bonds. Superheroes usually represent secure attachment figures, allowing readers to have a sense of inspiration and safety. Adversely, the antihero character often displays attachment patterns of insecurity or disorganization, resorting to their struggles and complexity to appeal to the reader, creating connections as a consequence of the empathy the reader feels for them despite their flaws (Favaro, 2019; Freire and Vidal-Mestre, 2022).

The psychological theory of cognitive dissonance, introduced by Festinger in the late 50s, also governs comic book writing (Varis, 2021). This theory describes the mental discomfort created by conflicting beliefs, values or attitudes (Harmon-Jones and Mills, 2019). The author explains that this conflict creates unpleasant feelings of unease and discomfort. Comic book writers resort to this theory when they create scenarios that defy the superhero's morals, like when Superman must fight his inner self, dealing with the morals of killing Doomsday, leading to internal conflict (Leonard *et al.*, 2023). The writer must present the main character in such a way that the reader can understand and identify with their dilemma. Thus, engaging with the hero's psychology enhances the story's depth and relatability (Stein, 2020).

The last theory considered is the social identity theory, which Tajfel and Turner proposed in the 1970s. This theory asserts that a person's membership in social groups is a significant source of their sense of self (Brown, 2019). Tajfel and Turner's (2000) theory explains the cognitive processes and social conditions underlying prejudice, bias and discrimination. This theory is relevant to understanding the dynamics of superhero teams. Sanchez (2017) says that creating superhero groups in comic books, such as the Avengers or the Justice League, allows people to identify with a group and obtain identity and inclusion.

2.3 Benefits of comic book writing on English as a foreign language writing skills

The literature has provided evidence of comics' advantages in developing vocabulary, grammar, reading and writing skills (Wijaya *et al.*, 2021). Moreover, Nuzila (2019) states that students who wrote comic books in class improved their organization, structure and mechanics. Thus, their essay writing skills were also enhanced. Humola and Talib (2016) ascertain that using comic books aids earners who have writing difficulties.

Comic strips can help those learners whose writing skills require help. Listyani (2019) says that writing comics helps students stimulate their creativity. The author continues to say that an excellent prewriting exercise is to draw pictures to develop ideas before starting

to write the story. By triggering learners' imagination and having them doodle their ideas, less experienced writers can improve their writing skills. Istiq'faroh *et al.* (2020) go further, saying that since learners must plan the organization of the panels on each page, they can eventually develop and organize their ideas in writing. Moreover, Layla (2020) adds that writing comic books improves spelling and punctuation.

Practicing writing skills by writing comic books can be used to enhance writing skills. According to Wijaya *et al.* (2021), students who practiced writing comic books performed better than those who did it conventionally. The writing task is accompanied, the authors explain, by visuals which allow easier contextualization of the story. Additionally, it aids learners in remembering the grammar structures commonly used in the speech bubbles. Furthermore, Listyani (2019) has proven that writing comics improves learners' writing skills, and they pay closer attention to correct grammar, punctuation and spelling when they write comic books. Also, when students write comic books, they become more aware of using the correct verb tenses Nuzila (2019). The scholar also explains that students can improve their writing skills because using comics in the classroom is a fun activity, leading to a relaxed environment that helps students receive input better. Thus, they understand what has been explained faster and better.

Using comic books fosters creative problem-solving skills among learners (Istiq'faroh *et al.*, 2020). Furthermore, comics present an amalgamation of text and visuals that stimulate students' creativity in various dimensions (Katalkina *et al.*, 2021). Visual literacy, which, according to Różewski *et al.* (2021), is an essential skill to decode and comprehend the interconnectedness of visuals and text information, is fostered when using comics in the classroom as they encourage learners to interpret and analyze data beyond traditional textual forms (Wale and Bishaw, 2020). Moreover, encouraging students to create their comics as a form of expression and communication consolidates language skills and unleashes their creative potential. Crafting characters, developing plotlines and constructing visual sequences necessitate imagination, originality and the ability to envision and represent ideas in novel ways, all of which are integral components of creative thinking.

Wijaya *et al.* (2021) explain that comics can also be a platform for collaborative learning experiences. When students analyze comic books, they are required to interact and discuss with their peers (Rutta *et al.*, 2020), engage in dialogue (Dallacqua and Peralta, 2019), share interpretations (Istiq'faroh *et al.*, 2020) and collectively construct meaning from text and visuals (Reid and Moses, 2019). This collaborative environment is essential to cultivate communication skills by promoting the articulation of ideas and the ability to consider and respect diverse viewpoints. Moreover, Johnson (2022) explains that collaborative activities in creating comics solidify teamwork. The collaborative activities involved in writing comics require students to negotiate, compromise and synthesize several issues to create a coherent narrative. Patel *et al.* (2012) ascertain that through this process, students learn to understand their peers' strengths, develop a sense of communal engagement and sharpen crucial skills such as effective communication, task allocation and consensus building. Thus, using comics in the classroom enhances language skills and nurtures collaboration, essential skills for academic and professional undertakings.

2.4 Previous studies

Doepker *et al.* (2018) researched to explore the benefits of using comic books by preservice teachers in support of literacy skill development among young struggling readers and writers during guided reading. The researchers conducted a qualitative study using direct observation, assessment of student performance and teacher feedback. From the data set, it can be concluded that all preservice teachers found comic books to be an effective tool in

enhancing children's literacy skills with reading and writing. This study highlights that visualization is crucial in improving fluency and comprehension.

In a study performed in Ecuador by Cabrera-Solano *et al.* (2019), the researchers aimed to understand the impact of digital comics on improving writing skills among preservice teachers. The study used an action research design to evaluate improvements in teaching practice. Sixty-three students aged between 19 and 23 and five English teachers participated in the study. The students created ten comic strips using Pixton software, after which the teacher provided feedback on vocabulary and grammar. Before the intervention, students rated themselves poorly on writing performance. After using Pixton, there was notable improvement in student's writing proficiency levels. The research design seems suitable for meeting the objectives since it tests and affirms that digital comics can improve EFL writing skills among learners. However, details about how Pixton was used in the teaching process must be clearly described. The study does not mention any potential biases, but having a control group for comparison would be beneficial. The recommendations are unambiguous and align with usability guidelines, suggesting that more dynamic tools like Pixton should be used in teaching EFL writing.

Rahayu and Widiastuti (2019) researched the effectiveness of using comic pictures as a teaching tool for enhancing students' writing abilities, specifically in narrative text. The study was prompted by the need to find innovative and engaging ways to improve student learning outcomes in this area. The research used a mixed methods approach and sampled 33 s-grade students. Data were collected over two weeks in August 2019. The methods included pretests, lessons involving comic picture usage and posttests.

In another study conducted in Indonesia, Istiq'faroh *et al.* (2020) investigated the impact of digital comics on elementary school students' creativity and writing skills to understand if using digital comics could motivate students and enhance their creative thinking, problem-solving, critical thinking and writing abilities. Statistical analysis was performed using paired samples t-tests. The scholars concluded that digital comics positively affect students' creativity and writing skills. It was found that using animation has a significant effect on improving students' writing skills.

Cabrera-Solano *et al.* (2021) conducted mixed method action research in Ecuador to understand the effectiveness of using Pixton, an online comic creation tool, in enhancing university students' EFL writing skills. The sample included 52 male and female EFL students aged between 19 and 24 years from a private Ecuadorian university. The T-tests were used for statistical analysis of pre and posttest results. The researchers concluded that using Pixton significantly improved students' EFL writing skills. Students expressed positive perceptions about using Pixton, reporting increased engagement and motivation during class activities. The research design seems suitable for meeting the study's objectives. However, since only one class was used in the study, generalization of results cannot be achieved.

The research performed by Selong *et al.* (2021) in Indonesia explores the effectiveness of comic strips as a medium to enhance creative writing skills among students. The study used a survey method where students responded positively to six statements about using comic strips to strengthen their creative writing skills. This suggests that comic strips may effectively engage students and improve their creative writing abilities.

Montero *et al.* (2022) aimed to understand the impact of implementing comics in teaching writing skills to Ecuadorian students. The researchers wanted to assess improvements in vocabulary, grammar and mechanics, creativity organization and content of students' writing pieces. The study used a pretest and posttest design to evaluate the effectiveness of comics in improving students' writing skills. Data were collected through tests evaluating

vocabulary, grammar and mechanics, creativity, organization and content. It can be concluded that implementing comics improved students' writing abilities significantly. The proposed research design effectively answered the research question, showing improved students' writing abilities after implementing comics into teaching methods. Methods are described clearly enough for replication. Recommendations suggest incorporating visual aids like comics into teaching methods for better learning outcomes. Improvements could include a more extensive or more diverse data sample.

3. Methodology

The methodology used in this paper aimed to analyze the impact of using comics as a pedagogical tool for improving Ecuadorian undergraduate Polytechnique students' writing skills. This section outlines the participants' sampling, data collection methods and the intervention procedures associated with using comics to improve writing proficiency in the academic context.

3.1 Philosophical assumptions

According to Guba and Lincoln (2005), philosophical assumptions are the core beliefs that govern research. Meanwhile, Creswell and Plano Clark (2017) believe that researchers must have a worldview of the issues to be examined, composed of beliefs and assumptions of expertise that will bolster the study. These philosophical assumptions comprise the paradigm, ontological and epistemological positionings and methodology (Bahari, 2012).

A paradigm is a set of beliefs and assumptions that guide researchers in their investigative endeavors (Doyle *et al.*, 2009). Several researchers have posited that when a researcher follows a constructivist paradigm, he aims to understand how individuals make sense of their lives and their attitudes toward the investigated issue (Magoon, 1977; Adom *et al.*, 2016; Pilarska, 2021). Thus, this researcher aims to look at the participants' perceptions and how they intertwine with the social context of the problem under the scope to grasp their reality by describing their experiences during the intervention.

As Creswell and Creswell (2014) explained, ontology is how the researcher sees reality. Furthermore, Doyle *et al.* (2009) say that the relativist ontological positioning, which is related to a constructivist paradigm, requires the belief that multiple realities exist as they result from different interpretations related by students. Moreover, Molina-Azorin and Fetters (2019) explain that the subjects construct multiple realities, which the researcher seeks to understand with fresh eyes from the outside of the issue being investigated, although not forgetting that there is an inside question posed by the study participants that must be understood.

Bahari (2012) ascertains that epistemology is a branch of philosophy that studies the nature of knowledge. The researcher's objective is to understand reality as lived by the study participants. Al-Ababneh (2020) explains that epistemology has to do with the nature of knowledge and its scope, providing the philosophical grounds for the possible types of learning and ensuring they are adequate and appropriate. Three main types of epistemologies exist: objectivism, constructionism and subjectivism (Feast and Melles, 2010). This researcher follows the constructionist view, which refers to the meaning that emerges from human interaction with the world's reality. This viewpoint holds that subject and object develop as partners in forming meaning.

This researcher followed Al-Ababneh's (2020) suggestion when choosing the research approach for mixed methods action research. The author explains that when a researcher has chosen a constructivist paradigm, the ontological and epistemological stances must follow that same philosophical assumption. Thus, the methodological assumption is to

follow an inductive process that will look at multiple simultaneous shaping factors that should allow the emergence of categories identified during research. Thus, mixed methods action research falls into this description.

3.2 Participants

3.2.1 Sampling strategy. Etikan *et al.* (2016) ascertained that nonprobability sampling is practical when resources, time and workforce are limited. It uses a subjective method to select participants for the study. It is a fast, easy and inexpensive method to obtain data (Lehdonvirta *et al.*, 2020). Purposive sampling is a kind of nonprobability sampling, which, according to Campbell *et al.* (2020), aims to choose respondents who are likely to convey helpful information to the research. Finally, Onwuegbuzie and Collins (2007) explain that the researcher selects individuals or groups of informants who maximize the understanding of the phenomenon under the scope.

3.2.2 Sample size. The sample size for the quantitative section of the research comprises the different courses assigned to the researcher in the first semester of 2023. From the total, only 109 signed the informed consent form and were considered for answering the survey. According to Hennink and Kaiser (2022), it is recommended to use between 9 and 17 participants for interviews or four and eight respondents for focus groups to assess saturation in the qualitative portion of the research. This suggestion is also ascertained by Onwuegbuzie and Collins (2007) and Campbell *et al.* (2020). Thus, this research uses semistructured interviews, and 12 respondents became the sample size for this section. Table 1 contains the demographic data obtained from the participants.

3.3 Research design

A mixed method sequential explanatory design is proposed to investigate Ecuadorian undergraduate polytechnic students' perceptions of the usefulness of writing comics to enhance their writing skills. This research design begins with the collection and analysis of quantitative data and then proceeds to collect and analyze qualitative data to furnish additional in-depth explanations of the qualitative findings (Creswell and Plano Clark, 2017).

In the first stage of the study, the researcher will administer a survey to respondents who have gone through the writing comics and the intervention. The survey questions will be designed to evaluate learners' experiences writing comics, the effectiveness of this method and their confidence in writing (Ball, 2019). Quantitative data will be analyzed using descriptive and inferential statistics (Gupta *et al.*, 2019) to determine the effectiveness of writing comics for improving writing skills.

The second stage will collect qualitative data using semistructured interviews to obtain more information about participants' experiences writing comics (Adeoye-Olatunde and Olenik, 2021). Data from the interviews will be analyzed using thematic analysis to provide an in-depth understanding of participants' accounts (Braun and Clarke, 2022).

3.4 Data collection tools

This research relied on quantitative and qualitative data collection tools to attain the necessary data to reach the conclusions below. For the quantitative investigation stage, a survey was designed and samples from students' writing were collected, which served as pre and posttests. Meanwhile, the researcher counted on a semistructured interview for the qualitative stage.

3.4.1 Survey. The quantitative stage of this mixed methods research involved using a survey instrument designed by the researcher. This decision was made out of the need to acquire tailored data aligned with the research's objectives. The survey was crafted to

Demographics	Categories	$n = 109$	%
Gender	Male	69	63
	Female	40	37
Age	18−21	63	58
	22−25	35	32
	26−29	7	6
	30+	4	4
Race	Mestizo	99	90
	Montubio	3	3
	African Ecuadorian	3	3
	White	3	3
	Indigenous	1	1
Secondary	Private	66	61
Education	Public	43	39
City of origin	Guayaquil	63	58
	Salinas	8	7
	Playas	2	2
	Milagro	2	2
	Daule	2	2
	Others	32	29
People in family	2	1	1
	3	11	10
	4	34	31
	5+	63	59
Decision to enter	Own decision	95	88
the university	Parents	8	7
	No other choice	6	5
Faculty	FIEC	31	28
	FCSH	29	27
	FIMCP	19	17
	Other engineering programs	30	28
Started studying English	School	52	48
	High school	43	39
	University	14	13
Source: Created by the author			

capture nuanced aspects of writing comics to enhance students' writing skills. The instrument consisted of two sections aimed at eliciting comprehensive responses from participants. It commenced with demographic inquiries to gather information about participants' backgrounds, followed by a section dedicated to probing students' perceptions of the usefulness of writing comics as an instrument to improve their writing skills. The questions within this last section were predominantly structured as Likert scale items.

3.4.1.1 Validity. According to Ball (2019), validity accounts for a survey's accuracy of the questions proposed to measure what is required to assess. The four types of validity included in survey research are face, content, criterion and construct validity (Almanasreh *et al.*, 2019). The researcher conducted the following tests to ensure the survey's validity.

First, face validity was assessed, which evaluates clarity, ambiguity, reasonability and relevance. Patel and Desai (2020) suggest that 10 to 12 experts should be used for the assessment. Thus, this researcher requested the cooperation of ten colleagues from the languages department, who were instructed on the activity's aims and procedure, to participate in this evaluation. After the experts finished their evaluation, the researcher

calculated the percentage of agreement reached per question. Furthermore, Taherdoost (2016) suggests analyzing the collected data with Cohen's Kappa Index (CKI). This study's survey obtained 89.28% agreement and a CKI of 0.699, which, according to McHugh (2012), is a substantial agreement. Nonetheless, face validity is considered the weakest for validity. Thus, the researcher also tested the survey for content validity.

The second test to account for the validity of the proposed survey was to assess the questionnaire's content validity. According to Taherdoost (2016), it is the degree of relevance and representation of the elements of an assessment tool of the construct being assessed. Yusoff (2019) recommends starting by preparing a content validation form to be used by the panel of six experts. The researcher defined one domain: students' perceptions of the usefulness of writing comics and 25 tested items over which the experts had to decide on one, the item is not relevant for the tested domain, to four, the item is highly relevant for the tested domain. This researcher followed Yusoff's (2019) suggestion to calculate the content validity index and obtained the following indices. The Scale Content Validity Index equals 0.95. The average item content validity index/Average equals 0.88. These indices, according to Lynn (1986), are acceptable values.

The next stop was to test the survey questionnaire for construct validity, which is related to how much a questionnaire accurately measures what it is supposed to do (Cronbach and Meehl, 1955). According to Goodwin (1999), exploratory factor analysis (EFA) can identify if the factors proposed in a survey are correlated or uncorrelated. It is a process that helps evaluate the score validity of a test. Thus, the researcher used the Principal Components method since it is the most frequently used method in practice. Also, the Direct Oblimin rotation method was performed as recommended when the researcher considered a relationship between factors (Liu and Leighton, 2021).

The Kaiser-Meyer-Olkin (KMO) sample adequacy value was found to be 0.768, according to Goretzko et al. (2019), which shows a sufficient sample size to perform the EFA. The KMO values calculated for each item were also found to be the lowest at 0.820, confirming an adequate sample size. Also, Bartlet's text $x^2(45) = 384,803$, $p < 0.05$ finding, which shows the correlation between items was large enough to carry out the EFA.

As a result of the EFA, the researcher determined that the Writing Comics Scale (WCS), which consists of 15 items, had a structure of four dimensions or factors that explained 78.53% of the total variance. According to these results, it was concluded that the scale has a valid feature. Finally, as the total variance explained is more than 50%, the measurement tool can achieve the purpose it wants to measure. Therefore, the survey has been demonstrated to achieve construct validity.

3.4.1.2 Reliability. The reliability procedures assess the consistency and internal reliability of the WCS. The test was aimed at determining the extent to which the items in the scale correlate, measuring the same construct consistently. Cronbach's alpha coefficient was used to perform this assessment. This coefficient is a commonly used measure to evaluate internal consistency (Amirrudin et al., 2020), and it relates to the degree of correlation among items within a scale (Tavakol and Dennick, 2011).

The computed Cronbach's alpha coefficient for the WCS was found to be 0.952, a value indicating a high level of internal consistency (DeVellis, 2021) among the items within the scale. Therefore, the WCS demonstrates a high internal consistency, which suggests that the scale items are closely related and they measure a coherent underlying construct. Finally, this reliability analysis validates the scale's capacity to produce reliable and foreseeable findings when applied to a similar context or population.

3.4.2 Writing samples. Two writing samples were obtained. The first one before the students began the intervention and then again after the intervention was over. The prompt for the writing pieces was obtained from www.cambridgeenglish.org/. The researcher used the same prompt for both writing exercises. Students had to write a 120–150–word academic paragraph.

3.4.3 Semistructured interviews. The following data collection instrument used was an open–ended questionnaire comprising ten questions. Semi-structured interviews are useful for collecting rich, qualitative data that capture students' varied perceptions and experiences (Alves-Pinto *et al.*, 2021). Given the exploratory nature of researching students' opinions on using comics to improve their writing skills, a semi-structured framework allows for a balance of predetermined questions and the freedom to go deeper into individual experiences. This method allowed the researcher to acquire in-depth insights (Eppich *et al.*, 2019) regarding the perceived effectiveness of producing comics to enhance students' writing skills.

Several measures were taken to account for the interview protocol's validity and reliability. Before the interviews, a pilot study was conducted with a small group of students to refine questions, ensuring clarity and relevance (Adeoye-Olatunde and Olenik, 2021). This step helped identify ambiguities and validate the appropriateness of the protocol. Three of the questions were contended during the pilot study. The researcher rewrote them so they were more straightforward and more transparent. Then, the interview framework was established; the interview was structured around predefined themes, focusing on learners' perceptions. This framework ensures consistency across the questions while permitting room for deeper questioning. Finally, participants had the opportunity to look at summaries from their interviews to validate the accuracy of the information (Eppich *et al.*, 2019), ensuring their perspectives were accurately introduced.

3.4.4 Procedures. The procedures for data collection of this research were divided into three distinctive stages. The pretest administration and error analysis was the first one. The second was the grammar intervention and comic creation. The last stage included different activities done before the end of the semester.

The first stage started on the third week of the 16-week academic term. A pretest was administered to assess students' writing abilities. Subsequently, an error analysis was conducted on the collected writing pieces – the analysis aimed to identify recurring errors and patterns prevalent across participants' compositions. The most common errors were isolated to inform the design of the grammar intervention.

The second stage began with the grammar intervention, strategically integrated into every session when learners reconvened to work on the comics. Concurrently, students began developing their comics in phases. Students worked in groups at first, generating character ideas and developing the basic plot. Following that, in the second phase, students produced their comic narratives, segmenting the story into an introduction, body and conclusion that corresponded to the first phase's brainstorming concepts. Finally, in the third phase, students concentrated on writing the scripts for their comics.

During the third phase of the intervention, the teacher offered tailored comments to individual groups upon completion of each step of comic development, focusing on areas for writing growth. Furthermore, class-wide discussions focused on particular difficulties generated from the previous error analysis. During week 12, a posttest was given to evaluate the intervention's influence on students' writing skills. The posttest activity was the same as they did during the pretest. Furthermore, in week 13, a survey was distributed to students to obtain their impressions of the effectiveness of the intervention. Finally, to guarantee

objectivity, a language department colleague blindly scored the pretest and posttest writing pieces and cross-verified them by the researcher using the same rubrics.

4. Analysis

Two types of analysis, quantitative and qualitative, were done during this investigation. The data obtained from the survey were quantitatively analyzed using SPSS V.20. Descriptive statistics and frequencies were used to obtain the results depicted below. The researcher gets a clearer picture of the current data with that obtained and analyzed using the SPSS software package. Also, inferential statistics were also used to make projections based on the data collected. The data received from the students' writing samples considered as the pre and posttests were treated with paired T-tests performed on the SPSS package V.20 to identify the score differences after the intervention.

The data obtained from the semistructured interviews were thematically analyzed. Moreover, it entails a methodical coding and theme-creation approach that yields insights into a study's questions (Castleberry and Nolen, 2018). The first stage in thematic analysis is becoming acquainted with the material through repeated readings or listening to audio recordings to develop a thorough knowledge of the topic (Braun *et al.*, 2022). After familiarization, the data are carefully categorized, with relevant units or segments recognized and labeled.

5. Results

This research aimed to identify students' perceptions of the usefulness of writing comics to improve their writing skills. This section delves into the results obtained from the quantitative and qualitative analyses conducted on the data from the collection tools discussed above.

5.1 Quantitative results

The quantitative section of this research was fed from a survey and pre and posttests. Table 2 contains the descriptive statistics obtained from the SPSS analysis.

As can be seen in Table 2, the means of all items ranged from 4.165 to 4.532. The highest mean score (M = 4.532/SD = 0.727) is for the proposition that using comics makes the learning process of writing more engaging for me. This statement is followed by the one that says comics can assist in explaining writing concepts effectively (M = 4.477/SD = 0.714). The third highest mean score is for the statement, I find myself more capable of creating cohesive and coherent written pieces after using comics, which has a (M = 4.358/SD = 0.776). This is followed by "comics have contributed to enhancing my storytelling and narrative skills in writing," which has a (M = 4.385/SD = 0.679). The fifth statement states that comics effectively illustrate writing principles and techniques (M = 4.376/SD = 0.802).

The second statistical analysis performed was the paired T-test conducted on the results from the composition participants wrote. Table 3 contains a statistical summary of the results obtained.

As can be seen in Table 3, the p-value equals 0.00000133 [P(x ≤ 5.2758) = 1]. This result means that the likelihood of a Type I error is small, which means rejecting a correct hypothesis. According to Halsey (2019), the smaller the p-value, the more the results support the established hypothesis. The test statistic T equals 5.2758, which is not in the 95% region of acceptance [−1.9935, 1.9935]. The posttest minus the pretest (1.41) is not in the 95% region of acceptance [−0.5342, 0.5342]. The 95% confidence interval of the posttest minus the pretest stands at [0.8795, 1.9479]. Also, the observed effect size d stands at medium with a value of 0.62. This value indicates that the magnitude of the difference between the average of the differences and the expected average of the differences is medium.

Items	N	Mean	SD	Variance	Asimetry	Kurtosis
Comics help in enhancing my understanding of writing	109	4.357	0.700	0.491	−0.957	0.910
I believe comics can make the learning of writing skills more enjoyable	109	4.284	0.779	0.594	−0.911	0.448
Integrating comics into writing exercises can stimulate creativity in my work	109	4.357	0.703	0.491	−0.628	−0.761
Comics are an effective way to illustrate writing principles and techniques	109	4.376	0.802	0.644	−1.009	0.004
I think comics can assist in explaining writing concepts effectively	109	4.477	0.714	0.511	−1.312	1.411
Using comics makes the learning process of writing more engaging for me	109	4.532	0.727	0.529	−1.217	−0.014
I am confident that comics can improve my overall writing proficiency	109	4.284	0.770	0.594	−0.541	−1.117
Comics are a valuable tool for visual learners to comprehend writing concepts	109	4.348	0.809	0.655	−1.043	0.303
Incorporating comics into writing tasks can enhance my retention of writing rules and guidelines	109	4.321	0.718	0.516	−0.568	−0.881
I feel motivated to learn writing skills through the use of comics	109	4.229	0.823	0.678	−0.755	−0.265
I am interested in exploring and creating comics to develop my writing abilities	109	4.256	0.737	0.545	−0.450	−1.040
Engaging with comics encourages me to practice and refine my writing skills	109	4.183	0.722	0.522	−0.292	−1.032
I find myself more actively involved in writing tasks when incorporating comics	109	4.196	0.738	0.546	−0.324	−1.101
I will spend more time learning writing if comics are included	109	4.192	0.726	0.527	−0.313	−1.045
I feel accomplished when I use comics to improve my writing	109	4.229	0.702	0.493	−0.353	−0.921
My writing skills have improved since I started using comics as a learning tool	109	4.165	0.799	0.639	−0.640	−0.221
I feel more confident in expressing myself through writing after using comics	109	4.229	0.753	0.567	−0.408	−1.129
I believe my overall writing proficiency has enhanced due to incorporating comics	109	4.220	0.737	0.544	−0.375	−1.075
Using comics has positively influenced my ability to structure and organize my writing	109	4.302	0.822	0.676	−0.922	−0.007
I think my vocabulary and language usage have expanded through comics	109	4.311	0.766	0.587	−0.601	−1.049
I notice improvements in my grammar skills after engaging with comics in writing exercises	109	4.312	0.676	0.457	−0.474	−0.768
Comics have helped me to develop a better understanding of sentence structure and syntax	109	4.357	0.739	0.547	−0.685	−0.862
I find myself more capable of creating cohesive and coherent written pieces after using comics	109	4.358	0.776	0.602	−1.086	0.700
Comics have contributed to enhancing my storytelling and narrative skills in writing	109	4.467	0.688	0.473	−0.925	−0.361
I believe comics have improved my ability to convey ideas effectively in writing	109	4.385	0.679	0.461	−0.657	−0.654

Source: Created by the author

Table 2.
Descriptive statistics of the survey's propositions

To validate the above results, the statistical software performed three separate tests. First, the Tukey–Fence method was used to detect outliers, which are values that might badly influence the test result (Osborne and Overbay, 2019). The difference column contains five potential outliers, which amount to 6.85% of the observations (−3.4, 6, −5, 6.8, 7.6). Since the Paired *T*-test is sensitive to the presence of outliers, too many of them may result in a skewed distribution. The Shapiro–Wilk test checked the normality assumption, resulting in ($\alpha = 0.05$). Therefore, it is assumed that the posttest minus the pretest follows a normal distribution (*p*-value = 0.759), which means the normality assumption cannot be rejected. Finally, the test power was calculated, which resulted in a strong score of 0.987.

It can be said that the results of the paired T-test indicate that there is a significant medium difference between the pretest (M = 5/SD = 1.7) and the posttest (M = 6.4/SD = 1.7) with a $t(72) = 5.3$ and a *p*-value that is < 0.001.

5.2 Qualitative results

The qualitative results of this investigation come from the semistructured interviews, which were analyzed using thematic analysis. Three themes were identified after several rounds of reading. They are "Perceptions over comics as a teaching tool," "Motivations and engagement," and "Impact of comics on writing performance." The following are students' responses to the ten-question protocol.

5.2.1 Theme 1: perceptions over comics as a teaching tool. Respondent 5 said, "I think comics are great for improving writing skills. When we were creating the story for the comic, I helped with the dialogues, so I had to structure my ideas and explain them to the group. Also, I learned to describe the actions of the comic concisely; now I don't beat around the bushes, as they say."

Respondent 12 added, "I believe this activity helps my writing skills because I can be creative with words. I have practiced my writing with the dialogues we wrote. There was this one time when I changed what one of the characters would say five times until I was satisfied with the result."

Respondent 9 also said, "I had a hard time writing one of the panels for the comic, and then in class, you said it could help if I drew a stick figure picture of the way I wanted the panel to look, and it helped me so much. It let me visualize the sequence of events about which I was writing. Also, writing the dialogues and captions for the panels improved my ability to express my thoughts and emotions in writing."

Additionally, Respondent 8 said, "I think writing comics is a good way to improve writing skills. They are more fun than regular writing exercises, and when I wrote the story with my classmates, you gave us feedback on how to improve our writing. I remember those things more because I relate them to this fun activity."

Finally, Respondent 1 said, "Using comics as a writing exercise is much more interesting than other methods. I feel very involved in creating the story, and it helped me remember vocabulary and grammar rules better because I used them in the story for the comic."

5.2.2 Theme 2: motivations and engagement. Respondent 2 explained, "One thing I really enjoyed was reading the comics you brought to class, and I used them as models when

Parameter	N	*p*-value	T	Average of differences	SD of differences	Normality *p*-value
Value	109	0.000	5.275	1.414	2.289	0.759

Source: Created by the author

I wrote the script for the comic. I followed some of the panel designs and the wording they would use on those comics so that I would use similar things. Writing comics is more fun than simple sentences, making me want to do more writing assignments."

Respondent 10 said, "This activity with the comics was motivating. I had never done something like that. The process of writing the brief, then the main story, and the script was enjoyable. My group decided to download some comics from the Internet to analyze them, which helped me understand how to structure the story and inspired me to write more interesting compositions."

Respondent 8 added, "Our comic was about a superhero, and after finishing the script, I felt excited and wanted to write another comic. I was talking to some of my group members, and three of them thought writing the second part of the comic was a good idea. Writing the comic helped me think of and write about different situations."

Respondent 12 answered, "We created a comic adaptation of a historical event with my group, and as we were writing the main story, I felt curious to know more about it. Creating this comic made me write a very detailed story of the event. One of my classmates studies graphic design, so he made cool pictures of how our comic would look, and we used them to participate'actively in the writing. We could visualize first and then put in writing in a more interesting way."

Respondent 10 said, "Writing comics was fun for me. I got involved with my group in the story planning. We tried to draw the scenes but were not very good at drawing, so we used stick figures. This is much better than just writing because I have to think about making my written instructions for the artist clear enough for him to make my comic book."

5.2.3 Theme 3: the impact of comics on writing proficiency. Respondent 4 claimed, "Writing comics has affected how I write. It has improved my ability to use the language correctly and enhanced my storytelling skills. I have learned that writing comics needs concise writing, and that ability has influenced how I write, making my sentences clearer and more creative, which also means that I can better transmit my ideas."

Respondent 6 said, "The comic that my group created was a mystery story; we spent a lot of time planning the scenes and dialogues for the comic. I understand that our work together, planning and organizing the comic, helped us have a good structure. You can see the introduction, body, and conclusion in the comic. It made me think about what comes next, how to tell it, and make it interesting for the reader."

Respondent 3 disclosed, "I have noted that since we started writing comics, my organizational skills in writing content have improved. For example, when we were writing the script for our comic, we needed to draft the different scenes, dialogues, and the progression of the plot in a logical way so that it made sense when you read it. This process has helped me improve how I structure the content of my writing assignments. I know my ideas have cohesion, and this concept was difficult for me to understand, but not anymore."

Respondent 10 explained, "I know from the improvement in my grades that writing comics has improved my language skills. It has enhanced my vocabulary as I had to learn how to say certain specific things for the dialogues in the comics, and this is vocabulary that I tend to use more frequently. Moreover, the continuous practice we did in the classroom and outside school when I met with my classmates to do our writing assignments improved the way I used grammar."

6. Discussion
The discussion section of this mixed method research paper comprehensively explores the multifaceted dimensions surrounding the integration of comics as a pedagogical tool to enhance the writing skills of Ecuadorian undergraduate polytechnic students. Addressing a

spectrum of research questions, the culmination of findings unfolds an intricate tapestry of insights into the perceptions, attitudes, motivations and overarching impact of using comics within the educational sphere.

The first research question aimed to identify Ecuadorian undergraduate polytechnic students' perceptions of comics' usefulness in enhancing their writing skills. The answers to this question lie in the survey and interview answers. From the descriptive analysis, we can see that the proposition with the highest mean is "using comics makes the learning process of writing more engaging for me," followed by "I think comics can assist in explaining writing concepts effectively" and "I find myself more capable of creating cohesive and coherent written pieces after using comics," with means that range from 4.532 to 4.358, which mean they are in the medium agree range of the Likert scale proposed. These findings agree with what has been found by other researchers (Rahayu and Widiastuti, 2019; Istiq'faroh *et al.*, 2020; Montero *et al.*, 2022).

The second research question aimed to determine students' attitudes and motivations toward using comics to improve their writing skills. Students generally felt engaged by working with the comics, and this activity motivated them to write more. The answer to this question rests in the answers participants gave during the rounds of interviews. Take the student's ten answers; he explained that he felt motivated to write comics. The whole process, he explained, was enjoyable, to the point that he did extra research on the internet to better structure the story of his comic, which he finished, inspired him to write more interesting compositions. This view is shared by research conducted by Doepker *et al.* (2018) and Cabrera-Solano *et al.* (2019, 2021).

Research question three aimed to discover how writing comics impacted students' writing proficiency. To respond to this inquiry, we look at the results from the paired *T*-test performed on the writing pieces produced by participants. These results indicated a significant medium difference between the pretest and the posttest. Thus, the experiment conducted was successful. This is also corroborated by reports by other scholars (Cabrera-Solano *et al.*, 2019; Rahayu and Widiastuti, 2019; Istiq'faroh *et al.*, 2020; Montero *et al.*, 2022).

The last research question looked at the linguistic aspects that improved due to writing comic books. The answer to this query lies in the survey, where it can be evidenced that the propositions regarding this issue all have a mean score of over 4.3, which means that participants agree to have seen an improvement in their understanding of grammar and vocabulary (Montero *et al.*, 2022; Selong *et al.*, 2021), sentence structure (Cabrera-Solano *et al.*, 2019) and syntax (Hasanudin *et al.*, 2022), conveying ideas effectively and writing cohesively and coherently (Cabrera-Solano *et al.*, 2019, 2021; Montero *et al.*, 2022). The issue of how writing comics help learners better convey their ideas in writing has yet to be explored in any of the articles reviewed by this researcher; thus, this paper's addition to the literature.

7. Conclusions
Using comics to enhance students' writing skills was studied, addressing four critical questions. The research found that participants agreed on the engagement and usefulness of comics in conveying ideas and improving written works. This supports previous research and confirms the effectiveness of comics in boosting writing abilities. Moreover, students' attitudes and motivations toward using comics for writing showed engagement and motivation, leading to increased satisfaction and a desire to write more interesting pieces. These findings contribute to the ongoing debate on the motivating impact of comics in writing exercises.

A paired *T*-test was conducted on writing pieces to examine the impact of writing comics on students' writing skills. The results showed significant differences between pretest and posttest scores, supporting the effectiveness of using comics to improve writing skills. Participants also reported improved grammar, vocabulary, sentence structure, syntax and idea transfer.

However, the study has limitations that should be considered. The small sample size of 109 students limits the generalizability of the findings to a broader context. Additionally, the study focused only on students from a single university, potentially limiting the representation of diverse backgrounds. Finally, the sample's heterogeneity in English proficiency levels may affect students' engagement and learning experiences. Further research on a larger scale is needed to validate and apply the outcomes more broadly.

Future research should explore how using comics for writing instruction can impact diverse student populations, including those with learning disabilities and different cultural backgrounds. Using neuroscientific and cognitive psychology methods can help understand cognitive processes involved in comic-based writing and analyze thought processes to uncover how this method influences learning and creativity.

The paper has several implications. This study's positive findings support multimodality and multiple literacies in foreign language writing development. They permit learners to construct meaning using multiple semiotic modes, such as linguistic, visual and spatial. The scaffolding afforded by comics aligns with genre-based literacy perspectives, valuing instruction in textual genres and social purposes. From a practical pedagogical point of view, this paper's results suggest the potential of comic narratives and storyboarding. Comics writing could be added to classroom activities to vibrantly aboard brainstorming, drafting and peer reviewing before dealing with higher stakes assignments. Legitimizing alternative mediums like comics for academic writing tasks has social implications in terms of promoting literacies in a multimedia world. Writing comics nurtures multiliteracies aligned with participatory digital cultures by expanding traditional linguistic-centric norms. This multimodal composing has the potential to increase access and representation and amplify voices across identities and cultures.

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