



MASTERING THE APA CITATION STYLE: THE EXPERIENCES OF UNDERGRADUATE IT STUDENTS IN KAZAKHSTAN

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ABSTRACT

Aim/Purpose	This study investigates the challenges undergraduate IT students in Kazakhstan face in mastering APA citation style and evaluates the impact of introducing citation instruction earlier in the curriculum.
Background	In English-medium instruction (EMI) contexts, particularly in post-Soviet educational systems, students often have limited prior exposure to international academic writing conventions. As a result, mastering citation practices presents both technical and conceptual challenges.
Methodology	A mixed-methods, two-stage comparative design examined 200 student essays (100 from 2020 and 100 from 2021) across nine APA formatting categories. Semi-structured interviews with 15 students provided qualitative insights into their learning experiences. Chi-square tests assessed the statistical significance of differences between cohorts.
Contribution	This study contributes empirical evidence on citation learning in STEM-oriented, non-Anglophone, post-Soviet contexts. It demonstrates the differential impact of early instructional interventions on various dimensions of citation competence.
Findings	Earlier APA instruction was associated with lower error rates across most categories. The largest improvement was in page numbering, $\chi^2(1, N = 200) =$

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	106.70, $p < .001$, $V = .73$, followed by margins and font formatting, indicating strong gains in mechanical aspects of citation. Moderate improvements were found in paraphrasing and quotations, while smaller significant effects appeared in reference formatting and the alignment of in-text citations with reference lists. Title page formatting showed no statistically significant change. These results suggest that early instruction improves rule-based formatting, while more complex citation practices remain challenging.
Recommendations for Practitioners	Citation instruction should be introduced early and reinforced through scaffolded practice, with particular emphasis on higher-order skills such as paraphrasing and reference construction.
Recommendations for Researchers	Future research should examine the longitudinal development of citation skills and explore how linguistic, cultural, and institutional factors influence the acquisition of citation skills across diverse contexts.
Impact on Society	Improving citation literacy supports academic integrity, enhances the quality of student writing, and facilitates integration into global academic standards.
Keywords	APA citation, IT students, academic writing, EMI, Kazakhstan, referencing practices

INTRODUCTION

This study examines the challenges undergraduate students face in understanding and applying citation rules in their writing in an English-medium instruction (EMI) university in Kazakhstan. Accurately acknowledging the ideas and work of others through citation is a cornerstone of academic integrity and scholarly communication. In this context, an in-text citation refers to a brief reference within the main body of a text that directs readers to a corresponding entry in the reference list. More broadly, citation can be understood as the pairing of in-text references with their full bibliographic entries, forming a system that enables traceability, accountability, and knowledge integration.

The development of standardized citation styles, such as the American Psychological Association (APA) format, reflects the need for consistent and transparent documentation of sources across disciplines (American Psychological Association, 2020). However, mastering APA citation, particularly its technical and stylistic requirements, remains a significant challenge for students at all levels of higher education (Neubauer & Hernaiz-Sánchez, 2025). This challenge is further intensified in the digital age, where the abundance of easily accessible information increases both the risk of plagiarism and the complexity of source integration (Selwyn, 2008). As a result, clear and structured instruction in citation practices has become increasingly important.

Citation difficulties are not limited to novice undergraduate writers. Previous research has documented persistent citation and referencing problems among more advanced learners, including doctoral and postgraduate students (Gaber & Ali, 2022; Jiao et al., 2008; Sreehari et al., 2025). For example, Jiao et al. (2008) examined citation errors among doctoral students, while Sreehari et al. (2025) found frequent APA formatting problems in doctoral theses in Library and Information Science, including errors related to punctuation, volume numbers, and author names. These findings suggest that citation competence develops gradually and requires sustained instructional support rather than one-time exposure.

Such challenges may be especially pronounced in linguistically and culturally diverse EMI contexts, where students are expected to master citation conventions while also adapting to unfamiliar academic writing norms, such as those for argumentation, authorship, and knowledge construction. For students in Kazakhstan, where English is typically a foreign language, limited exposure to English in everyday contexts creates additional barriers. Drawing on Cummins' (2000) distinction between basic

interpersonal communication skills and cognitive academic language proficiency, developing the formal language required for academic success takes sustained time and support. Without this foundation, students may struggle to meet the expectations of EMI universities, particularly when institutional policies prioritize internationalization without sufficient pedagogical support (Tajik et al., 2024).

In response to these challenges, research has demonstrated that targeted instructional interventions can improve students' citation skills. For example, structured training programs and workshops have been shown to enhance APA-related writing competencies (Gaber & Ali, 2022). However, not all interventions are equally effective. Asynchronous resources alone may yield only limited improvement, underscoring the importance of interactive instruction, formative feedback, and sustained engagement (Neubauer & Hernaiz-Sánchez, 2025). Furthermore, integrating citation instruction directly into the curriculum and fostering collaboration between academic departments and support services has been shown to improve student outcomes (Mejorada et al., 2023).

Within this context, this study investigates the challenges undergraduate IT students face in mastering APA citation style at a Kazakhstani EMI university. While previous research has examined citation errors in advanced academic work (Sreehari et al., 2025) and broader EMI-related challenges in Kazakhstan (Tajik et al., 2024), less attention has been given to undergraduate STEM students in this regional context. Addressing this gap, the study analyzes common APA citation errors in student writing and complements this analysis with qualitative insights from student interviews. Conceptually, it approaches citation learning not only as the acquisition of technical formatting rules, but also as a socially situated academic literacy practice (Lea & Street, 1998) and a potentially transformative threshold in students' development as academic writers (Meyer & Land, 2003). By combining quantitative and qualitative approaches, the study provides a more comprehensive understanding of citation learning. It offers context-specific implications for instructional strategies that support students in developing both competence and confidence in using APA style.

BACKGROUND

This study was conducted at a recently established technology-focused university in Kazakhstan that uses English as the medium of instruction. The institution trains undergraduate and graduate students across several disciplines, including Computer Science, Engineering, Intelligent Systems, and Social Sciences. English is the medium of instruction, and all students are required to complete courses such as English for Academic Purposes and Academic Writing as part of their core education curriculum.

Within the Faculty of Social Sciences, the Department of Language Studies is responsible for delivering these academic communication courses, which are designed to equip students with foundational writing and research skills. These courses involve tasks such as essays, projects, and seminar papers, all of which require proper use of referencing conventions, most often APA style. However, students from contexts where international citation conventions are still being integrated, such as Kazakhstan, where historically different referencing practices prevailed, often enter university with minimal prior exposure to academic writing norms and limited experience with structured research assignments. As a result, many students encounter difficulties when asked to cite sources in APA style.

These difficulties are not limited to surface-level formatting issues but also involve conceptual misunderstandings about the purpose of citation and the broader norms of academic integrity. Despite being proficient in digital tools, many students struggle to adapt to the conventions of scholarly writing, particularly when referencing multiple sources or integrating in-text citations properly. The issue is compounded in contexts where academic conventions are still evolving. In many post-Soviet educational systems, the emphasis on international citation standards is relatively recent, and students often lack early exposure to consistent referencing practices in secondary or even early tertiary education. Instructors, too, may be navigating the transition between different academic traditions and expectations, making it difficult to implement uniform citation instruction across departments.

While there is a substantial body of literature addressing challenges in citation learning among students in the social sciences and humanities (Jorgensen & Marek, 2013; Kargbo, 2010; Knight-Davis & Sung, 2008; Lanning, 2016; Mandernach et al., 2016; Neubauer & Hernaiz-Sánchez, 2025; Sreehari et al., 2025), very few studies have examined how students in IT and STEM programs develop these competencies (Lindoo et al., 2017). Even less attention has been paid to citation instruction in the post-Soviet context, where educational legacies differ significantly from Western academic norms and the adaptation of international citation rules remains a work in progress.

This study seeks to address both of these gaps. Examining how undergraduate IT students at a university in Kazakhstan perceive and learn APA citation style contributes to a more inclusive and context-sensitive understanding of academic writing instruction. It explores not only the technical aspects of citation learning but also the cultural and institutional dynamics that shape students' experiences, offering new insights into how citation practices can be more effectively taught in post-Soviet higher education settings.

LITERATURE REVIEW

COMMON CITATION ERRORS AND LEARNING CHALLENGES

The challenge of effectively teaching citation and referencing practices has been widely documented across educational levels, particularly among undergraduate students. Research consistently shows that citation errors remain prevalent even among advanced learners, including doctoral students, often due to insufficient early training and limited instructional emphasis (Jiao et al., 2008; Waytowich et al., 2006). These errors are not merely technical; they are also shaped by cognitive and psychological factors. For instance, perfectionism and library anxiety have been shown to influence students' ability to apply citation conventions accurately (Waytowich et al., 2006).

Importantly, students' difficulties with citation are often linked to ineffective learning strategies and limited metacognitive awareness. Karpicke et al. (2009) demonstrate that students frequently rely on passive study habits rather than active retrieval-based learning, which limits their ability to internalize complex rules such as citation formats. These findings suggest that citation errors should not be viewed solely as procedural failures, but as indicators of broader challenges in learning, cognition, and academic socialization.

MECHANICAL AND CONCEPTUAL DIMENSIONS OF CITATION ERRORS

Previous research suggests that students' APA-related difficulties range from surface-level formatting problems to more complex documentation and source-use issues (Dawe et al., 2021; Mandernach et al., 2016; Neubauer & Hernaiz-Sánchez, 2025). Mandernach et al. (2016), for example, found that instructors viewed documentation problems, especially citations, references, and quoting, as greater areas of concern than general style and formatting errors. This distinction is important because some APA requirements, such as spacing, font size, margins, page numbering, title page format, indentation, punctuation, and alphabetization, are relatively rule-based and visible in the final text. Studies of undergraduate and postgraduate writing have repeatedly identified such errors in reference lists and formatted manuscripts, including spacing, indentation, alphabetical order, punctuation, volume numbers, author names, and source-type formatting (Kargbo, 2010; Mulyadi, 2023; Sreehari et al., 2025). These findings indicate that mechanical accuracy is an important component of APA competence, but also suggest that such errors may be more amenable to correction through explicit instruction, examples, templates, checklists, rubrics, formatting tools, and repeated practice.

At the same time, the literature shows that citation difficulties are not limited to visible formatting errors (Mandernach et al., 2016). Students also struggle with the broader academic functions of citation, including supporting claims with evidence, integrating quotations, paraphrasing appropriately,

constructing accurate reference entries, and ensuring consistency between in-text citations and reference lists (Kargbo, 2010; Neubauer & Hernaiz-Sánchez, 2025). Dawe et al. (2021) similarly argue that students often focus on the “mechanics” of citation to avoid penalties, while faculty seek to communicate its wider ethical and intellectual meaning as part of academic integrity. From this perspective, citation competence involves not only knowing where commas, dates, or page numbers should be placed, but also understanding how sources function in scholarly argumentation and knowledge attribution. This literature helps explain why mechanical APA errors may decline relatively quickly after instruction, while paraphrasing, quotation use, reference construction, and citation-reference alignment may remain more persistent because they require deeper academic literacy development.

INSTRUCTIONAL INTERVENTIONS AND PEDAGOGICAL APPROACHES

A substantial body of research emphasizes the importance of structured, sustained instructional interventions for improving citation competencies. Studies have shown that tools such as templates, checklists, and rubrics can significantly enhance students’ ability to apply citation conventions (Andrade, 2005; Franz & Spitzer, 2006; Reddy & Andrade, 2010). These tools are particularly effective when they clarify expectations and provide consistent guidance.

However, not all instructional approaches yield the same outcomes. For example, Boysen (2019) found that while students often prefer error-recognition activities, citation-production tasks, in which students actively generate citations, lead to significantly better learning outcomes. This suggests that deeper engagement with citation practices is necessary for meaningful learning. Similarly, short-term interventions such as workshops and targeted training programs have demonstrated effectiveness (Jorgensen & Marek, 2013; Mandernach et al., 2016), particularly when combined with feedback and active learning strategies. These findings indicate that citation competence develops most effectively through continuous, context-sensitive instruction that combines explicit guidance with opportunities for practice and reflection.

STEM AND IT-SPECIFIC CITATION CHALLENGES

Citation practices may present distinct challenges for students in STEM disciplines, particularly in fields such as computer science and information technology. Unlike students in the humanities and social sciences, STEM students often receive limited formal training in academic writing and referencing. Lindoo et al. (2017) found that computer science students demonstrated lower citation accuracy compared to their peers in other disciplines, despite their familiarity with structured systems such as programming languages. This observation challenges the assumption that technical proficiency translates into competence in academic writing. Instead, it highlights the need to conceptualize citation as a distinct form of disciplinary literacy. Lindoo et al. (2017) propose framing APA style as a “syntactical language,” analogous to coding, which can help students understand its rule-based structure while also recognizing its communicative function. This perspective reinforces the importance of integrating writing and citation instruction across the curriculum rather than treating them as peripheral skills.

DIGITAL TOOLS AND CITATION LEARNING

The growing availability of digital tools has significantly expanded opportunities for supporting citation learning, research organization, and academic writing (Strobl et al., 2019). Instructional technologies, including self-paced applications and interactive platforms, have been shown to reinforce citation practices by providing flexible and scalable learning environments (Sharif et al., 2018). In the context of IT education, such tools may be particularly relevant because technology-mediated learning environments can align with students’ disciplinary orientation and prior familiarity with digital systems.

In addition to instructional applications, citation management tools such as Zotero, Mendeley, and EndNote have become integral components of modern academic workflows, enabling students to navigate the complexities of digital information management and reference organization (Ramadhan et al., 2024). These tools can reduce the mechanical burden of formatting references and managing sources, but their effectiveness still depends on students' ability to understand and correctly apply the underlying citation principles (Ramadhan et al., 2024). Building on this literature, the present study treats citation management systems as supportive scaffolding rather than substitutes for conceptual understanding of citation practices.

Recent technological developments have further extended the role of digital tools in academic practice (Khalifa & Albadawy, 2024). Advanced technologies, including large language models (LLMs) and visualization software such as CiteSpace, enable more sophisticated engagement with scholarly texts, including citation intent classification and the mapping of intellectual structures within academic discourse (Balakireva & Klein, 2024; Lendvai, 2025). These developments highlight the evolving nature of citation practices in digitally mediated academic environments.

At the same time, the increasing reliance on digital tools introduces important pedagogical challenges. While systematic reviews suggest that such tools can enhance writing proficiency, adherence to citation standards, and overall research productivity (Ramadhan et al., 2024), there is growing concern about over-reliance on automated systems. In particular, AI-based writing assistants may generate inaccurate or fabricated citations, raising concerns about academic integrity (Walters & Wilder, 2023). Moreover, excessive dependence on these technologies may limit the development of critical thinking, source evaluation, and analytical synthesis skills if not accompanied by appropriate instructional support (Zou et al., 2025).

Overall, digital tools offer significant benefits for citation learning but must be integrated thoughtfully within pedagogical frameworks. A balanced approach, one that combines technological support with explicit instruction in citation principles and critical digital literacy, is essential to ensure that such tools complement, rather than replace, students' development of academic writing competencies.

CONCEPTUAL AND AFFECTIVE DIMENSIONS OF REFERENCING

Beyond technical competence, citation practices are deeply connected to students' academic identities and emotional experiences (Gravett & Kinchin, 2020). Gravett and Kinchin (2020) conceptualize referencing as a threshold practice, marking a transition from novice to legitimate participant in academic discourse, and from this perspective, learning to cite is not simply about following rules but about understanding one's role within a scholarly community.

It seems students often experience citation as a source of confusion, anxiety, and frustration, particularly when expectations are implicit or inconsistently communicated (Gravett & Kinchin, 2020). These affective dimensions are critical, as they influence motivation and engagement. The concept of pedagogic frailty further highlights how unclear or unarticulated instructional practices can hinder students' ability to internalize citation norms (Gravett & Kinchin, 2020). This suggests that effective citation instruction must address both cognitive and emotional aspects of learning.

INSTITUTIONAL AND CULTURAL CONTEXTS OF CITATION PRACTICES

Institutional and cultural contexts might also shape citation practices (Dawe et al., 2021). Dawe et al. (2021) emphasize the importance of consistency in institutional guidance, showing that conflicting expectations across instructors can lead to confusion and reduced student confidence. Centralized support systems and clear guidelines can mitigate these challenges by providing students with stable reference points.

In post-Soviet contexts, including Kazakhstan, these issues are further complicated by historical and educational legacies. Academic traditions in these regions have often followed different conventions, and the adoption of international citation styles such as APA represents not only a technical adjustment but also a broader epistemological shift. As a result, both students and instructors may face challenges in adapting to new norms of academic writing and knowledge attribution.

Despite the growing body of research on citation practices, there remains a notable lack of studies focusing on Central Asian and post-Soviet contexts, particularly within STEM disciplines. This gap is significant, as it limits understanding of how citation practices are learned and applied in diverse educational environments.

CONCLUSION

Taken together, the literature shows that citation learning is shaped by mechanical, conceptual, cognitive, affective, institutional, and disciplinary factors. Prior studies have documented persistent citation errors among undergraduate and graduate students and have shown that structured instruction, feedback, rubrics, and citation-related practice can improve citation accuracy. However, the literature also suggests that different types of citation errors may respond differently to instruction. Mechanical features of APA style, such as spacing, margins, page numbering, and other visible formatting conventions, may be more readily improved through explicit guidance and practice, whereas conceptually demanding practices, such as paraphrasing, integrating quotations, constructing references, and aligning citations and references, may require deeper academic literacy development.

Despite this growing body of research, three gaps remain. First, much of the existing literature is located in Western or Anglophone higher education contexts. Second, relatively few studies examine citation learning among IT and STEM students, whose academic writing needs are often treated as peripheral to disciplinary training. Third, limited attention has been paid to post-Soviet EMI contexts such as Kazakhstan, where students encounter international citation conventions within a distinct linguistic, institutional, and educational tradition. These gaps justify the present study's focus on undergraduate IT students in Kazakhstan and lead to the following research questions:

- RQ1.** What are the most common types of APA citation errors made by undergraduate IT students in an EMI university in Kazakhstan?
- RQ2.** To what extent does the earlier introduction of APA instruction reduce the frequency of citation errors across different categories?
- RQ3.** How do students perceive the challenges of learning and applying APA citation style in their academic writing?

THEORETICAL FRAMEWORK

Understanding students' difficulties with mastering APA citation style requires moving beyond a purely technical interpretation of referencing as a set of formatting rules. This study draws on two complementary theoretical perspectives - Academic Literacies and Threshold Concepts to conceptualize citation as a complex, socially situated, and transformative academic practice. Together, these frameworks provide a lens for examining how students engage with citation not only as a procedural task but as a process of entering and participating in academic discourse.

The Academic Literacies approach (Lea & Street, 1998, 2006) conceptualizes academic writing as a set of social practices embedded within disciplinary conventions, institutional expectations, and power relations. From this perspective, writing and, by extension, citation are not simply technical skills but socially situated activities that require students to navigate unfamiliar norms of knowledge construction and attribution. This is particularly relevant in English-medium instruction (EMI) contexts such as Kazakhstan, where students must engage with global academic standards, such as APA

style, within local linguistic and educational traditions shaped by post-Soviet legacies. For undergraduate IT students, who often have limited exposure to formal academic writing, citation practices may represent not only a new technical system but also an entry into a different epistemological framework. As such, difficulties with APA citation reflect not only gaps in procedural knowledge but also challenges in understanding how knowledge is produced, positioned, and validated within academic communities (Barton & Hamilton, 2012; Gourlay, 2009).

Complementing this perspective, the concept of Threshold Concepts (Meyer & Land, 2003, 2006) provides a useful framework for understanding why certain aspects of citation are particularly challenging for students. Threshold concepts are characterized as transformative, integrative, and often troublesome forms of knowledge that mark a transition in learners' understanding (Meyer & Land, 2006). In the context of academic writing, citation practices, particularly referencing and in-text citation, can function as threshold concepts, as they require students to move beyond surface-level rule application toward a deeper understanding of intellectual ownership, evidence use, and scholarly communication (Gravett & Kinchin, 2020).

For many students, citation is initially perceived as a mechanical requirement; however, mastery of these practices involves a shift in perspective, where students begin to see themselves as contributors to academic discourse rather than passive consumers of information. This transition is often accompanied by what Meyer and Land (2003) describe as a "liminal" phase, during which students experience confusion, uncertainty, and partial understanding. In this study, such experiences are reflected in students' reported difficulties with paraphrasing, quotations, and reference formatting, areas that require not only technical accuracy but also conceptual clarity. The persistence of errors in these domains suggests that students may acquire procedural elements of APA style without fully crossing the conceptual threshold required for meaningful application.

Academic Literacies and Threshold Concepts offer a robust and complementary framework for interpreting the findings of this study. While Academic Literacies emphasizes the social and institutional dimensions of citation practices, Threshold Concepts highlights the cognitive and transformative processes involved in mastering them. This integrated perspective suggests that difficulties with APA citation among undergraduate IT students are not solely technical, but are shaped by broader linguistic, cultural, and epistemological factors. It also supports the need for pedagogical approaches that combine explicit instruction with opportunities for reflection, practice, and gradual conceptual development.

These frameworks informed the research design in three ways. First, the Academic Literacies perspective (Lea & Street, 2006) guided the study's attention to citation as a socially situated academic practice rather than merely a technical formatting task. This informed the inclusion of interview questions exploring students' perceptions of citation, academic integrity, instructor expectations, and learning experiences. Second, Threshold Concepts theory (Meyer & Land, 2006) shaped the distinction between mechanical APA errors, such as spacing, font, margins, and page numbering, and more conceptually demanding practices, such as paraphrasing, quotation use, reference formatting, and alignment between in-text citations and reference lists. Third, the combination of these frameworks supported the mixed-methods design by linking quantitative patterns of citation errors with qualitative accounts of students' confusion, uncertainty, and gradual understanding. In this way, the theoretical framework guided both the selection of error categories and the interpretation of students' experiences.

METHODS AND DATA

RESEARCH DESIGN

This study employed a mixed-methods, two-stage comparative design to examine undergraduate IT students' experiences with APA citation and to assess the impact of introducing citation instruction

earlier in the curriculum. Quantitative analysis focused on identifying and comparing frequencies of APA-related errors across two cohorts (2020 and 2021), while qualitative data from semi-structured interviews provided insight into students' perceptions and learning experiences. The design was informed by Academic Literacies and Threshold Concepts perspectives, which positioned citation as both a socially situated academic practice and a potentially challenging developmental threshold in students' academic writing.

Participants and context

The study was conducted at an English-medium instruction (EMI) university in Kazakhstan, where APA is the mandatory citation style for all undergraduate coursework. Participants were first-year undergraduate IT students enrolled in two core courses: English for Academic Purposes (EAP) and Academic Writing.

Two cohorts were examined. The 2020 cohort (baseline condition) received APA instruction only in the Academic Writing course. The 2021 cohort (intervention condition) was introduced to APA earlier in the EAP course and continued applying it in Academic Writing. For the quantitative component, essays were selected from institutional student writing pools submitted in the relevant courses. From 535 essays in 2020 and 452 essays in 2021, 100 essays from each cohort were randomly selected for detailed coding. Only essays from students who had provided consent for their work to be used for research were included. This sampling strategy was used to ensure comparability across cohorts while keeping the coding process manageable and systematic.

DATA COLLECTION

Essay data

Student essays were collected from multiple instructors across both cohorts. All essays included in the analysis were anonymized prior to coding.

The instructional difference between the two cohorts concerned the timing of APA instruction. In the 2020 cohort, APA citation was introduced primarily in the Academic Writing course. In the 2021 cohort, APA instruction was introduced earlier, during the first-semester English for Academic Purposes course, and then reinforced in the subsequent Academic Writing course. The earlier instruction included explanations of APA formatting rules, in-text citations, reference list construction, quotation and paraphrasing practices, and alignment between in-text citations and references. Instruction was delivered through classroom explanation, examples, practice tasks, and instructor feedback on written assignments. The intervention was therefore curricular and instructional rather than experimental; it reflected a change in course sequencing and timing of citation instruction. Course materials are not publicly available, but the instructional content covered APA formatting, in-text citation, reference construction, quotation, paraphrasing, and source-list alignment.

Interview data

To complement the quantitative analysis, semi-structured interviews were conducted with 15 volunteer students in Spring 2021. During the consent process for the essay analysis, students were informed that their anonymized essays could be used for research purposes and were also asked whether they would be willing to participate in a follow-up interview. The 15 interview participants were therefore selected from among students who indicated their willingness to be interviewed. Participants were first-year undergraduate students aged between 18 and 20. Interviews lasted approximately 20–30 minutes and were conducted in English, Russian, or Kazakh, at the participant's preference. Interview questions focused on students' experiences learning APA style, perceived challenges, and strategies used to apply citation rules.

Ethical Considerations. The study received approval from the university's Research Ethics Committee prior to data collection. All participants provided informed consent, and only essays from consenting students were included. Data were anonymized, securely stored, and reported in aggregate form to ensure confidentiality.

Identification of APA Error Categories. Prior to coding, a thematic analysis of instructor feedback was conducted to identify recurring APA-related issues. Fifty graded essays (10 per instructor) were reviewed, resulting in nine error categories:

- Double spacing
- Font size
- Margins
- Title page formatting
- Page numbering
- Quotation formatting
- Paraphrasing
- Reference formatting
- Alignment of in-text citations with reference lists

These categories formed the coding framework for all 200 essays.

DATA ANALYSIS

The analysis was limited to nine APA-related error categories that were identified as recurring issues in instructor feedback and judged most relevant to the course learning outcomes. These categories do not represent all possible APA errors. Rather, they reflect the most salient and instructionally relevant categories observed in the sampled essays and course context.

Quantitative analysis

Each essay was coded for the presence (1) or absence (0) of errors across the nine categories. Descriptive statistics were calculated to examine error frequencies.

To assess whether differences between the 2020 and 2021 cohorts were statistically significant, chi-square tests of independence were conducted for each category. Effect sizes were calculated using Cramér's V, with significance set at $p < .05$.

Reliability

As this was a single-coder study, all essays were coded by one of the researchers using a predefined coding framework. To enhance consistency, the coding framework was first applied systematically across the dataset, and a subset of essays was re-coded after a time interval. Any discrepancies identified during the re-coding process were reviewed against the coding criteria and resolved through repeated comparison with the original framework.

Qualitative analysis

The interviews were transcribed and translated by one of the authors. The transcripts were then analyzed using a combination of deductive and inductive coding. Initial codes were informed by the existing literature on citation practices, while additional themes were developed from patterns that emerged in the interview data. Coding was conducted by one of the authors. To protect participants' confidentiality, real names were not used in the manuscript; all names appearing in the findings section are pseudonyms.

The qualitative data were integrated during the interpretation stage of the analysis. After the quantitative results had been analyzed, the interview data were used to contextualize and extend the statistical findings by providing deeper insight into students' experiences, perceptions, and challenges in learning APA citation style. This integration supported triangulation by connecting observed patterns in citation errors with students' own explanations of their learning process.

RESULTS

OVERVIEW OF APA ERROR PATTERNS

In response to RQ1, which examines the most common types of APA citation errors, the analysis identified error patterns across nine categories, including both mechanical formatting elements and more complex citation practices. A total of 200 essays (100 per cohort) were included in the analysis.

In the 2020 cohort, where APA was introduced only in the Academic Writing course, errors were distributed relatively evenly across categories. The highest proportions of errors were observed in paraphrasing, quotations, and reference formatting, indicating early challenges in integrating and citing sources. Mechanical errors, including spacing, font size, and margins, were also present but less pronounced.

In contrast, the 2021 cohort, who received earlier exposure to APA instruction in the EAP course, demonstrated a substantial reduction in overall errors, decreasing from 468 in 2020 to 220 in 2021. Improvements were particularly evident in mechanical aspects of formatting, suggesting that early exposure supported the development of basic citation skills (see Table 1).

INFERENTIAL ANALYSIS OF APA ERROR REDUCTION

In response to RQ2, chi-square tests of independence were conducted to determine whether differences in error frequencies between the 2020 and 2021 cohorts were statistically significant. Table 1 presents the results of the inferential analysis, including chi-square values, p-values, and effect sizes (Cramér's V) for all APA error categories.

Table 1. Comparison of APA citation errors across cohorts with inferential statistics

Category	2020 <i>n</i> (%)	2021 <i>n</i> (%)	$\chi^2(1)$	<i>p</i>	Cramér's V
Double spacing	32 (32%)	10 (10%)	14.58	< .001	.27
Font size	33 (33%)	9 (9%)	17.36	< .001	.30
Margins	46 (46%)	9 (9%)	34.34	< .001	.41
Title page	12 (12%)	6 (6%)	2.20	.138	.11
Page numbers	85 (85%)	12 (12%)	106.70	< .001	.73
Quotations	69 (69%)	47 (47%)	9.93	.002	.22
Paraphrasing	66 (66%)	38 (38%)	15.70	< .001	.28
Reference formatting	73 (73%)	54 (54%)	7.78	.005	.20
In-text/reference alignment	52 (52%)	35 (35%)	5.88	.015	.17

Note. Percentages indicate the proportion of essays in each cohort containing at least one error in the category. *N* = 100 per cohort. Cramér's *V* indicates effect size.

Significant improvements were observed in mechanical formatting elements, including double spacing, $\chi^2(1, N = 200) = 14.58, p < .001, V = .27$, font formatting, $\chi^2(1, N = 200) = 17.36, p < .001, V = .30$, and margins, $\chi^2(1, N = 200) = 34.34, p < .001, V = .41$, indicating moderate to large effect sizes. The most substantial improvement was found in page numbering, $\chi^2(1, N = 200) = 106.70, p < .001, V = .73$, representing a very large effect size. This suggests a positive instructional effect on students' mastery of basic formatting conventions.

More complex citation practices also showed statistically significant improvements, though with smaller effect sizes. These included quotations, $\chi^2(1, N = 200) = 9.93, p = .002, V = .22$, paraphrasing, $\chi^2(1, N = 200) = 15.70, p < .001, V = .28$, reference formatting, $\chi^2(1, N = 200) = 7.78, p = .005, V = .20$, and alignment between in-text citations and reference lists, $\chi^2(1, N = 200) = 5.88, p = .015, V = .17$. In contrast, the difference in title page formatting errors was not statistically significant, $\chi^2(1,$

$N = 200$) = 2.20, $p = .138$, $V = .11$, indicating that this aspect was less affected by the instructional intervention.

CATEGORY-SPECIFIC TRENDS

Although improvements were observed across all categories, several areas remained challenging. In 2020, 69% of essays contained quotation-related errors, compared to 47% in 2021, indicating improvement but continued difficulty. Similarly, paraphrasing errors decreased from 66% to 38%, suggesting that students made progress but had not fully mastered this skill. Reference formatting remained the most persistent issue, decreasing from 73% to 54% of essays. This indicates that students continued to struggle with applying formatting rules across different source types. Errors in aligning in-text citations with reference lists also declined (from 52% to 35%), but remained relatively common, suggesting ongoing challenges in managing citation systems holistically.

Overall, the findings demonstrate that earlier, more structured instruction significantly improves students' performance in APA formatting, particularly in mechanical elements. However, more complex citation practices, such as paraphrasing, quotation use, and reference construction, remain comparatively challenging. These results suggest that while early instruction is effective in developing foundational skills, sustained, conceptually oriented pedagogical approaches are required to foster a deeper understanding of citation practices.

STUDENT EXPERIENCES AND PERSPECTIVES

Initial encounters with APA style

Most participants reported that the university was the first place they encountered any citation style. As one student recalled, "it was in the first semester when we were conducting research and writing literature review ... my instructor introduced APA style for the first time" (Begim). Others shared similar experiences, admitting they "heard about APA style in the University for the first time" because they "did not like to write essays and did not know about citation styles" before entering higher education (Zhangali). Only a few students noted prior exposure at school, explaining that "the first time I've heard about the APA style was at school ... in 10th grade" (Ademi) or in "11th grade, I guess" (Nurzhan).

Students' initial emotional reactions to APA formatting were commonly marked by confusion and uncertainty. Many questioned its purpose, saying they "were not sure why should I use it" (Zhanna) or felt "kind of concerned, why do we even need this?" (Maral). Some expressed stronger reactions, noting that "the citation styles slightly shocked me ..." (Ruslan). In contrast, those who had some prior knowledge felt more confident, explaining that they were "already familiar with the APA style, so I didn't have big difficulties" (Ademi) or that "I already knew how it works, so it wasn't that hard ... so I was fine" (Nurzhan).

Understanding the purpose of APA

According to participants, the main purpose of using APA formatting is to avoid plagiarism, uphold academic integrity, and credit authors. Several participants explained, "I think, students should write it in certain styles because it will help to avoid plagiarism. I think, that's a main purpose of doing that" (Zhanna). Others highlighted academic integrity more broadly, noting that citation is essential "to respect the copyright and plagiarism policies and ... to refer to the idea of another person and not to pass these ideas as their own" (Medet). Azhar agreed with him, stating that "the main purpose of citations is to give credit to others for their ideas".

Learning through practice and instructor feedback

Students consistently reported that their first attempts at applying APA style were confusing and error-prone. Many acknowledged that the learning process became clearer only after receiving instructor feedback and repeated practice. As Begim noted, "My first work was so bad. So, when I got feedback, I understood it." Similarly, Ademi explained that using APA more frequently during the second

semester helped because they “were able to get well acquainted with this style in practice,” while Azhar emphasized that they “learned from our mistakes and, eventually, were able to fully understand the APA style.”

When asked about the benefits of being introduced to APA in the first-semester English for Academic Purposes course, many students felt this scaffolding improved their mastery in the subsequent academic writing course. Several described significant improvement, such as feeling “pretty sure that I improved my knowledge of APA” (Yerassyl) or stating that second-semester examples “helped to understand better” (Zhangali). However, not all students perceived major change; for instance, Medet felt the second semester “just repeated the knowledge from the first semester,” and that the earlier introduction had already been sufficient.

Challenges in applying APA style

Despite improvements, students continued to struggle with the technical aspects of formatting, particularly when constructing reference lists and remembering specific rules for different source types. Many described the reference list as the most challenging part, with one student saying there were “too many rules related to reference styling, such as author’s name in alphabetical order, putting DOI link and so on” (Begim). Others emphasized difficulties with punctuation and order, explaining that “it was quite difficult to control the punctuation” (Zhanna) and “the most difficult and confusing part ... is how to remember the order of things, like the name, date, title, location, URL” (Yerassyl). Students also found it confusing that “journal articles and website sources... are cited differently” (Ruslan).

A source of additional frustration was the inconsistency between instructors’ expectations. One student explained that in the first semester, they were told “to use page numbers with both paraphrasing and quotations,” but in the next semester, another instructor said page numbers were needed “only when we directly quoted the source” (Anar). Such contradictions reinforced the perception that even instructors were unsure of the details of APA formatting.

Learning strategies and resources

Students primarily relied on online resources to figure out APA rules, describing the Internet as “fast and easy to do” (Begim) and noting that “there are so many articles ... and many websites” explaining citation (Yerassyl). Others preferred seeking help from instructors who were “good at explaining” (Nurzhan) or using materials provided in class (Maral). Some students turned to peers, saying they discussed confusing points with groupmates (Zhangali). Notably, none of the students used the official APA manual; several stated they were unaware of its existence. As Ruslan admitted, “If I knew that there is APA manual I would definitely get 100% on APA,” while Ademi noted hearing about it from teachers but still relying only on Internet sources.

Perceived relevance for future studies and work

Most participants believed that APA skills would be useful in their future studies or professions. Those planning to pursue postgraduate education described citation as essential for academic writing, explaining, “I’m planning to continue my studies until getting PhD ... I will need to write articles with appropriate stylings like APA” (Begim). Others saw its relevance to professional documentation, arguing that software engineering involves creating or updating applications where they “will need to do documentations” (Maral) or “study the work from A–Z” for client projects (Zhangali). However, some students felt that APA had little relevance to their IT careers, stating, “I will not use it in future, because I’m a software engineer and I will not write academic articles” (Zhanna) or simply, “we don’t use citation styles” (Nurzhan).

Suggestions for improving instruction

Students offered a range of pedagogical recommendations to make APA style more accessible. Many wanted more visual resources, noting that “visualizations of the APA style’s rules ... divided by blocks” would make learning easier (Zhanna). Others emphasized the value of working with concrete

examples: “not only tell and show the rules, but also show examples from different works” (Zhangali) and “introduce the APA style by showing more examples and maybe by doing some in-class activities” (Begim). Several students stressed the need for additional practice, suggesting “more practice on just citing the sources like separate assignment” (Maral).

Some participants highlighted the importance of simplifying explanations and adapting instruction to IT students’ learning preferences. As one student put it, “teachers should introduce it like something simple because it’s really simple” (Nurzhan), while another suggested using creativity and interactive tools since “we are students of IT field, we need something connected with games or practical things ...” (Ruslan). Others offered innovative ideas such as using songs “to remember the order of things” (Yerassyl) or encouraging self-study by providing key links to reliable sources (Ademi).

DISCUSSION

This study examined how undergraduate IT students in a Kazakhstani EMI context learn and apply APA citation style and evaluated the impact of introducing citation instruction earlier in the curriculum. The findings show that early, structured instruction was associated with a substantial reduction in APA-related errors, from 468 in the 2020 cohort to 220 in the 2021 cohort. However, the improvement was uneven across error categories. Mechanical features of APA style, such as page numbering, margins, spacing, and font formatting, improved more strongly, while more conceptually demanding citation practices, including paraphrasing, quotation use, reference formatting, and citation-reference alignment, remained comparatively challenging.

This pattern supports the distinction in previous research between visible formatting problems and broader documentation or source-use difficulties. Mechanical errors are generally rule-based and more directly observable in the final text, whereas conceptual citation difficulties require students to understand how sources are integrated, attributed, and positioned within academic argumentation (Dawe et al., 2021; Jorgensen & Marek, 2013; Mandernach et al., 2016; Neubauer & Hernaiz-Sánchez, 2025; Sreehari et al., 2025). In the present study, this distinction informed the coding framework, which included both formatting-related categories and more complex citation practices. The results suggest that early exposure to APA instruction can help students acquire surface-level conventions relatively quickly, but deeper citation competence requires more sustained pedagogical support.

The findings can be interpreted through the lens of Academic Literacies (Lea & Street, 2006), which conceptualizes academic writing as a socially situated practice rather than a neutral technical skill. From this perspective, students’ improvement in mechanical formatting indicates that they learned visible conventions when they were explicitly taught and reinforced. However, persistent difficulties in paraphrasing, quotation use, and reference construction suggest that students were still developing an understanding of the epistemological functions of citation, including knowledge attribution, source integration, and participation in scholarly discourse. Citation learning, therefore, involves more than applying APA rules; it requires students to understand why citation matters within academic knowledge-making.

The results also align with Threshold Concepts theory (Meyer & Land, 2006). Paraphrasing, quotation integration, and reference construction appear to function as troublesome areas of learning because they require students to move beyond procedural compliance toward conceptual understanding. Interview data support this interpretation: students frequently described confusion, uncertainty, and gradual learning through feedback and repeated practice. These experiences resemble the liminal phase associated with threshold learning, in which students partially understand a concept but have not yet fully internalized it. The persistence of errors in these areas suggests that students may acquire procedural competence in APA style without fully crossing the conceptual threshold required for confident and meaningful source use.

The qualitative findings further highlight the affective and institutional dimensions of citation learning. Many students reported that university was their first sustained encounter with APA style, and their initial reactions were often marked by confusion, anxiety, or uncertainty about its purpose. This finding is consistent with research that conceptualizes referencing as emotionally and cognitively demanding for students (Gravett & Kinchin, 2020). Students also reported inconsistencies in instructor expectations, particularly around when and how to use page numbers. Such inconsistencies may undermine student confidence and contribute to what Dawe et al. (2021) describe as pedagogic frailty, in which unclear or poorly coordinated instructional practices make academic conventions harder for students to internalize.

The effectiveness of the two-stage instructional approach aligns with prior research emphasizing the importance of early, explicit, and sustained citation support (Kargbo, 2010; Lanning, 2016; Manderbach et al., 2016). However, the findings also show that exposure alone is insufficient. While earlier instruction was associated with notable improvements in mechanical accuracy, it did not fully resolve more complex citation challenges. This supports Boysen's (2019) argument that active citation production is more effective than passive error recognition and suggests that citation instruction should include repeated practice, formative feedback, examples from student writing, and opportunities to revise citation use over time.

From a disciplinary perspective, the study contributes to research on citation learning in STEM and IT contexts. Consistent with Lindoo et al. (2017), the findings suggest that IT students may respond well to structured, rule-based explanations of APA style, particularly when citation is framed as a system with recognizable patterns. However, technical familiarity with structured systems does not automatically translate into competence in academic writing. Students may learn the "syntax" of APA style while still struggling with its rhetorical and epistemological functions. This reinforces the need to integrate citation instruction across STEM curricula rather than treating it as a peripheral skill taught only in writing courses.

Finally, the findings point to emerging challenges related to digital tools and AI. Students reported relying heavily on online resources, while none referred to the official APA manual. This suggests a gap between formal citation guidance and the informal digital sources students actually use. While digital tools can support citation learning, they may also encourage over-reliance if students use them without understanding underlying citation principles. Given the increasing availability of AI-based writing tools that may generate inaccurate or fabricated citations (Walters & Wilder, 2023), citation instruction should include critical digital literacy, source evaluation, and an explicit discussion of the limits of automated citation support.

Overall, the study demonstrates that citation learning is a multidimensional process shaped by mechanical, conceptual, cognitive, affective, institutional, and disciplinary factors. Early instruction is valuable, but it should be accompanied by sustained, conceptually oriented teaching that helps students move from rule-following to deeper academic literacy.

LIMITATIONS AND FUTURE RESEARCH

This study has several limitations. First, it was conducted at a single institution, which may limit the generalizability of the findings to other EMI, STEM, or post-Soviet higher education contexts. Second, comparing two cohorts introduces potential confounding variables, such as differences in student characteristics, instructor practices, assignment design, and broader institutional conditions. As a non-experimental design, the study cannot establish causal relationships, although it provides indicative evidence that earlier APA instruction was associated with reduced citation errors. Third, the interview data were based on a volunteer sample of 15 students, which may reflect the perspectives of students who were more willing to discuss their learning experiences.

Future research should examine citation learning longitudinally to explore how students' citation competence develops across several semesters or years of study. Further studies could also compare

students across disciplines, institutions, and language backgrounds to better understand how citation learning is shaped by disciplinary expectations and educational context. Given the growing use of citation generators, reference managers, and AI-based writing tools, future research should also investigate how emerging technologies influence students' understanding and application of citation practices.

CONCLUSION

This study investigated how undergraduate IT students in a Kazakhstani EMI university learn and apply APA citation style and examined the impact of introducing citation instruction earlier in the curriculum. Using a mixed-methods design, the study combined quantitative analysis of citation errors across two cohorts with qualitative insights into students' experiences of learning APA style.

The findings show that earlier and more structured instruction was associated with a substantial reduction in APA-related errors. The greatest improvements were observed in the mechanical aspects of APA formatting, including page numbering, margins, spacing, and font formatting. However, more conceptually demanding citation practices, such as paraphrasing, quotation use, reference formatting, and alignment between in-text citations and reference lists, remained challenging despite improvement.

These results highlight that citation learning is not merely a technical process. Rather, it is a developmental academic literacy practice that requires students to understand the purpose of citation within scholarly communication, academic integrity, and knowledge construction. This is particularly important in EMI and post-Soviet contexts, where students may encounter international citation conventions for the first time at the university level and may need support in navigating unfamiliar academic writing expectations.

From a pedagogical perspective, the study demonstrates the value of introducing citation instruction early in the curriculum and reinforcing it through consistent, scaffolded practice. At the same time, the findings suggest that effective citation instruction should go beyond rule-based formatting. Students need opportunities for active citation production, feedback, revision, source evaluation, and reflection on the role of citation in academic argumentation. For IT and STEM students, citation instruction may be especially effective when it connects the rule-based structure of APA style with the broader communicative and ethical purposes of academic writing.

By focusing on undergraduate IT students in Kazakhstan, this study contributes to the literature on citation learning in under-researched STEM, EMI, and post-Soviet higher education contexts. It shows that early instruction can improve citation accuracy, but deeper citation competence requires sustained pedagogical attention to both the mechanical and conceptual dimensions of academic writing.

DISCLOSURE STATEMENT

During the preparation of this manuscript, the authors used ChatGPT, a generative AI tool developed by OpenAI, for language editing, copyediting, and improving clarity of expression. The tool was not used to generate research data, create citations or references, conduct statistical or qualitative analysis, interpret findings, or make substantive scholarly decisions. All AI-assisted revisions were reviewed, verified, and edited by the authors, who take full responsibility for the accuracy, integrity, and final content of the manuscript.

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