Understanding student citation literacy: A multi-method approach

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Abstract

This multi-method study investigated the citation literacy, the knowledge and ability to create and understand citations, of undergraduate students in the humanities and social sciences. Although a critical academic and information literacy skill, citation literacy is often given insufficient instructional time or attention. The authors evaluated citation accuracy in 25 APA and 25 Chicago style student papers and conducted a focus group. The aim was to better understand student citation behavior, perspectives on citations, and available support. The findings suggest the need for more citation literacy training at universities, which academic librarians are well positioned to offer.

Keywords: bibliographic citations, citation literacy, referencing, focus groups, citation behavior

Introduction

Citation literacy can be defined as the knowledge and ability to create and understand citations and is an expectation in most undergraduate curriculums, enabling students to clearly and effectively communicate their ideas and contribute to the scholarly conversation. Citation literacy is also a key component of the *Framework for Information Literacy for Higher Education*, specifically the concepts Scholarship as Conversation and Information Has Value (Association of College and Research Libraries, 2016). However, the authors of this study have found that citation literacy is often part of the hidden curriculum, with little to no course time devoted to developing this crucial set of skills. Librarians at many institutions have recognized a need for citation literacy support and responded by collecting and making accessible style

guides, developing resources such as citation-focused LibGuides, and offering instruction in citation styles and citation management software. With an eye toward improving citation services and programming at McGill University Libraries, this study examined undergraduate student citation literacy by analyzing citation accuracy in a total of 1,566 citations in 50 humanities and social sciences papers and conducting a focus group. This multi-method approach allowed the authors to examine both student citation behavior in practice, as well as students' thoughts, opinions, and feelings about citations and available support.

McGill University in City, Canada, part of the U15 (a group of prominent doctoral-granting institutions in Canada), is a public research university that serves a population of over 27,000 undergraduate and 10,000 graduate students. McGill University Libraries are comprised of twelve branch libraries, including the Humanities and Social Sciences Library. Nearly 10,000 undergraduates are enrolled in the Faculties of Arts and Education, the primary student groups served by the Humanities & Social Sciences Library. Although more robust citations programming is relatively new at [university] Libraries, a citations committee has existed since 2016 with the primary goal of teaching and supporting the use of citation management software, particularly Zotero and EndNote. The committee also maintains a Citations LibGuide and citations-focused email account. In 2020, the Humanities and Social Sciences Library began offering workshops on APA style, based on *The Publication Manual of the American Psychological Association*, 7th edition. In 2022, workshops on Chicago style based on *The Chicago Manual of Style*, 17th edition and MLA style based on *Modern Language Association Handbook,* 9th edition joined the citation style offerings. These workshops were attended by undergraduate and graduate students, as well as members of the public unaffiliated with the university. Librarians also answer student questions over email and during reference

consultations. In addition to library support, the university also has a Writing Centre which offers writing support by appointment for students, which can include reviews of citations.

The study was guided by the following two research questions:

Research Question #1

What is the level of citation literacy, including citation accuracy, among undergraduate students in the humanities and social sciences?

Research Question #2

What can librarians learn from students about their citation literacy abilities to inform services and programming?

Literature Review

Several studies have used citation analysis to examine student citation behavior, including citation accuracy, although most studies focus on the types of sources students use for assignments (Carlson, 2006). Some librarians have specifically used this method to assist in making collections decisions (Hendley, 2012). Datig (2016) analyzed undergraduate social science papers to determine the types of sources and what percentage of sources were foreign language. Researchers have examined student papers to determine how they fare in citing online resources, including more traditional library resources such as books and journal articles that are increasingly available in electronic formats (Carlson, 2006; Davis, 2002; Davis, 2003), with many noting that students fare poorly at citing online materials and websites in particular (Clarke & Oppenheim, 2006; Dawe et al., 2021; Greer & McCann, 2018; Stevens, 2016). This is perhaps compounded by students' general inability to differentiate between types of sources, especially when all sources are viewed online (Greer & McCann, 2018; Lantz et al., 2016; Park et al., 2021; Van Note Chism & Weerakoon, 2012).

Analysis of student citation accuracy has taken many, often bespoke, forms, making it challenging to compare studies. For example, in their classic study of undergraduate student papers, St. Clair and Magrill (1990) analyzed 1,958 undergraduate bibliographies for what they termed "completeness" of bibliography entries – essentially measuring whether students included enough information for the source to be identified by the research team. Conducting two separate studies over the course of two years, Waytowich et al. (2006) and Jiao et al. (2008) examined graduate student dissertation proposals for the number of "missing" or "inconsistent" citations, defining "missing" citations as those that appeared in in-text citations but not the reference list or vice versa, and "incomplete" citations as those in which the author or date was inconsistent between the in-text citations and the reference list. The authors then calculated a citation error rate based on the proportion of "missing" and "incomplete" citations. Both studies also rated each proposal on the "quality" of the reference list by scoring them on a 5-point Likert scale measuring how much the reference list followed APA guidelines. Lantz et al. (2016) assessed student citation accuracy on a 3-point scale, whereas Mejorada et al. (2023) assessed student citation knowledge on a 15-point scale. Some studies, such as Clarke and Oppenheim (2006), have analyzed only a selection of the types of sources included in student bibliographies. Stevens (2016) tallied individual errors in citations drawn from student papers, finding that in 18 papers, none had a works cited page that was error-free.

Other studies have assessed student citation knowledge based on performance on surveys or other assessment metrics. For example, Van Note Chism and Weerakoon (2012) asked students in a doctoral proseminar to correct errors in a reference list developed by the course instructor and reviewed the citations created by students for their final assignments, coding errors by category. However, their study did not include a list of these codes. Greer and McCann

(2018) analyzed undergraduate students' ability to create accurate citations in APA style using an online questionnaire, finding that students were able to create correct APA citations only 27% of the time. Mejorada et al. (2023) likewise used a questionnaire to determine undergraduate students' knowledge of APA style, but in opposition to Greer and McCann (2018), found most students were "proficient" (scoring 8-11 on a 15-point scale). It is possible that the differences between the findings of these two studies is based on the type of questions they asked students: Greer and McCann (2018) asked students to create citations themselves, whereas Mejorada et al. (2023) seem to have provided students with multiple-choice questions. The sheer variety of methods and approaches researchers have taken to assess student citation knowledge and accuracy is truly dizzying. Scheinfeld et al. (2023) are currently undertaking a scoping review to address the challenge of analyzing citations, with a focus on APA citation style in particular, noting in their protocol that there is "no standard terminology for the concept of citation accuracy or reference accuracy."

Researchers have also studied students' opinions and views on citations, as well as faculty opinions. Kargbo (2010) found that the majority of undergraduate arts students surveyed were not confident in creating citations, a finding echoed by Gravett and Kinchin (2020). Mandernach et al.'s (2016) survey of teaching faculty determined that the formatting of in-text citations and reference list entries were some of the most problematic parts of students' papers formatted in APA style. However, Dawe et al.'s (2021) focus groups with students and faculty unveiled the opinion of faculty that students were better at the mechanics of referencing as compared to the art of citation, such as "incorporating research into their work" (p. 997). Gravett and Kinchin's (2021) interviews with teaching faculty revealed that, from the perspective of faculty, students' fail to see the value of creating citations or following standards, although their

instructors considered this a key skill. Peters and Cadieux (2019) surveyed both undergraduate students and professors about information, writing, and referencing skills, determining that although a preponderance of students (94.7%) expected to develop referencing skills during their university studies, most professors (82.9%) expected students to already have these skills, demonstrating a severe mismatch in expectations. Overall, student and faculty opinions reveal that citation literacy is an area to be improved.

Students are often taught that citing correctly is the only way to avoid unintentional plagiarism. However, as Michalak et al. (2018) have demonstrated, the definition of plagiarism is contextual and can vary widely, leading to student confusion over instructors' expectations. This, coupled with the common method of teaching plagiarism as "cheating" or "theft" has led many students to develop fear and anxiety around creating citations. For over a decade, many authors have argued that this "scare tactic" approach should be swept aside in favor of more positive or hands-on approaches (Fishman, 2009), such as the critical writing approach advocated by Vardi (2012) or Buckley's (2015) activity demonstrating proper paraphrasing using Lego blocks. Such approaches and activities can be more useful for students to learn the art of citations, but may fail in teaching students the nuts and bolts of the formatting of a particular citation style, especially if they must follow different styles in different courses. Both the mechanics and art of citations are key components of students' information literacy skill sets, as well as essential elements of their writing abilities. As such, academic librarians are in an excellent position to promote citation literacy and academic integrity within the library as well as within classrooms (Giannakouli et al., 2023; Kloda & Nicholson, 2007; Matonkar & Gopakumar, 2024).

Methods

Two methods were used in this study. The authors inquired about Research Ethics Board approval, and were told it was not necessary since the sole purpose of the data collection was to improve services for students at [home institution].

1. Evaluation of citation accuracy in undergraduate research papers
2. Student focus group

Evaluation of citation accuracy

The authors examined a total of 50 undergraduate research papers to evaluate students' citation accuracy, focusing on completeness and formatting of citations in adherence to the guidelines set in a particular manual of style. In total, this analysis considered 1,566 citations. A total of 25 research papers came from a beginner-level history course in which students were instructed to write a 1,000-word essay on a research question of their choosing and cite their sources (no minimum number of sources required) using *The Chicago Manual of Style* (CMS), 17th edition (notes-bibliography). Although there was no minimum number of sources required, students were required to cite at least one monograph, one peer-reviewed journal article, and one primary source. This exercise was unusual in that students were asked to write the beginnings (introduction and first several body paragraphs) of what would be a traditional longer essay for a history class. A total of 25 papers came from an intermediate-level sociology course in which students were instructed to write an opinion essay with supporting evidence and to cite a minimum of eight scholarly sources using *The Publication Manual of the American Psychological Association* (APA), 7th edition. The authors wanted to evaluate citation accuracy of both humanities and social sciences students in their own citation styles. The goal was not to compare students' citation literacy between disciplines, but rather to gain an understanding of

citation literacy among more than one group of learners, thereby enriching our understanding of citation strengths and challenges as well as training or support needs at a large humanities and social sciences library. In order to gain access to student papers, the authors contacted one history professor and one sociology professor and asked for their support to evaluate citation accuracy in student papers. The authors were given access to the student papers through the university's learning management system and 25 were randomly selected from each course. The papers were downloaded, printed, and names and student identification numbers were redacted.

Student papers were examined and evaluated for citation accuracy based on categories of errors adapted from Van Ullen and Kessler (2012). The analysis focused on accuracy of the elements when compared to the original source, and whether the formatting conformed to current APA and CMS guidelines. Categories of errors used were: punctuation, capitalization, incorrect order of elements, missing elements, inclusion of unnecessary elements, improper use of italics/underlining, name(s) misspelled, name(s) missing, failure to modify first name(s) to initial(s) for APA, date, pagination, incorrect URL formatting, inability to retrieve webpage, and inclusion of accessed/last modified dates. The authors adopted this method of evaluation as these were the types of errors they were curious about and they were able to objectively determine whether a citation was correct or incorrect. Since no qualitative judgements were being made about the suitability, variety, or quantity of the citations, and this was strictly intended to evaluate formatting and mechanical errors, the authors approached the evaluation using categories of errors to gain a better understanding of the frequency and types of errors students made.

One author used the categories of errors to evaluate the bibliographies and footnotes (CMS) in the 25 history papers and the other author used the categories of errors to evaluate

reference lists and in-text citations (APA) in the 25 sociology papers. This resulted in four separate lists created from two different evaluations for each set of 25 papers – one for the bibliographies/reference lists and one for the footnotes/in-text citations. For each paper, the authors counted the number of bibliography or reference list entries and the number of footnotes or in-text citations, identified the errors, and added the data to a spreadsheet. This data was then analyzed by adding up the errors to find total and average numbers of entries/errors, range of number of entries/errors, and most and least common errors.

Focus group

The authors chose a focus group for this study to help enrich the citation accuracy data by facilitating a conversation about citations among undergraduate students in humanities and social sciences disciplines. Focus groups allow participants to not only share their ideas and opinions but to build off one another, thereby making the conversation deeper and more interesting, with the moderator helping to tease out certain themes, creating a full picture of the subject being discussed (Waugh & Subramanium, 2018). The authors wanted to assess students' citation accuracy, but they also wanted to gain a better understanding of students' experiences learning about and using different citations styles for academic writing. Hearing about students' experiences creating citations, as well as how and why they seek support when they are struggling has the potential to inform and strengthen citation literacy programming at the library.

The authors recruited seven focus group participants with the help of email promotion on the part of the history and sociology departments, announcements made in class by the authors, and announcements posted in the learning management system by the collaborating professors. Participants were offered free coffee and donuts as a thank you for participating. It is not possible to know exactly how many students were emailed or exposed to the focus group

announcement. Of the seven participants, six were from the department of history and classics and one was from the department of sociology. The focus group took place in a quiet room in the library and lasted one hour. The only information gathered about each student was the name of their department and their year of study (first year, second year, etc.). The authors received consent from all seven participants to record the conversation. The questions were prepared ahead of time as well as some probes to keep the conversation going if necessary. One author took notes and recorded the conversation while the other author acted as moderator, asking questions and some follow-up questions. Later on, the notetaker transcribed the conversation with the assistance of the dictate feature in Microsoft Word. As the data set was relatively small, it was not coded systematically. Instead, both authors analyzed the transcript together, identifying themes and pulling out the important points and key details of the conversation.

Results

Evaluation of citation accuracy

Undergraduate history papers (CMS)

From the 25 undergraduate history papers that were evaluated for citation accuracy in the bibliography, the total number of bibliography entries was 225 and the average number of bibliography entries per paper was 9. The total number of citation errors in bibliography entries was 404, and the average number of citation errors per bibliography was 16.16. The average number of citation errors per bibliography entry was 1.8. No papers were free of bibliography errors, and each bibliography had between 7 and 38 errors. On average, each bibliography entry had at least one error. The top three most common errors in CMS bibliographies accounting for nearly two-thirds of errors were missing elements (95 total, 24% of errors in CMS

bibliographies), unnecessary elements included (85 total, 21% of errors), and underlining/italics (70 total, 17% of errors). The average number of errors per bibliography was 16.16.

From the 25 undergraduate history papers that were evaluated for citation accuracy in the footnotes, the total number of footnotes was 372 and the average number of footnotes per paper was 14.88. The total number of citation errors in the footnotes was 502, with an average number of citation errors in the footnotes of 20.08 per paper. The average number of citation errors per footnote was 1.35. No papers were free of errors in the footnotes, with each having between 6 and 38 citation errors in the footnotes. On average, there were between 1 and 2 errors per footnote. The top three most common errors in the footnotes, accounting for more than two-thirds of errors, were missing elements (121 total, 24% of errors in footnotes), inclusion of unnecessary elements (113 total, 23% of errors), and punctuation (113 total, 23%). See Table 1 for a complete breakdown of citation errors in history paper bibliographies and footnotes.

[Table 1 near here]

Undergraduate sociology papers (APA)

From the 25 undergraduate sociology papers that were evaluated for citation accuracy in the reference list, the total number of reference list entries was 307 and the average number of reference list entries per paper was 12.28. The students were required to cite at least eight academic sources. The total number of citation errors in reference list entries was 564, and the average number of citation errors per reference list was 22.56. The average number of citation errors per reference list entry was 1.84. No reference lists were free of errors and each one had between 2 and 44 citation errors. On average, all of the reference list entries had at least one error. The top three most common errors accounting for nearly two-thirds of errors were in the

following categories: capitalization (144 total, 26% of errors in APA reference lists), missing elements (108 total, 19% of errors), and underlining/italics (96 total, 17% of errors). The least common citation error in the reference lists was "unable to retrieve web page" (indicating that web sources were relatively uncommon).

From the 25 undergraduate sociology papers that were evaluated for citation accuracy in the in-text citations, the total number of in-text citations was 662 and the average number of in-text citations per paper was 26.48. The total number of citation errors in the in-text citations was 337, and the average number of citation errors in the in-text citations per paper was 13.58. There was one paper free of errors in the in-text citations, but the other 24 papers had between 1 and 44 errors in the in-text citations. The average number of citation errors per in-text citations was 0.51, which is a strikingly high figure considering the small amount of information contained in an in-text citation in APA format. The top three most common errors in the in-text citations, accounting for just over two-thirds of errors, were pagination (96 total, 28% of errors in in-text citations), punctuation (78 total, 23% of errors), and date (60 total, 18% of errors). See Table 2 for a complete breakdown of citation errors in sociology paper reference lists and in-text citations.

[Table 2 near here]

Focus group

Familiarity with citation styles and training/instruction

The majority of participants reported receiving training in high school using the *Modern Language Association Handbook* (MLA style) and APA style. One participant who identified as an "international student" was offered a special summer course in high school where the students

learned a variety of different styles. Another participant reported being taught CMS in high school, but wondered if that was because they were enrolled in the International Baccalaureate program, considered to be a rigorous program; the suggestion being that CMS is a more advanced citation style and so not commonly taught at the high school level. The majority of participants use CMS in university (recall that most students came from the department of history and classical studies) and two participants also said they use APA in university. One participant said sometimes MLA is required for an English Literature elective. The three main styles the participants are familiar with are MLA, APA, and CMS but students reported currently using CMS the most.

While the majority of participants reported learning MLA or APA in high school, the majority of participants also said they do not receive any training at university on how to cite. One participant explained that in their first year a professor dedicated two full class sessions to using the library and teaching citation skills which the participant found very helpful. Aside from this one participant, all other participants report being self-taught at the university level. For example, one student shared:

> *"I mean I never knew how to use any citation styles, so when I came to [authors' institution] I was introduced to it but I felt like I had to know how it was supposed to be used, so I just taught myself how to use it through YouTube or, like, the book, our teacher, um, professor, she gave us a link to the citation, a citation resource where I can use [sic]."*

Reasons for citing

Although most participants noted that the main reasons they are told to cite are (1) to avoid plagiarism and (2) give credit where credit is due, participants expressed a range of reasons to cite including demonstrating thorough and comprehensive research, accountability to a body

of scholarship, aiding in the writing process, providing strong and reliable evidence for an argument, and providing a reader with further information. When it came to learning about the importance of citations, one participant shared

> *"I think the main message is like anti-plagiarism and giving credit, but what I don't think is like really emphasized is that citations, especially Chicago, like footnotes, like really help the reader like get more information like if they want to go beyond whatever you're reading they can go into where you got the information from and learn more."*

Creating citations

Participants reported both on how they create citations, and when during the writing process they cite their work. Two participants reported adding all of their citations at the end of the writing process. Both explained they write their paper and make a note of where a citation needs to be inserted when a source is referenced, with one student explaining

> *"Any [citations I do] I do completely at the end. Like I write everything, I edit everything, and when I write I do it all on my computer, I add a little comment saying this is where you got your source from. And then after I edit everything, like I have the good like word count, then I add the citations."*

Another participant said they cite as soon as they reference a source, and another participant agreed and said they cite throughout the writing process. Almost all of the participants said they will copy and paste a citation from a database citation generator, the library catalogue, or even Zotero and then edit it according to a citation guide like the Online Writing Lab (OWL) from Purdue. Only one participant reported that they write out all their footnotes manually throughout the writing process and then use the online CMS or Google for guidance on how to format more complex sources, beyond books and journals. Two participants use Zotero, a free citation management software, to format a bibliography or to store references, but none of the participants knew about the Zotero extension for word processing software that automatically

formats citations according to the user's chosen citation style. Other students hadn't heard of Zotero or other citation management software and were keen to learn more.

Confidence in ability to cite properly

Many of the participants agreed that citing is "the worst part of academic writing," that it is "really scary" and "annoying" and that essentially, "it's the worst." One participant said they did not trust themselves to get formatting right, even in the last year of their degree. When the participants were probed as to why citing is so challenging, the resounding consensus among the participants was that lack of help and inconsistency/lack of standard expectations was driving their frustration and anxiety about citing sources. Students were also frustrated about a lack of general formatting guidance, as expressed by one participant:

> *"I mean it just stresses me out sometimes when they [professors and instructors] like don't commit to a citation [i.e., style] entirely. Like, OK, like do footnotes but only like this type of footnotes, or do footnotes but it doesn't have to be Times New Roman or something like that. Like if you're gonna go Chicago, like let me do everything Chicago, 'cuz like otherwise it just gets messy I guess."*

Most participants explained that some of their professors are strict about citations whereas others are not, leaving them guessing from one class to the next. For example, some professors want students to cite lecture content and some do not, explaining to students that information imparted in lectures constitutes "common knowledge." Some professors insist on citing everything and others ask for footnotes but not a bibliography. According to the sociology student, depending on the course, they might be asked to use CMS or APA and even within those styles, the expectations are inconsistent:

> *"I feel like every single prof is different. Where it's like, oh, use like this one or this one, so Chicago or APA, or I don't care and just be consistent. Or you know in-text citations with page numbers and no bibliography. Like, it's just different in every class. It's really*

weird."

One participant reported a dilemma wherein they are taking three different courses with a paper due in each course and each professor has provided different instructions for how to cite sources using CMS. The participants were all in agreement that varying expectations concerning citations, ranging from different policies with regard to citing information imparted in course lectures to bespoke expectations within a style like Chicago, led to frustration and feelings of insecurity about their ability to cite sources properly.

Assistance and support with citing

When asked what help or support they had sought when challenged with citing sources, most participants said they have never reached out to a librarian or someone at the [institution's] Writing Centre. Some said they ask friends for help. Two participants reported asking their professors for help in the past, but one admitted that if it is a tough question about a primary source then the professor will likely struggle to provide a clear answer about how to cite the source. One participant said they "just wing it [and] it either works or it doesn't … I don't push it." Another said, "I think if it's not easily found online then whoever I might ask probably doesn't know either."

The participants had some ideas for the types of support they wished existed through the university for aiding them in creating and incorporating citations into written assignments. One participant pointed out the obvious advantage of an in-class guest lecture by a librarian to teach citation skills. They reported this type of training, as well as research training, occurring in some, but not many, courses, adding that this would be especially helpful in their first semester or first year. In describing why in-class workshops were preferable to workshops or drop-in citation supported hosted in the library, one participant shared:

> *"I think you have to like lower the barriers as much as humanly possible, which means that you can't ask students to seek [the librarian] out. Which is why I think [librarians] going to classes is so helpful, like they're [i.e., the students are] going to be there anyways. 'Cuz it's like, like we're not gonna take our time, like we're really stressed about stuff, to like track someone down unless it's like we're really desperate. I'm, I don't have time to go see someone, I'm just gonna wing it. I feel like that's definitely the most common experience."*

One participant suggested incorporating more library resources, including information about citations, into the course management system and on syllabi. When probed to comment on the usefulness of online guides, one participant emphasized that it would need to be really well advertised and another added that guides should highlight difficult to cite sources, not just journals articles and book chapters.

Without time or motivation to go to a voluntary stand-alone workshop on citation skills, one participant wondered if offering a credit-bearing elective course would provide an impetus for students who want to learn more about research and citing while earning credit at the same time. This suggestion got another participant excited about the idea of a Massive Open Online Course (MOOC) like the kind offered on the EdX or Coursera platforms. When probed, a couple of the participants said it would be a great idea for the library to create a video version of one of the Libraries' citation skills workshops, but again, emphasized that it would have to be easy to find.

Discussion

Citation Accuracy

The evaluation of citation accuracy in student papers revealed that students from sociology (APA) and history (CMS) are making a high number of errors both in their footnotes and in-text citations and their bibliographies and reference lists.

Reference lists and bibliographies

The authors evaluated papers using 14 different categories of errors. As reported in the Results, no paper was free of errors in its reference list or bibliography. This is consistent with findings in a study by Stevens (2016) which analyzed 18 papers with a total of 91 MLA citations (works cited only) and 317 citation errors. No single works cited had 0 errors, and only 11 citations were error free. The average number of errors per works cited list was 14.41. The most frequent error was failing to include required information (26% of total errors), followed by punctuation (21%). Researchers conducting such assessments are left wondering why students make so many errors when there are clear models to follow in style guides and in online guides like the OWL (Greer & McCann, 2018; Stevens, 2016).

These results could suggest an overreliance on citation generators. Citation generators make errors, often the same types of errors found to be the most common mistakes students made in the papers evaluated for this study, such as capitalizing letters in the title when that does not conform to APA style (the most common error in APA reference lists in this study) and incorrectly italicizing titles. In Van Ullen and Kessler's (2012) study of APA and MLA style citations generated in databases, they found that the databases studied created citations with an average of 3.4 errors per citation, a number notably larger than the average number of errors per APA reference list entry (1.84) and CMS bibliography (1.8) in this study's student sample. Comparing this study with that of Van Ullen and Kessler (2012) demonstrates that student-created citations often include the same types of errors as those automatically generated by databases, such as errors in capitalization and the inclusion of unnecessary elements or exclusion of necessary elements. 10% of the citation errors generated in databases were attributable to capitalization errors, the most common citation error committed by students in APA reference

lists. Syntax errors, including missing or unnecessary elements and incorrect order of elements, accounted for 20% of the citation errors generated by the databases, but these categories of mistakes were far larger for the student papers (37% of the errors in APA reference lists, and 57% of the errors in CMS bibliographies). Furthermore, citation generators often fail to include all the necessary elements of a complete APA reference list entry or add unnecessary elements in the case of a CMS bibliography entry.

Most of the focus group participants reported using a database, library catalogue, or software program like Zotero to format the citations in their bibliographies or reference lists (not footnotes or in-text citations), then editing by hand afterward according to the style guide. Notably, Salem and Fehrmann (2013) found that most undergraduates recruited into their focus groups were creating bibliographies manually rather than using citation management software. These students indicated that they had been warned against using such software due to possible inaccuracies. The literature suggests that students are correct to be wary of automatically created citations. However, Greer and McCann's (2018) study demonstrated that students rely on database citation generators as well as that of the library's discovery tool when they were tested on creating APA style citations. Interestingly, the students in Salem and Fehrmann's (2013) focus groups did not express such concerns about inaccuracy when creating citations manually. Citation literacy training must teach the basics of formatting citations according to a particular style and instruct students on what types of errors to look out for when using automatically generated citations. Targeted training on this could discourage students from relying on citation generators to produce accurate citations and help familiarize them with the formatting expectations of the citation style they are using.

In-text citations and footnotes

This study also evaluated accuracy in footnotes (CMS) and in-text citations (APA). Students creating in-text citations (APA) regularly failed to include a page number for a direct quote. This could suggest that students are relying on citation management software, perhaps in conjunction with a word processing extension, for creating and inserting citations automatically. These programs require the user to manually add the page number for direct quotes. However, even though it was a small focus group, the students the authors spoke to for this study reported that they did not know about word processing extensions for automating in-text citations or notes. Another explanation could be unfamiliarity with the style, especially formatting and pagination rules for paraphrasing versus directly quoting. When libraries offer workshops on how to cite using citation management software and word processing programs, an emphasis should be placed on the drawbacks of this technique and how to avoid common mistakes. In doing so, libraries who offer this type of programming are not only highlighting the limitations of certain software applications, which is important, but they have the opportunity to teach students not just the 'how' but also the 'why' of using different conventions for paraphrasing versus directly quoting, which is integral for grasping the rationale behind proper attribution of sources.

Most errors in footnotes came from missing elements or including unnecessary elements (nearly 50% of errors together). Most missing elements and unnecessary elements could be attributed to a lack of familiarity with CMS's complicated system of shortened notes, which requires the exclusion of most, but not all, bibliographic information after the first instance that a source is cited. Additionally, the 17th edition of CMS advises against the use of *ibid.* in notes to refer to a source cited in the immediately previous note. However, as students frequently see *ibid.* while reading course materials and conducting research, it is possible that they copy this

convention, leading them to fail to include necessary bibliographic information. Students also frequently misidentified or misunderstood sources found online, leading to the inclusion and exclusion of elements. The authors recommend in-depth citation literacy training on more complicated but heavily used styles like CMS and Turabian notes-bibliography style, with more of an emphasis on citing online sources as well as archival sources. To ensure students and researchers are aware of changes to formatting rules in a new edition of a style guide, libraries can use a variety of different strategies to communicate changes, including communicating via blogs and social media, direct outreach with faculty and students, updating online guides like LibGuides as well as any citation literacy materials librarians use, and presenting and sharing a table of changes between the last and new edition at the outset of a citation literacy or citation management software training session.

Focus group

The focus group participants reported receiving little to no formal training about how to cite once at university. While some training took place in high school, according to data collected for this study, students are not given much, if any, instruction on how to cite in either CMS or APA style and are for the most part self-taught. The literature exploring this topic covers a range of reports pertaining to when students learn to cite. Kargbo (2010) found that although most students learned to cite "in the university" (p. 227), few were taught in classes or by faculty. Dawe et al. (2021) likewise found that most undergraduate students learned citations while in their current programs, although some had learned citation styles in high school or other previous study. In Peters and Cadieux's (2019) study of Canadian undergraduates and professors, they found that the vast majority of students expected to learn referencing skills (i.e., citations) in university, whereas professors expected students to already have these skills before beginning

their university studies. This reality means that any support the library can offer will be crucial for student success in academic writing and citing, as the library might be one of the only units on campus where teaching citation literacy is a priority. A proactive response from libraries, based on this data, could be to build awareness among students in teacher training programs and advocate for teaching citation literacy education to secondary school students. Libraries could also team up with local high schools to offer workshops to students or teachers or both, on citation literacy topics, helping to prepare students going into college or university.

The data collected for this study suggests that some students have almost no time or motivation to seek out help in the form of people or guides, and that if they are to use them and benefit from them, there must be almost no barriers between the students and those resources/supports. This attitude was pervasive among the focus group participants in this study. Most academic libraries offer citation literacy support in one form or another, through the provision of guides, in-person or online workshops, video tutorials, and collecting and making accessible the latest editions of all the style manuals. However, the discoverability and convenience of these materials and services must be such that students do not need to spend a lot of time seeking them out. Challenges could also arise when discovery tools suppress the most recent edition of style manuals, leading students to refer to out of date editions or when students cannot easily locate or navigate citation guides from their own institution. One possible response from libraries is to embed citation guides, videos, links to style guides in the catalogue, and librarian information right into course modules in the learning management system or course syllabi. Another response is to strive to consistently build citation literacy training into research skills and other information literacy workshops. Students from the focus group told the authors that they would be especially interested in such workshops happening during class time during

their first semester or first year at university. Of course, as noted by Dawe et al. (2021), instructors are often hesitant to give up class time to focus on the very research skills students need to develop. Libraries are continually trying to promote their products and services through their websites and social media channels so that patrons are aware of everything on offer. How successful libraries are at doing this is another question. For the authors of this study, speaking to students, regardless of how small the group was, was very enlightening and reinforced how important it is to be visible to students if libraries want them to benefit from the available support and training.

The participants in this study's focus group agreed that they are not motivated to proactively seek out help with citations. Although participants in this study indicated they were more likely to ask their peers for help than librarians or instructors, Van Note Chism and Weerakoon (2012) found that graduate students "did not trust their peers to be accurate" in using APA style (p. 33). One reason participants provided for their lack of proactivity in seeking citation assistance is that the stress they are under just to complete readings and assignments prevents them from doing so. Compounding this day-to-day stress about course load and course work is the stress and anxiety brought on by the prospect of formatting and integrating citations correctly, especially when students are taught that any errors constitute cheating, plagiarism, and even theft. For over a decade researchers have been considering the role that fear and anxiety play in students' understanding of plagiarism and citations (Vardi, 2012). Jiao et al. (2008) examined the impact that library anxiety specifically may have on students' ability to cite, finding that graduate students with greater library anxiety committed more citation errors. This finding may suggest that making the library a more welcoming environment and encouraging students to reach out to subject or liaison librarians with questions on citation styles may

decrease the number of errors students create while citing. Libraries could also respond by being more sensitive to the language they use to talk about plagiarism and academic integrity and avoiding words like “cheating” and “misconduct.”

Exacerbating this cycle of higher rates of anxiety leading to more errors, are the inconsistent and varying expectations of professors – the number one reason, reported by participants in this study, for stress and uncertainty when it comes to citing. Some students have even gone so far as to suggest that they should be allowed to “cite the way they like” rather than be forced to follow a system of rules (Kargbo, 2010, p. 228). To alleviate the complexities and anxiety for students of managing multiple citation styles, some institutions have limited the number of assigned styles across the institution (Dawe et al., 2021) or even created their own custom in-house style for use across the university (George & Rowland, 2017). How professors and instructors evaluate their students is out of the library’s control. However, one possible response from the library could be offering more faculty support for teaching citations. This could include course specific guides, in-class instruction sessions, or presenting on this topic at a faculty meeting or communicating with professors and instructors over email, with the aim to create more departmental unity.

The students who provided information for this study see the value in citing their sources properly. Whereas Park et al. (2011) posited that “students do not see the beneficial connection that a correctly cited bibliography can offer themselves and other academics in the discipline through research validation, a portal to similar studies, and recognition of original ideas of thought” (p. 43), a sentiment echoed by the academic staff interviewed by Gravett and Kinchin (2021), students in this study provided a wealth of reasons to include citations. The authors believe this should motivate professors and librarians, as well as other educators on campus, to

help students however they can to clearly and effectively communicate their ideas and research using proper citation techniques. Discussions of academic integrity have gone beyond concepts like plagiarism and cheating and now encompass broader ideas like the ethical use of information and meaningfully contributing to the scholarly conversation. Teaching and learning librarians, with the ACRL IL Framework to guide them, can tap into students' growing sense of how important it is to understand the responsibility of knowledge creation and dissemination.

Limitations

This study faces several important limitations. The analysis of citation accuracy focused on mechanics, which may not be the most important aspect of citations for all librarians, professors, or educators. Indeed, not all errors such as those in capitalization and punctuation make it impossible to retrieve the original cited document. However, the authors feel that contributing to the scholarly conversation appropriately includes adhering to the professional standards of a discipline, which includes properly citing according to a particular manual of style. Moreover, if, as Dawe et al. (2021) report, students are in fact better at the mechanics than the art of citation, this is perhaps a demonstration that students need greater assistance and instruction in the mechanics in order to gain confidence in the more challenging aspects of citation, such as paraphrasing.

Another limitation is that focus group data is not generalizable. Moreover, the authors acknowledge that the sample size (seven participants) is small. Of the seven focus group participants, six were enrolled in the department of history and classics and one was enrolled in sociology, meaning that the group did not represent all humanities and social sciences students, but primarily history majors who typically use CMS. Despite these limitations, the focus group methodology allowed us to delve more deeply into student opinions on and experiences with

citations, as well as some motivated students' suggestions for improving and enhancing library services with regard to citation literacy.

Conclusion

The goal of this study was twofold. The authors wanted to measure the level of citation literacy through evaluating citation accuracy in papers written by undergraduate history and sociology students who use CMS and APA style respectively. Having a better understanding of the types of errors students are making can help the authors and other practitioners make informed decisions about what to focus on when planning and providing citation literacy support. In the opinion of the authors, the mechanics of citation are critical for clear and effective scholarly communication. That said, gaining insight into the technical citation errors undergraduate students make is only one part of the picture. The authors also wanted to know more about students' abilities in this area beyond the number and types of citation errors they make. Using a focus group, the authors were able to gather information from students regarding why they cite, how they are taught (or not taught) citation skills, and what kind of support they need and the best ways to access that support. The undergraduate student papers contained high numbers of errors, especially in certain categories, pointing to a possible overreliance on citation generators found across a variety of tools. Students describe citing as a frustrating part of academic writing and expressed a desire for clearer and more consistent guidelines from their instructors and professors, as well as easily accessible and convenient citation literacy support from the library, preferably integrated directly into their courses. They also consider proper citations to be more than giving credit and see it as a signal to their reader that they are well socialized in their discipline and their research is sound. The results of both the paper evaluations and the focus group help guide the way for academic librarians who wish to better understand the

types of citation errors students are making, possible reasons why they are making them, student attitudes about citation practices, and how they can strengthen their support in this important area of research and scholarly communication.

Disclosure Statement

The authors report there are no competing interests to declare.

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Appendix

Focus group questions

1. What citation styles are you most familiar with?

2. Where have you learned about citations: at [home institution], in secondary/high school, during another degree, self-taught?
3. What are the reasons citations are required for academic writing?
    a. (Why) Are citations important to you? To your professors?
4. How do you go about creating citations? Do you use any online guides or tools?
5. At what point in the writing process do you create citations? (E.g., while writing a paper, at the end of paper writing.)
6. Do you feel confident in creating citations? What aspects do you find easiest, or most challenging?
7. Where do you seek support when struggling with citations?
8. What kind of support do you wish was available?
    a. Instructional videos?
    b. In-person support in the library?
    c. In-person instruction in the classroom?
    d. In-person support in your department?
    e. Online guides and manuals with step-by-step instructions and examples?

Table 1. Citation error analysis in history paper bibliographies and footnotes

Bibliography Citations (CMS)	
Total number of bibliography entries	225
Average number of bibliography entries per paper	9
Range of number of bibliography entries	5-14
Total number of citation errors in bibliography entries	404
Average number of citation errors per bibliography	16.16
Range of number of citation errors per bibliography	7-38
Average number of citation errors per bibliography entry	1.80
Most common citation error in bibliography	Syntax: missing elements
Least common citation error in bibliography	Pagination and inclusion of accessed/modified dates unnecessarily (tied)
Footnote Citations (CMS)	
Total number of footnotes	372
Average number of footnotes per paper	14.88
Range of number of footnotes	1-29
Total number of citation errors in footnotes	502
Average number of citation errors in footnotes per paper	20.08

Range of number of citation errors in footnotes	6-38
Average number of citation errors per footnote	1.35
Most common citation error in footnotes	Syntax: missing elements; second tied punctuation and inclusion of unnecessary elements
Least common citation error in footnotes	Date

Table 2. Citation error analysis in sociology paper reference lists and in-text citations

Reference List Citations (APA)	
Total number of reference list entries	307
Average number of reference list entries per paper	12.28
Range of number of reference list entries	8-21
Total number of citation errors in reference list entries	564
Average number of citation errors in reference lists	22.56
Range of number of citation errors in reference lists	2-44
Average number of citation errors per reference list entry	1.84
Most common citation error in reference lists	Capitalization
Least common citation error in reference lists	Unable to retrieve webpage; after website errors, misspelling of names
In-Text Citations (APA)	
Total number of in-text citations	662
Average number of in-text citations per paper	26.48
Range of number of in-text citations	8-57
Total number of citation errors in in-text citations	337
Average number of citation errors in in-text citations	13.48
Range of number of citation errors in in-text citations per paper	0-44

Average number of citation errors per in-text citation	0.51
Most common citation error in in-text citations	Pagination
Least common citation error in in-text citations	After website errors and other items that don't apply, misspellings