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Research Article

Government Information Use by First-Year Undergraduate Students: A Citation Analysis

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Abstract

Objective – The objective of the study was to investigate how first-year undergraduate students in a general education communication course engaged with government information sources in their academic research. The study examined the frequency, types, and access points of cited government information, as well as patterns in secondary citations and topic-based variation, to identify implications for library instruction, discovery systems, and collection strategies.

Methods – For the study, the researchers analyzed citations from persuasive papers submitted by 136 students across 14 course sections. A total of 1,704 citations were reviewed, of which 124 were identified as government information sources. A classification scheme was developed to code citations by source type, government level, agency, and access point. Researchers also conducted a secondary citation analysis to identify where students referenced government-produced

content through nongovernmental sources and categorized papers by topic to assess variation in government information use.

Results – Government sources constituted 7.3% of all citations, with 45.3% of students citing at least one government source. Most cited materials came from U.S. federal agencies, particularly the Department of Health and Human Services and the U.S. Congress. Students predominantly accessed government sources through open Web sources, with minimal use of library databases and materials. The types of government sources most commonly cited were webpages, press releases, and reports. An additional 201 secondary citations referenced government information indirectly. Citation patterns varied by topic, with higher engagement in papers on government, immigration, and environmental issues.

Conclusion – The findings suggest that even without explicit instruction or assignment requirements, undergraduate students demonstrated baseline awareness and independent use of government information sources. However, their reliance on open Web access and secondary references highlights gaps in discovery, evaluation, and access. Instructional support could enhance students' ability to locate and critically engage with more complex and authoritative government documents. Beyond instruction, the findings inform strategies for enhancing discovery, improving visibility, and promoting balanced access to government information.

Introduction

Popular and scholarly sources remain a central focus in introductory information literacy instruction for first-year undergraduate students, often shaping how research skills are taught (Jankowski et al., 2018; Seeber, 2016). Students typically progress through a general education course by engaging with credible popular sources, building up to academic sources, and culminating in a research assignment requiring a certain number of both source types (Insua et al., 2018; Koelling & Russo, 2021). Within this structure, and constrained by both source requirements and time, librarians often frame their instruction around these two source types, teaching source evaluation techniques with examples such as a news website and a scholarly article or introducing library databases as access points to newspapers and peer-reviewed journal articles (Fisher & Seeber, 2017; Insua et al., 2018) While this approach undoubtedly introduces students to different types of information and prepares them for more advanced research, it also overlooks a third type of information that is equally essential to the research process: government information.

Government information is an essential aspect of academic research, providing authoritative and freely available resources on topics ranging from public policy and health to science and global affairs in the form of reports, datasets, legislation, and agency publications. Its broad coverage and established credibility make government information an ideal information source type for first-year undergraduate students who often select research topics grounded in broad or well-known issues, often tied to current events, social concerns, or policy debates (Hallam et al., 2021; Shrode, 2013). Because government sources remain freely available after graduation, developing skills for locating and evaluating them not only strengthens students' academic research but also has the potential to build the foundation for lifelong information literacy and civic engagement (Dubicki & Bucks, 2018; Hogenboom, 2005; Rogers, 2013). As Brunvand and Pashkova-Balkenhol (2008) noted, government information is an "essential part of the information universe" (p. 205) that shapes learners into reflective and informed citizens. Yet the extent to

which first-year students discover, incorporate, and evaluate government information in their research process remains an open question. Answering this question, particularly in light of information literacy instruction that presents an information ecosystem consisting of primarily popular and academic sources, is important to both better understand current first-year student research habits and identify ways to change current information literacy instruction practices (Leiding, 2005).

In this study, we examined how first-year undergraduate students in a general education communication course at a large public land-grant research university in the United States engaged with government information in their research. The course's persuasive paper assignment, which requires students to take a stance on a current policy issue, offers a natural opportunity to investigate how students integrated government information without being explicitly prompted to use it. Through a citation analysis of persuasive papers, the researchers explored the frequency, type, and access points of government information used by students, as well as the role of library resources in facilitating its use. Notably, the persuasive paper assignment did not require students to use any specific type of resource, allowing for an analysis of how government information naturally fits into student research habits. Although previous research has shown that undergraduate students' source choices are strongly influenced by instructor expectations and assignment design, and strict scholarly source requirements can discourage exploration of nontraditional materials (Davis, 2003; Robinson & Schlegl, 2004), in this study, we explored what students do when no such prompt or source-type requirements are given. This instructional design may contribute to a broader variety of sources, including government information.

By analyzing student citation behaviours, this study contributes to ongoing discussions about the visibility and accessibility of government information in undergraduate education. The findings have implications for library instruction, resource promotion, collection development, and strategies to improve discovery and access to government documents in academic settings.

Literature Review

Introduction

Government information encompasses a wide range of materials produced by U.S. federal, state, local, and international entities including legislative documents, statistical data, agency reports, and public communications. Government sources support everyday life by offering resources such as weather alerts, tax filing tools, public health updates, and transportation schedules. Additionally, government information serves crucial roles in academic research and civic engagement, providing authoritative and publicly accessible information that can enrich evidence based inquiry and promote informed citizenship. In this literature review, we explored how undergraduate students engage with government information, focusing on patterns of use, barriers to discovery and evaluation, and the role of instruction. We also highlight gaps in existing research, particularly regarding how first-year students discover and use government information.

Undergraduate Use of Government Information

Before the widespread adoption of the Internet, Hernon (1979) looked into the academic use of government publications by social scientists at various academic institutions in the Midwest. The leading reasons for government information usage were statistical data, research and technical reports, historic information, and current events and issues of interest. Although Hernon only looked at faculty use of government publications, he believed that faculty use heavily influences student utilization of sources

which was confirmed as one of the major reasons of government information use of undergraduate students by a later study by Nolan (1986).

Nolan (1986) surveyed undergraduate students in the social sciences and found that 68% of the respondents used government documents at least once in the past academic year. To questions asking about the reason for non-use or infrequent use of government publications, a majority responded that it wasn't required for classes, followed by, they were unfamiliar with arrangement, not worth the effort, and nothing was valuable to their interest. The reason for choosing documents as a source was that half of the respondents knew that government publications would be a good source for meeting their needs. The next four reasons were recommended by faculty, cited in the literature, required by faculty, and discovered in card catalogue.

The rise of the Internet has profoundly shaped undergraduate students' use of government information. Brunvand and Pashkova-Balkenhol (2008) found that as online access expanded, government information became one of the most frequently cited sources in undergraduate research, even when its use was not required. The authors did note that a library session took place beforehand where they mentioned the value of government information. Their citation analysis of undergraduate bibliographies from 2003–2006 showed that 42% of students cited at least one government source in their annotated bibliography consisting of six sources in specified formats. The government information sources represented 10% of all sources used by the students, however, 42% of the students selected a government source as the best source for their topic area.

Leiding (2005) offered a valuable look at pre- and post-Internet information-seeking behaviours by analyzing bibliographies of undergraduate honors theses from 1993–2002. Leiding examined the types of sources students cited and identified emerging trends. Results showed that Web citations started appearing in 1997. Government documents, law texts, court cases, and bills constituted 5% of all citations with only 45.4% of the cited non-legal government publications available locally. As more government publications move online, Leiding emphasized the importance of the ability to navigate government websites for future access.

Barriers to Discovery and Evaluation

Despite the increasing availability of government information online, significant barriers remain for undergraduate users. Students often struggle with finding credible or relevant sources and evaluating the authority sources, especially when encountering complex legislative or technical formats.

In the pre-Internet era, many librarians believed that government publications were underutilized mainly due to poor bibliographic control making it difficult for researchers, students, and faculty to become aware of and gain access to needed government publications (Hernon, 1979; Nolan, 1986). In Hernon's study (1979), faculty members indicated that they didn't use or infrequently used government publications in their research and teaching because there was nothing of value for their area of interest or too much time was required to locate and extract government information. Instead, they relied on current, summarized information found in newspapers, periodicals, and loose-leaf services. Hernon also noted that unfamiliar classification systems and complex retrieval methods discouraged use.

Brunvand and Pashkova-Balkenhol (2008) observed that students primarily discovered government information through general search engines at 48% followed by a .gov site specific search at 14%. Authors noted that the method of using the general Internet search might have been the reason students failed to

locate and use congressional and legislative information that was more discoverable through government specific portals and databases. The authors further argued that Web searching may also have hindered the students' ability to retrieve authoritative or complete resources. Even in the pre-Internet age, government documents weren't easy to locate and use. Nolan (1986) highlighted similar barriers decades earlier, emphasizing that many students found government documents confusing to locate and use, largely because of unfamiliar classification systems and the lack of clear guidance.

In a user study conducted at the University of Montana to understand how students, faculty, and staff use government information and their preferences and awareness of available resources, Burroughs (2009) further supported these findings by identifying lack of awareness, difficulty in discovery, and perceived time consumption as key reasons for the underuse of government resources among library users.

Psyck (2013), in a chapter addressing public service strategies in the digital age, noted that digital access has made government information more visible and approachable by removing physical and classification barriers. However, this has not aways been accompanied by instruction in evaluating source credibility, leaving users vulnerable to misinformation or shallow interpretations of complex government data.

Hollern and Carrier (2014) and Simonsen et al. (2017) provided additional insight into challenges faced by students engaging with legal and scientific government information. Their studies highlighted the complexity of interpreting such documents and recommend structured, subject-specific instruction to build competency.

Instruction

Several researchers have explored how targeted instruction can improve students' engagement with government information. Downie (2004), in a two-part article, noted that time constraints and the perceived complexity of government documents often prevent their inclusion in library instruction. However, Downie argued that librarians can overcome these internal barriers through strategic planning and a shift in attitudes toward the value of government information.

Scales and Von Seggern (2014) developed a government document information literacy program that emphasized observable learning outcomes, encouraging students to incorporate unfamiliar but publicly available information sources into their research. Their approach challenged students to engage with authoritative government resources beyond traditional scholarly articles. The study documented an increase in government information use among undergraduates, with an increase from 25% to 56% of students choosing to use government information in their work post-library instruction.

Simms and Johnson (2021) advocated for integrating government information into first-year information literacy sessions through familiar methods such as subject-based Google searches. By meeting students where they are in their current research habits, librarians can introduce government sources early in their academic journeys, helping to build information literacy skills. The early introduction to government information promotes lifelong engagement with freely accessible and authoritative sources.

Gaps in the Literature

While existing studies provide valuable insights, most focused on upper-division courses (Leiding, 2005; Oppenheim & Smith, 2001), targeted instructional programs or workshops (Hollern & Carrier, 2014; Scales & Von Seggern, 2014; Simms & Johnson, 2021), or contexts where students receive structured guidance specifically on locating and using government information or have restrictions on using specific source types (Brunvand & Pashkova-Balkenhol, 2008; Davis, 2003). There is limited research examining first-year students' natural, unprompted use of government information in general education courses.

This study aimed to address this gap by examining how first-year undergraduate students integrated government information into a research paper, building on the work of Brunvand and Pashkova-Balkenhol (2008). However, this study offers an updated perspective, reflecting how Internet access has become a ubiquitous part of student life and research practices. Additionally, students in the course were not required to use government information nor did they receive instruction on how to find or use it, allowing us to observe how novice researchers independently discover and apply these sources.

Aims

This study aimed to explore how first-year undergraduate students used government information in academic research when they were not explicitly required or guided to do so. Focusing on persuasive research papers from a general education course, we sought to understand students' natural information-seeking behaviours and how government information fits into their research practices.

Specifically, we addressed the following research questions:

- How often do first-year undergraduate students cite government information in their research papers?
- What types of government information do students most frequently use?
- How do students access government information?
- What patterns in student use of government information can inform future library instruction, resource development, and strategies to improve discovery and access?

By investigating these questions, we contribute to a deeper understanding of how undergraduate students independently engage with government information and offer insight for improving support through academic libraries and instruction programs. Understanding the importance undergraduate students place on government information highlights the potential for government information to serve both as an academic and lifelong learning tool in information literacy instruction programs.

Methods

To investigate how first-year students incorporated government information into their academic work, we analyzed citations drawn from persuasive research papers assigned in a required introductory general education course at a large public research university. The course emphasizes the development of critical thinking, writing, and speaking skills through analysis, research, and argumentation with a particular focus on first-year undergraduate students. The course is structured around a series of assignments that build toward a final persuasive research paper. This assignment requires students to take a stance on a current policy issue related to a broader controversy they have researched throughout the term. Papers must be at least eight pages in length and cite a minimum of eight sources from a longer working bibliography of 20 or more references.

Library involvement in the course included each section receiving a one-shot information literacy instruction session taught by a librarian or trained graduate assistants during the Fall 2023 semester. All course sections received 50 minutes of instruction consisting of an overview of the library, development of source evaluation skills using a report from The Brookings Institution, and learning database search techniques to find scholarly articles using the database Academic Search Ultimate. A few sections were 80 minutes long and those sections received additional instruction on how to read a scholarly article.

Information literacy instruction focused primarily on developing fundamental source evaluation skills, such as determining credibility via author, publisher, and publication date, and using library databases to find news and scholarly articles. A sample topic "Government regulation of the use of artificial intelligence in social media is a controversial issue" was used throughout the session due to the course requiring students to select a currently policy issue. The Brookings report used in the instruction sessions, "Protecting privacy in an AI-driven world," did cite government information. While the sample topic and source were related to governmental policies, the instruction sessions did not teach students how to find or evaluate government information nor was government information suggested as a possible source for their assignments. Additionally, information about government information was not included on the course library guide. As a result, students' use of government information in their research papers offers insight into their independent engagement with these sources, absent formal guidance or requirements.

This course was chosen for this study because it allowed students broad flexibility in their source selection. As many researchers pointed out, courses where the instructors encouraged students to use books and academic journals and discouraged Web content, resulted in lower usage of government sources (Brundvand & Pashkova-Balkenhol, 2008; Robinson & Schlegl, 2004). Unlike many first-year courses that require students to use a set number of specific source types such as peer-reviewed sources or newspaper articles, this course's persuasive paper assignment did not have source-type requirements. This approach provided a unique opportunity to observe students' natural information-seeking behaviours, including their selection and use of government information. In Fall 2023, 369 students enrolled in the course. The research team visited 15 out of 18 sections of the course to recruit students interested in participating in the study with 178 out of 369 students consenting to having their persuasive papers and annotated bibliographies sent to the research team (a detailed breakdown of papers collected by section is provided in Table 1). The research team's institutional review board reviewed the present study and determined it did not meet the definitions of Human Subjects Research, deeming that IRB oversight was not required.

Although 178 students initially consented, persuasive papers were received for only 165 students as well as annotated bibliographies from 163 consenting students. Additionally, one section of the course did not send any persuasive papers or annotated bibliographies to the research team, reducing the number of participating sections to 14. This study focused only on the persuasive papers as the authors determined that sources cited in a paper better represented sources students would use or apply to their work than those in an annotated bibliography. The authors also decided to only analyze persuasive papers with a works cited section for consistency as some papers either lacked a works cited section or included an annotated bibliography in place of a works cited section. Adjusting for persuasive papers with a valid works cited section resulted in 136 papers analyzed in this study. This sample represents approximately 37% of the total course enrollment and reflects a broad cross-section of first-year students, including those across 14 sections taught by multiple instructors, which helped reduce the influence of a single instructor's teaching content. This focus on first-year undergraduate students is particularly significant because, as Nolan (1986) noted, senior undergraduates often engage with information sources differently

due to major-specific readings and research expectations, a factor less prevalent among first-year students.

Persuasive papers were de-identified by replacing student names with codes and then deleting any identifying information within the paper. A total of 1,704 citations from the works cited sections were copied to a separate Excel spreadsheet and labeled with the corresponding student code. Instances where students cited the same title multiple times were deduplicated to ensure that each unique source from the same student was counted only once.

The research team developed category definitions and a coding scheme to ensure consistent classification of source types. For interrater reliability, three coders independently coded a random subset of approximately 10% of citations (161) from the dataset. The coding results were compared, discussed, and repeated until full agreement was reached. The category definitions were then revised to incorporate these clarifications and ensure consistency across all coders.

The research team developed a two-step coding process to classify source types. During the initial phase, coders used broad, easily identifiable categories such as Academic Source, Major News Source, News Source, Book & Book Chapter, and Other. Any ambiguous or multi-format citations, including those that were government-related or required additional context to classify, were temporarily placed in the "Other" category to maintain coding consistency across multiple coders. This process was necessary as government information can be difficult to identify at first glance and may require additional research or discussion to confirm. For example, determining whether a source was produced by an intergovernmental organization or a nonprofit publisher often involved reviewing the publishing entity or organizational affiliations. Some publications emerged from government-funded programs or partnerships, and in these cases, the research team only classified them as government information if a government agency was clearly listed as a direct publisher or contributor to the content.

In the second phase, the "Other" category was systematically reviewed by the two lead researchers. For the purposes of this project, government information sources were defined as any information produced by government entities at the U.S. federal, state, local, or municipal levels, as well as by international governments and intergovernmental organizations (IGOs) with recognized authority in specific areas. This included entities such as the United Nations (UN) and other similar organizations. Government produced sources were recorded as "Government Source" and analyzed separately. The analysis identified the level of government, the agency, and the type of resource, which allowed for differentiation between various formats of government information such as books, reports, datasets, or blog posts content while maintaining a consistent categorization framework. The definitions for the types of government resources and levels of government used in the coding process are detailed in the Appendix. Other citations in the "Other" category were assigned to subcategories such as Advocacy & Nonprofit Source, Professional Communication, and Reference Source.

To improve clarity for this article, these categories were later unified into a single list of source types: Academic Source, Major News Source, News & Media Source, Advocacy & Nonprofit Source, Government Source, Professional Communication, Reference Source, Higher Education Source, Business Communication, Book & Book Chapter, Media & Social Media, Institutional Analysis & Report, Interview, Speech, & Discussion, Dissertation & Thesis, and Unknown & Miscellaneous. For full details of the categories and definitions, see the Appendix.

To supplement this analysis, the researchers conducted a secondary citation review to identify cases in which students referenced government-produced information such as laws, statistics, court cases, or agency statements indirectly through non-governmental sources, rather than citing the original government information sources. This review applied a strict inclusion standard: only nongovernmental citations were included when the section that included the citation clearly described or summarized content produced by a government entity. The researchers did not examine the cited source itself or any surrounding context.

To further explore patterns in how students used government information, all persuasive papers were assigned a topical category based on the subject of their paper. Categories were created inductively using common themes in paper titles. After categorization, the number of original government information and secondary government citations were totaled for each topic. Additionally, to account for variation in the number of papers per category, the researchers calculated the average number of government citations per paper in each topical area.

Access points for government information citations were determined by examining the URLs included in the student citations. The majority of government citations contained direct links to the source. It was assumed that students accessed these sources through the URLs provided. Citations with URLs leading to government or agency websites were classified as open Web access, while citations containing library proxy links or referencing subscription-based databases were categorized as library access.

Results

Overall Government Information Use

1To contextualize student use of government information, all 1,704 citations were categorized into source types. Academic sources made up 29% of the total, followed by major new sources at 22.3%, advocacy and nonprofit sources at 11.2%, and general news and media sources at 10.3%. Government information accounted for 7.3% of all citations, while professional communication comprised 4.7%, reference sources 4%, higher education sources 3.5%, and business communication 3.3%. Less common source types included books and book chapters (1.9%), media and social media (0.6%), institutional analyses and reports (0.4%), interviews, speeches, and discussions (0.3%), dissertations and theses (0.1%), and unknown or miscellaneous sources (1.1%). These distributions are illustrated in Figure 1. 136 government information citations accounted for 7.3% of the total 1,704 citations, with 124 citations identified across 62 papers. Nearly half of the papers included at least one government citation, representing 45.3% of the sample. Of persuasive papers that cited government information, 28 papers had one government information citation, 18 contained two citations (29.0%), 7 contained three citations (11.3%), 7 contained four citations (11.3%), 1 contained five citations (1.6%), and 1 contained six citations (1.6%). Government citations appeared in papers across all course sections, though unevenly distributed.

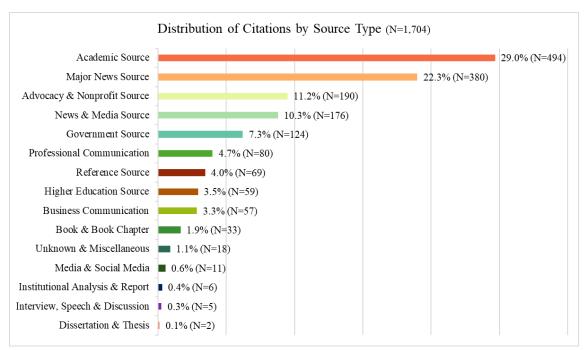


Figure 2 Distribution of citations by source type (N=1,704).

Table 1 summarizes the number of persuasive papers collected per section, the number of papers citing at least one government source, the percentage of papers citing government information, and the average number of government citations per papers that cited government information. The percentage of papers citing government information ranged from 20-80% with an average of approximately 45.3% across all sections.

Table 1
Distribution of Government Information Use Across Sections^a

Section	Total Papers	Papers Citing Gov	Percentage Citing	Average Gov Citations per
	Analyzed	Info	Gov Info	Paper
A	10	2	20.0%	1.00
В	6	2	33.3%	2.00
B2	9	5	55.6%	1.80
С	5	2	40.0%	2.50
D	13	5	38.5%	2.40
Е	9	4	44.4%	2.25
F	9	2	22.2%	1.00
F2	17	9	52.9%	2.22
G	10	8	80.0%	2.00
Н	3	2	66.7%	1.00
H2	5	4	80.0%	2.00
Ι	11	6	54.5%	2.50
I2	11	4	36.4%	1.75
J	18	7	38.9%	1.86

^a Section identifiers have been de-identified for reporting. Additionally, sections with 2 indicate a second section taught by the same instructor as the corresponding base alphabet.

Government Information by Government & Agency

As shown in Table 2, federal government sources were the predominant category, making up 84 of the 124 government information citations, or 67.7%. IGOs accounted for 28 citations, representing 22.6% of the total. State and local government sources were minimally utilized, contributing just nine citations, or 7.3% and one citation, or 0.8%. Foreign government sources also appeared infrequently, with only two citations, making up 1.6% of the total.

Table 2
Citation by Type of Government (N=124)

Type of Government	Citations	Percentage of Government Citations
U.S. Federal	84	67.7%
Intergovernmental Organization (IGO)	28	22.6%
State	9	7.3%
Foreign	2	1.6%
Local & Municipal	1	0.8%

Among the 84 federal sources, the Department of Health and Human Services was the most cited agency, appearing in 19 citations, or 22.6% of federal government citations. Other frequently cited federal sources included the U.S. Congress, cited 10 times, accounting for 11.9%, while the Department of Justice appeared in 7 citations, or 8.3%. The Department of Agriculture, Department of Education, and NASA were each cited four times, representing 4.8% each.

For IGOs, the UN was the leading source, accounting for 18 citations or 64.3% of all IGO references. The European Union (EU) was cited three times, representing 10.7%, while both the International Monetary Fund (IMF) and the World Bank were cited twice each.

State and local government sources showed a sparse distribution, with Illinois, Florida, and the City of New York being the only identifiable contributors. Similarly, foreign governments were represented by only two citations from the United Kingdom and Australia.

Government Information by Source Type

In terms of document type, the most frequently cited source types were general webpages followed by press releases and agency news and reports. Students also cited fact sheets, data and statistics, articles, legal documents, blog posts, books, and even podcasts and speeches.

Table 3
Government Citation by Type of Information (N=124)

Type of Information	Citations	Percentage of Government Citations	
Webpage	34	27.4%	
Report	25	20.2%	
Press Release, Statement, & News	25	20.2%	
Article & Blog Post	8	6.5%	
Fact Sheet & Information Brief	8	6.5%	

Bill, Legislation, & Legal Document	7	5.6%
Congressional Research Service (CRS)		
Report	5	4.0%
Book & Book Chapter	5	4.0%
Data & Statistic	5	4.0%
Speech & Podcast	2	1.6%

Secondary Citations to Government Information

In addition to 124 direct citations to government information, a separate analysis was conducted to identify secondary citations where students referenced government-produced information such as laws, statistics, or agency statements through nongovernmental sources. This review revealed 201 such instances across the 136 persuasive papers analyzed.

These secondary citations were drawn from a wide range of source types. As shown in Table 4, the most common categories included Major News Sources (34.3%), Advocacy and Nonprofit Sources (19.4%), Academic Sources (16.9%), and News Sources (12.4%).

Table 4
Secondary Citation to Government Information by Type of Information (N=201)

Type of Information	Citations	Percentage of Secondary Citations	
Major News Source	69	34.3%	
Advocacy & Nonprofit Source	39	19.4%	
Academic Source	34	16.9%	
News Source	25	12.4%	
Reference Source	12	6.0%	
Professional Communication	7	3.5%	
Higher Education Source	5	2.5%	
Business Communication	4	2.0%	
Unknown & Miscellaneous	3	1.5%	
Media & Social Media	2	1.0%	
Book & Book Chapter	1	0.5%	

Topic-Based Variation in Government Information Use

When combining both direct and secondary citations to government sources, a total of 325 citations were identified across 136 student papers. Government information appeared most frequently in papers about environmental issues (15.1%), immigration (13.8%), and technology and artificial intelligence (11.7%). Other frequently represented categories included health and healthcare (8.3%), government and politics (8.0%), gender and civil rights (7.4%), and education (6.8%).

As shown in Table 5, topic categories also varied in the average number of government citations per paper. Papers on government and politics had the highest average (5.2 citations per paper), followed by immigration (4.5), economics and labor (3.5), criminal justice and prisons (3.5), and food (3.4). In contrast, education (1.8), technology and AI (1.4), censorship (1.0), and sports (0.5) showed lower levels of

government information engagement per paper. These findings suggest that topic choice influenced both the frequency and depth of government source usage in student research.

Table 5
Government Information Citation Counts by Topic Category

Topic Categories	Direct and Secondary	Number of	Average
	Government Citations	Papers (N=136)	Government
	(N=325)		Citation per Paper
Government & Politics	26	5	5.2
Immigration	45	10	4.5
Economics & Labor	14	4	3.5
Criminal Justice & Prisons	7	2	3.5
Food	17	5	3.4
Environment	49	15	3.3
Gender & Civil Rights	24	9	2.7
Health & Healthcare	27	12	2.3
Privacy & Data	8	4	2.0
Other/Uncategorized	25	13	1.9
Animals & Animal Rights	17	9	1.9
Education	22	12	1.8
Technology & AI	38	27	1.4
Censorship	3	3	1.0
Sports	3	6	0.5

Government Information Access Points

Out of 124 government information citations analyzed, 121 or 97.6% of government citations included links to open Web resources, typically on government or agency websites. Only three citations were identified as coming from subscription-based library resources, and one citation lacked a link entirely, leaving the access point unknown.

The majority of URLs led directly to materials hosted on government and agency websites. Many of these linked sources were in formats such as webpages, press releases, news articles, and fact sheets. More technical or specialized formats, such as legislative documents or datasets, were cited less frequently.

Discussion

This study provides insight into how first-year undergraduate students engaged with government information when not explicitly required to do so by assignment or instruction. Government information comprised 7.3% of all citations, and 45.3% of analyzed papers included at least one government citation, a pattern consistent with findings by Brunvand and Pashkova-Balkenhol (2008), despite key contextual differences. In that earlier study, students received targeted instruction on the value of government information, while students in the present study did not. The similarity may point to the changing landscape of discovery, where the availability and presentation of government information, particularly on the open Web, shape student access.

One possibility may be that current first-year students are more aware of government information and may not perceive it as unfamiliar or difficult to use. This would contrast with earlier studies like Downie (2004), who noted that students often avoided government sources unless recommended by faculty or librarians. In this course, students were also required to complete an annotated bibliography in advance of their persuasive paper, which may have prompted more intentional reflection on the value and credibility of sources, possibly contributing to their decision to cite government sources. Another possibility is that government information is more readily available and more discoverable today. As shown in Table 3, the high proportion of government webpages (27.4%), reports (20.2%), and press releases/statements/news (20.2%) cited in this study supports this, as these types of information are frequently indexed and discoverable through general search engines like Google. This pattern aligns with Simms and Johnson's (2021) recommendation to incorporate Google-based discovery strategies into government information instruction, acknowledging students' natural search behaviours. At the same time, the reliance on easily accessible formats may reflect a limited or surface-level engagement with government information, highlighting an opportunity for deeper instructional interventions.

The use of these sources does not diminish the significance of students choosing to cite government information. However, future research examining student motivations on how they distinguish government sources, such as webpages, from other sources of online content would offer valuable insights. While this study can only speculate on possible student motivations and behaviours, the findings provide a meaningful foundation for exploring how first-year undergraduate students engage with use of government information. This foundation, strengthened by the context and the wide-spread distribution of government information use across course sections, raise potential avenues for future strategies in library instruction, collection development, discovery systems, and outreach.

Patterns of Government Information Use in Student Research

The analysis revealed that federal government sources were overwhelmingly the most common, while state, local, and foreign government sources were rarely cited. Several factors may explain this pattern. Students may be more aware of, or have easier access to, federal resources compared to non-federal sources. They may also find federal materials more discoverable through general search engines. The data showed that agencies such as the Department of Health and Human Services and the U.S. Congress were among the most frequently cited, suggesting that students often selected research topics such as healthcare, education policy, criminal justice, or climate change, which are often addressed through federal agencies and national-level information. Regardless of the reason, this imbalance has implications for library collection strategies. Libraries may need to enhance the visibility of state, local, or international government resources to help students access a broader range of perspectives and data.

The types of government sources cited were another important pattern. Students relied heavily on government sources that often summarize complex information in a more digestible form such as press releases, fact sheets, reports, and webpages. More complex and technical materials like legislation, legal texts, or datasets were rarely used. Brunvand and Pashkova-Balkenhol (2008) observed a similar trend, noting that general search engines often fail to retrieve detailed legislative materials, which limited students' exposure to these resources. This pattern may also reflect students' preferences for sources that can be quickly understood and integrated into persuasive arguments, particularly in the context of an early undergraduate general education writing assignment. Students might feel less confident engaging with legal or policy documents as well as data sources and choose to interpret them through media lenses rather than primary government texts. As Hogenboom (2005) pointed out, relying solely on media interpretations of government content can limit students' ability to engage critically with primary

materials. This suggests an opportunity for librarians to teach students how to locate and interpret original government sources, especially those that are more complex or specialized.

The distribution of government citations appeared to vary by topic. While environmental issues and technology accounted for the highest overall number of citations, papers on government and politics, immigration, and economics had the highest average citations per paper. This suggests that some topics may lend themselves more naturally to citing government sources, either due to content availability or perceived relevance. Lower citation averages in topics like sports, censorship, and popular media may reflect gaps in awareness or difficulty locating applicable government materials. These patterns suggest a role for instruction in helping students recognize when government information can strengthen arguments across a broader range of subjects.

Digital Discovery, Access, and Library Strategies

Our analysis confirmed that nearly all government sources cited by students were accessed through digital means, with 97.6% of citations including direct link to the online resources. At the institution where this study was conducted, the library has historically maintained a comprehensive print government publications collection as a federal, state, and UN depository library. The library also holds selected print publications from foreign governments including Canada and the United Kingdom. These print holdings are discoverable through the library catalogue and remain accessible to students.

However, despite this availability, students in this study overwhelmingly cited digital versions of government information. This suggests that even when print sources are accessible, students may default to digital options due to convenience or may be unaware that print materials are available. Additionally, an increasing portion of government information is now published exclusively online, further reinforcing this shift.

While earlier research described the expansion of the World Wide Web as reshaping access (Leiding, 2005; Oppenheim & Smith, 2001), this study reflects a complete shift in government information usage among first-year students now almost exclusively accessing government materials in digital format. As Selby (2008) emphasized, today's challenge is no longer about gaining access, but rather about navigating the overwhelming volume of online material and identifying outdated or incomplete government information. This evolving context highlights the importance of equipping students with strong evaluation and search skills to navigate the digital government information landscape effectively.

Additionally, the study found that almost all government citations pointed to open Web sources, while only a small fraction came from library resources. While we cannot definitely determine how students located these sources, prior research suggests that undergraduates frequently rely on general Web search tools to find government information (Brunvand & Pashkova-Balkenhol, 2008; Powell et al., 2011; Smith, 2010). This carries important limitations as search engines may not surface specialized government resources located in agency specific portals or library databases. For example, Hogenboom (2005) highlighted that general search engines are often unable to retrieve detailed resources like Census Bureau tables, which require targeted navigation within their specialized platform or library subscribed statistical databases.

It is important to recognize that open access government resources remain a valuable and necessary part of the information ecosystem. Many government agencies provide freely available public information that is not always accessible through subscription-based databases or library catalogues. Open access

resources also hold lifelong value, as students can continue accessing these materials after graduation without relying on library subscriptions or institutional logins Hogenboom, 2005; Roger, 2013; Scales & Von Seggern, 2014).

However, the overwhelming reliance on using open access government materials raises important questions about whether students are consistently identifying the most appropriate, stable, or authoritative versions of government materials. Open access government information can be inherently unstable as websites and resources can be modified, removed, or relocated without notice, especially due to shifts in government policies, administrative structures, and resource allocations. In contrast, government resources accessed through library databases and catalogues are actively managed and preserved by libraries and commercial vendors, ensuring more stable and consistent access. These systems also provide specialized search tools that can help students locate relevant government information more efficiently which can be particularly helpful for introductory level undergraduate student research. Meanwhile, search engines often fail to retrieve certain types of government information due to technical barriers such as dynamic databases, crawler restrictions, or poor indexing (Klein, 2008).

Library instruction can play a critical role in helping students critically evaluate government sources, recognize potential gaps or removals in open access material, and use specialized search tools within databases and catalogues to enhance their research. By integrating strategies for both open access and library-based government resources, students can develop a more comprehensive approach to using government information in their research.

Libraries can play a key role in strengthening discovery pathways for government information by enhancing catalogue records, improving the visibility of underused collections, creating user-friendly research guides, and integrating government sources more prominently into the library's discovery tools. Promoting balanced discovery strategies, such as combining the openness of Web searching with the stability and depth of curated library systems, can help ensure students find both accessible and authoritative government sources.

Applications to Library Instruction and Resources

Librarians focused on first-year undergraduate students should note the results of this study because greater attention to government information in first-year instruction programs and library resources may be beneficial. Adding government information literacy instruction either to in-person library instruction sessions or digital learning objects may help students who are both familiar and unfamiliar with government information sources. Students who are unfamiliar with government information can gain experience in an underutilized area of information that may result in more holistic information literacy habits and, potentially, higher quality research products. For students already using government information, instruction can help expand their government information literacy skills and introduce deeper engagement with more complex materials.

While no current study directly connects government information use to academic performance outcomes, prior researchers have emphasized the importance of government information literacy as part of lifelong learning and civic engagement. Brunvand and Pashkova-Balkenhol (2008) noted that "government information shapes a learner as a reflective and well-informed citizen" (p. 205), while Dubicki and Bucks (2018) highlighted its ongoing relevance beyond college. Hogenboom (2005) emphasized that using government information to teach source evaluation fosters transferable skills that

benefit students "throughout their college careers and beyond" (p. 464). Similarly, Rogers (2013) emphasized that government tools are vital for information literacy instruction because they are "a vital part of information literacy instruction for lifelong learning" (p. 13). Teaching students to engage meaningfully with government information is not just about academic research, it equips them with critical thinking skills they can apply as informed citizens.

The significant proportion of first-year students in this study who used government information without external motivators suggests that students are capable of finding these resources independently. Building on the baseline interest, rather than introducing government information as an entirely new or foreign concept, librarians can build upon the types of sources students are already finding—such as press releases, webpages, and reports—and guide them toward deeper, more authoritative, and complex resources.

One area of instructional opportunity is helping students understand the difference between government primary sources and secondary reporting or summaries about government activities, such as news articles referencing legislation. The secondary citation analysis revealed many students in this study relied on journalistic or secondary summaries when discussing laws, statistics, and government actions, which may indicate a lack of familiarity with where or how to find the original materials. These patterns suggest that students frequently encounter government content indirectly, through sources that may be more accessible or easier to understand, but which might not always provide the full context or original documentation. Library instruction can help students locate the primary source and develop evaluative skills to determine when using the original source might enhance the credibility and depth of their argument. This approach could also be combined with Albert et al.'s (2020) approach of teaching government information through the lens of information creation as process. Teaching how government is created in terms of primary and secondary sources may be an impactful way to help undergraduate students better find and evaluate government information.

Another key instructional focus could be developing students' search strategies across both open Web and library systems. Since most students seemed to have accessed government information through the open Web, instruction could emphasize when this approach is appropriate and how to identify trustworthy sources of information, navigate agency-specific sites, and understand the limitations of broad search engines. For example, full-texts of legislative material, such as hearing documents, are generally not discoverable through simple keyword searching in general search engines. Pairing this with instruction on the benefits of using subscription databases and curated collections for finding archived or more technical government materials can help students move beyond surface-level discovery and gain more control over the depth and scope of their research.

Limitations

While these findings offer useful insight into first-year students' use of government information, several limitations should be considered in this study. First, this study relies solely on citations in persuasive papers to analyze undergraduate students' use of government information. While this approach led to insights on undergraduate research behaviours and prioritization of government information as sources, it does not capture the full context of their government information-seeking habits. Relatedly, in this study we did not research how students found or evaluated government information sources they cited. Future research investigating how students search, evaluate, and decide to cite government information would be beneficial.

Second, the sample used in this study was likely very homogenous as all participants were undergraduate students from the same general education course at the same institution. The sample used in this study provides insight into government information use of undergraduate students, particularly first-year students, but may restrict the generalizability of this study's findings. Relatedly, this study took place in the United States and likely surveyed mostly American students. Additional research in different courses, student populations, institutions, and countries using a similar approach would improve the interpretation of results in the present study.

Finally, this study relied on undergraduate student-created citations, some of which may have been incomplete or incorrectly cited. Citation errors or incomplete citations may have affected the coding and categorization of government information sources. For instance, one citation lacked sufficient details to determine its access point and there were several instances where students cited the same title multiple times, highlighting potential inconsistencies in how undergraduate students document their sources.

Conclusion

In this study, we examined how first-year undergraduate students engaged with government information in a major general education research assignment. By analyzing 1,704 citations across 136 student papers, we examined the frequency, types, and access points of cited government information sources. The findings showed that, even in the absence of assignment requirements or targeted library instruction, 45.3% of students independently cited at least one government source.

However, most of the government citations came from federal sources and were accessed through open Web platforms, with limited use of library-curated databases or more technical government materials. A supplementary review also revealed that many students relied on nongovernmental sources to summarize or describe government produced information, revealing instructional opportunities for libraries to support students' discovery and evaluation of a broader range of government information, including more complex or authoritative documents. Topic-based trends in citation behaviour further suggested the need for instructional support to help students connect government information to diverse subject areas.

Beyond instructional implications, the results offered insight into undergraduate search behaviours and barriers to access. Understanding how students encounter government sources can inform enhancements in discovery systems, resource promotion, and collection development to ensure government information remains visible and relevant to student needs.

Overall, we achieved our aim of exploring how students integrated government information into academic research when not explicitly required to do so. While the findings are based on a single course at one institution, the assignment structure is common in many undergraduate curricula. As such, the results may inform broader strategies for fostering meaningful engagement with government information in early academic research and beyond. Libraries that invest in targeted instruction, improved discovery tools, and resource promotion can help students develop more confident, critical, and sustained use of government information throughout their academic careers and civic lives.

Author Contributions

Sanga Sung: Conceptualization (supporting), Data curation (equal), Funding acquisition (equal), Formal analysis (lead), Methodology (supporting), Investigation (equal), Writing – original draft (lead), Writing – review & editing (equal) Alexander Deeke: Conceptualization (lead), Data curation (equal), Funding

acquisition (equal), Formal analysis (supporting), Methodology (lead), Investigation (equal), Writing – original draft (supporting), Writing – review & editing (equal)

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Appendix

Source Type Classification

This appendix provides the classification scheme used to code citation sources by type. It includes definitions of the source type categories as well as the government types and government resource categories used in the study.

Source Type Categories

- Book & Book Chapter
 Includes academic monographs, edited volumes, standalone books, and individual book chapters.
- 2. Academic Source Includes peer-reviewed or scholarly journal articles and conference proceedings.
- 3. Major News Source Covers mainstream general news outlets such as *New York Times, Washington Post, Wall Street Journal*, and others.
- 4. News & Media Source Includes non-mainstream or specialized news/media platforms geared toward the general public (not highly technical or specialized for professionals).
- 5. Higher Education Source Includes university or college-produced materials such as campus news, official university webpages, or publications.
- 6. Media & Social Media Includes audiovisual materials, podcasts, recorded content, blog posts, and social media content that are primarily media-based rather than written formal publications.

7. Advocacy & Nonprofit Source

Covers websites, publications, and materials from nonprofit organizations, advocacy groups, and mission-driven entities (noncommercial).

8. Government Source

Includes publications, reports, datasets, and materials produced by federal, state, local, or international government agencies and intergovernmental organizations (IGOs).

9. Professional Communication

Includes trade publications, industry-specific magazines, technical communications, and materials geared toward professionals within a specific field (but not academic/scholarly).

10. Reference Source

Includes encyclopedias, dictionaries, factbooks, statistical compilations, or other authoritative reference materials.

11. Business Communication

Includes company-produced content such as blogs, white papers, marketing reports, commercial websites, or corporate publications.

12. Institutional Analysis & Report

Includes reports, briefs, or working papers produced by think tanks, research institutes, university centers, or similar entities presenting original institutional research or analysis (nonacademic, noncommercial, and nongovernmental).

13. Interviews, Speeches & Discussions

Includes materials drawn from interviews, public talks, conference presentations, speeches, roundtable discussions, or similar spoken-format sources.

14. Dissertation & Thesis

Includes formal graduate-level research outputs, such as master's theses or doctoral dissertations.

15. Unknown & Miscellaneous

For sources that do not clearly fit into any of the defined categories or lack sufficient information to classify confidently

Government Types

1. Federal

U.S. federal government agencies, offices, and departments such as Congress, executive agencies, and federal courts.

2. State

U.S. state governments, including state legislatures, executive offices, agencies, and state courts.

3. Local & Municipal

U.S. municipal or local governments, including city councils, mayoral offices, or municipal agencies.

4. Foreign

Government sources from countries outside the United States, including national-level and subnational governments.

5. Intergovernmental Organization (IGO)

International bodies formed by multiple countries to address shared challenges and promote international cooperation. Examples include the United Nations, European Union (EU), World Bank, or International Monetary Fund (IMF).

Government Resource Categories

1. Webpage

Government-hosted webpages that provide general information, background context, program overviews, reference materials, or exhibit content.

Press Release, Statement, & News

Official government communications including press releases, public statements, news articles, and announcements. These are generally time-sensitive and created for public information or media dissemination.

3. Report

Formal analytical documents or policy papers issued by government agencies, including strategic plans, white papers, evaluations, and frameworks. This category also includes official guidance or planning documents intended to inform policy or administrative action. Does not include CRS reports.

4. Fact Sheet & Information Brief

Concise summaries or overviews providing essential facts or key points on a specific topic.

5. Article & Blog Post

Government-authored content published in blogs, newsletters, or other editorial formats.

6. Congressional Research Service (CRS) Report

Nonpartisan research reports produced by the Congressional Research Service to support congressional decision-making. These are categorized separately due to their specialized authorship and legislative role.

7. Data & Statistic

Datasets, statistical releases, charts, and quantitative products published by government agencies. Includes tools, dashboards, and tables representing demographic, economic, health, or other official data.

8. Bill, Legislation, & Legal Document

Legal and legislative documents including bills, statutes, regulations, constitutions, executive orders, court rulings, and hearing transcripts. Includes materials involved in the lawmaking process or with legal authority.

9. Book & Book Chapter

Full-length government published books or individual chapters, often distributed as public documents.

10. Speech & Podcast

This category includes transcripts of official speeches or addresses delivered by government officials, as well as podcast episodes produced by government agencies to communicate information or perspectives to the public.