



Investigating Students' Information Literacy in Academic Writing at Higher Education

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Abstract

As digital information has been increasing, the practice of information literacy should be accommodated especially at the higher education level to prepare the students to be active and critical users. Thus, this research investigated students' informational literacy skills in academic writing. A qualitative method was employed to analyze 9 final essays as the sample of this study and used C.R.A.A.P. criteria which are currency, relevance, authority, accuracy, and purpose as the codes to evaluate the references in the final essay. The findings show that currency becomes the major issue, especially for the higher to medium scores of final essays since recent references or studies were not provided to support the topics. Authority, accuracy, and purpose became the major issues for lower scores as the tendency to use online resources was occurring instead of books or journal articles.

Keywords: Information Literacy, Academic Writing, C.R.A.A.P. Criteria

Introduction

Information literacy is one of the crucial skills in the 21st century as digital information is emerging into several platforms that require the audiences to critically evaluate the present information available. Several studies have defined information literacy as the ability to determine, assess, investigate, judge, and evaluate the available information which impacts the process of decision-making and produces new information (Rachmawati & Mustadi, 2018; Kozyreva et al., 2020; Cerny & Potancok, 2022, Naila et al., 2022). This skill eventually allows the audiences to be self-directed and lifelong learners as the regular habit of verifying and evaluating becomes the recurrent basis for criticizing the available sources. As a result, they improve their research ability to control the information needed and possess self-authority in the learning process (Pinto et al., 2019). Information literacy is also associated with computational competence when technological tools become the media to research the relevant resources. The skills of utilizing technological devices, navigating the sections or bars, and putting the relevant or synonymous keywords are parts of essential aspects of evaluating information in the 21st century age (Rachawati & Mustadi, 2018; Trujillo-Torres et al., 2020; Naila et al., 2022).

If the viewers or audiences are not able to verify the information and share it with others, the potential impact of 'misinformation and disinformation' may become an unavoidable threat (De Paor

& Heravi, 2020). This potential impact has been seen especially in higher education as a concerning issue. The difficulties of accessing, evaluating, extracting, and utilizing the information are still visible to higher education students (Subekti et al., 2019; Parmini et al., 2023; Mercado-Sierra & Northam, 2023). Other issues related to information literacy also mention that students need more improvement in willingness or self-initiation to interact with the librarian assistants, computational skills, time management, and ethical use of information (Olukemi, 2019; Cerny & Potancok, 2022; Dalal et al., 2022; Dolnicar & Boh Podgornik, 2023; Tita et al., 2023).

Therefore, higher education institutions could integrate students' proficiency in information literacy through several approaches. One of the approaches could be using the framework from the Association of College and Research Libraries proposing the information literacy framework for higher education that consists of six aspects which are authority is constructed and contextual; information creation as a process; information has value; research as inquiry; scholarship as conversation; and searching as strategic exploration (Association of College and Research Libraries, 2016). Those aspects entail that the students must activate their research skills to be more cautious and detailed readers to examine the credibility, the authority, the purpose, and the institutions or the parties behind the production process and provide the credentials when the information is being utilized. Within those aspects, higher education students are equipped with the lifelong learner skills to evaluate the present information (Brooks, 2022). The framework of information literacy could be integrated with several courses or learning objectives in the degree program at higher education. One of the courses could be academic writing focusing on essay composition and research skills to obtain and evaluate the references needed (Granruth & Pashkova-Balkenhol, 2018). Several components have been researched to measure student abilities in information literacy through academic writing which are the ability to formulate the research questions or issues to be researched; select and evaluate the credible, accurate, and relevant literature as the main resources; synthesize and analyze the information to answer the research questions; and cite the references using the citation standard (Wilkes et al., 2015; Shao & Purpur, 2016; Brazer & de Socio, 2021; Pechinkina & Vepreva, 2023; Permana et al., 2023). Those components have been proven to successfully accommodate the students to implement information literacy in their academic skills. However, a careful examination of the students' bibliographies in their academic essays should be investigated further whether students are able to select the current, reliable, accurate, and academic resources in their writing process.

Hence, this research aims to investigate the students' abilities of information literacy particularly in selecting and evaluating relevant resources through five indicators which are currency, relevance, authority, accuracy, and purpose (C.R.A.A.P). Currency and relevance measure the publication time and the related references to the topic or issues being discussed. Authority and accuracy indicate that references have credible authors and accurate resources referring to the availability of the list of bibliographies or the hyperlinks in some electronic articles. The purpose of the information will determine whether the information is produced for academic or commercial

purposes. Those indicators were developed by Sarah Blakeslee and her librarian team to ensure students' success in academic proficiency including information literacy (Esparrago-Kalidas, 2021). The use of this method helps students to be aware in assessing the available information, particularly in a digital exposure in which they can evaluate the information in every aspect of C.R.A.A.P (Fielding, 2019). Through C.R.A.A.P indicators, the research will focus on the implementation of information literacy skills in academic writing particularly in the writing process (outlining and drafting) and the quality of the students' referential list in the final essay.

Research Methodology

The research used qualitative methods to analyze the academic references in academic writing as the implementation of information literacy in higher education. The qualitative method refers to the text or image analysis which does not include the statistical data (Creswell & Creswell, 2018). Thus, the data used documentation of academic essays particularly the final version to investigate the scholarly references used in the Composition class. 9 final essays of academic writing were selected from 24 final essay submissions as the samples. The process of selection was based on the average score of the written assessments of the outline, draft, and final essay.

Table 1

Students' Progress on Information Literacy

No	Students	Topics	Outline	Draft	Final Essay	Average Score of Information Literacy
1	Student A	Comedy and Censorship	85	95	100	93.3333333
2	Student B	Fast Fashion Industry	95	80	100	91.6666667
3	Student C	Service Dogs	85	90	90	88.3333333
4	Student D	Social Media for Marketing	65	90	100	85
5	Student E	Absent Father	85	75	90	83.3333333
6	Student F	Anorexia	85	75	85	81.6666667
7	Student G	Free Education in Developing Countries	80	50	85	71.6666667
8	Student H	Cyberbullying Impact on Adolescent	60	80	75	71.6666667
9	Student I	Indie Game	25	75	80	60

Note. The scores were taken from three writing assignments within 6 weeks, and the writing assignments used MLA as the Citation Standard.

The references provided in the final essays were analyzed using deductive coding by deriving five indicators which are currency, relevance, authority, accuracy, and purpose (C.R.A.A.P.) as the codes of the existing theoretical framework in the deductive coding analysis (Linneberg & Korsgaard, 2019).

Findings and Discussion

Findings

The component of the outline in the Composition I class focused on organizational ideas highlighting the coherence between the thesis statement and the topic sentences including the relevant references supporting the proposed topic. This outline became the framework for the students to start their research by exploring references with search engines such as Google Scholar or the university library search engine at the beginning. The purpose of the outlining activity was also to scaffold the first-year students' ability in the Composition class as many of them did not experience the research skills in the previous schools.

As the writing process started from outlining the ideas, students grew their capacity of information literacy in a drafting process to synthesize the information and improve their critical thinking to be more selective in choosing the references. Below is the comparison of the student's progress from the outline and the drafting activities.

Table 2

Student's C Outline and Draft

Outline	Draft
<p style="text-align: center;">Topic/Title: Impact of Service Dogs for Human's Health and Wellbeing</p> <p>I. Introduction</p> <p>A. Thesis statement</p> <p>For people who are suffering from physical and/or mental disabilities, service dogs help them with physical assistance, emotional support, and social companionship.</p> <p>II. Body</p> <p>A. Service dogs help people who are suffering from physical disabilities with physical assistance.</p> <p>1. NEADS stated that service dogs assist adults and children with a physical disability by performing tasks that their handlers cannot do, including, but not limited to, picking up and retrieving objects from counters, tugging doors and cabinets open, barking on command for help, and many more. They provide a degree of independence that disabled people lost or never had. ("Service Dogs for People with Physical Disabilities – NEADS")</p> <p>2. According to a study done by Kerri Rodriguez and Maggie O'Haire, service dogs affect the psychosocial health of their handlers with physical disabilities. These individuals include people with vision impairment, hearing impairment, and mobility disability. (1350)</p>	<p>In addition to physical and mental assistance, service dogs also provide assistance for individuals with medical disabilities. Labeled as medical alert dogs (MADs), they may provide early diagnoses of diseases and can warn their owners of impending crises caused by the symptoms. A study has shown that MADs are highly accurate in alerting thirty-three different health conditions and alerting other people with the same conditions (Reeve, et al.). As an example, dogs have the ability to detect the chemical changes associated with the rise or drop of blood glucose in diabetic patients to prompt them into taking insulin as a preventive measure (G. Lippi et al. 452). In a state of emergency where their handler becomes unconscious and needs immediate aid, MADs can alert other multiple people in the proximity as first aid. Thus, they became a valuable asset for people with medical conditions, mainly to reduce the risk of serious complications and be life savers during emergencies.</p>

Note. A comparison of information literacy between the outline and the draft.

The picture above shows how Student C created the coherence between the thesis statement and the topic sentences as the framework of the essay and included the supporting evidence from the

reference provided. The drafting process shows the student's ability to analyze the information as a synthesizing activity was enhanced.

As the last component of the academic essay, Student C demonstrated the ability to avoid plagiarism issues by adhering to the citation format as a completion of the writing process in the academic writing. The interesting point from this writing process is students experienced the process of information literacy by finding more credible references as they did several revisions from the outline until the final version of their writing product as presented in Table 3. The previous list indicates that non-academic references were included in the outline, but the final essay version shows the removal of the non-academic references. In addition, the need for collaboration between scholars to give more insights or discussion would be beneficial as highlighted by the feedback given.

Table 3
Student C's referential list before and after the revisions

Before	After
<p>G. Lippi et al. "Diabetes alert dogs: a narrative critical overview." <i>Clinical Chemistry and Laboratory Medicine (CCLM)</i>, 57 (2018): 452 - 458. https://doi.org/10.1515/cclm-2018-0842.</p> <p>Hamilton, Rob "How Service Animals Can Benefit Veterans Veterans Place". <i>Veterans Place Of Washington Blvd</i>, 2021. https://www.veteransplaceusa.org/how-service-animals-can-benefit-veterans/. Accessed 17 Sept 2023.</p> <p>"Physical Disabilities - NEADS World Class Service Dogs". <i>NEADS World Class Service Dogs</i>, 2018. https://neads.org/service-dog-programs/physical-disabilities/. Accessed 18 Sept 2023.</p>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p>Maria Niayu Risma Novianti Check MLA.</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <p>Maria Niayu Risma Novianti Not academic advertisement purpose</p> </div> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Maria Niayu Risma Novianti Not academic advertisement purpose</p> </div> <p style="text-align: center;">Works Cited</p> <p>"Assistance Dog." <i>Healthdirect</i>, Healthdirect Australia, www.healthdirect.gov.au/assistance-dogs. Accessed 23 Oct. 2023.</p> <p>Fairman, S K., and R.A. Huebner. "Service Dogs: A Compensatory Resource to Improve Function." <i>Occupational Therapy In Health Care</i>, vol. 13, 2001, pp. 41–52, doi:10.1080/j003v13n02_03.</p> <p>G. Lippi et al. "Diabetes Alert Dogs: A Narrative Critical Overview." <i>Clinical Chemistry and Laboratory Medicine (CCLM)</i>, vol. 57, 2018, pp. 452–458, doi.org/10.1515/cclm-2018-0842.</p> <p>Rodriguez, Kerri E., et al. "Defining the PTSD Service Dog Intervention: Perceived Importance, Usage, and Symptom Specificity of Psychiatric Service Dogs For Military Veterans." <i>Frontiers in Psychology</i>, vol. 11, 2020, doi.org/10.3389/fpsyg.2020.01638.</p> <p>Reeve, Catherine et al. "Dog Owners' Survey Reveals Medical Alert Dogs can alert to multiple conditions and multiple people." <i>PloS one</i> vol. 16,4 e0249191. 14 Apr. 2021, doi:10.1371/journal.pone.0249191</p> <p>T. Crowe et al. "Veterans Transitioning from Isolation to Integration: A Look at Veteran/Service Dog Partnerships." <i>Disability and Rehabilitation</i>, vol. 40, 2017, pp. 2953–2961, doi:10.1080/09638288.2017.1363301.</p>

Note. The revised version has a better quality of academic references.

Based on the C.R.A.A.P. criteria, the findings have indicated that most of the students used journal article references, undergraduate or master theses, and government reports as support for the topic although some of them still used non-profit organization platforms to add the references. The finding also shows that students still encountered some issues in their information literacy skills, but they were lessened compared to the experiences in the outline activities as presented previously.

Table 4
Academic References Used in Students' Academic Essays

Students	Issues indicated by C.R.A.A.P. criteria
Student A	1. Currency (published more than 10 years of publications):

	Comedy as Being/Comedy as Idea (1987); Popular comedy in Aristophanes (1972); Joking in the context of political correctness (2009)
Student B	<ol style="list-style-type: none"> 1. Currency (published more than 10 years of publications): Waste Couture: Environmental Impact of the Clothing Industry (2007) 2. Authority (a non-scholar/non-academician writer) and accuracy (.com as the resources): 11 Fast Fashion Facts You Might Not Know by Martina Igni (a managing director of earth.org)
Student C	<ol style="list-style-type: none"> 1. Currency (published more than 10 years of publications): Service Dogs: A Compensatory Resource to Improve Function (2001) 2. Authority (no information on the reviewer): Assistance dog by healthdirect.gov.au
Student D	<ol style="list-style-type: none"> 1. Currency (published more than 10 years of publications): Active Innovation- Case Study in Smart Exercise Environments: Comparing Traditional and Experimental Innovation Methods (2010) 2. Accuracy (unpublished research at dissemination or conference): The Impact of Social Media on Society (A final paper project)
Student E	<ol style="list-style-type: none"> 1. Currency (published more than 10 years of publications): Absent Fathers: Effects on Abandoned Sons (1998)
Student F	<ol style="list-style-type: none"> 1. Currency (published more than 10 years of publications): Leptin levels in patients with anorexia nervosa are reduced in the acute stage and elevated upon short-term weight restoration (1997); Elevated physical activity and low leptin levels co-occur in patients with anorexia nervosa (2003); Decision making under stress: A selective review (2012)
Student G	<ol style="list-style-type: none"> 1. Relevance (irrelevant information with the topic): you're fired,' says the Robot by PK McClure
Student H	<ol style="list-style-type: none"> 1. Relevance (irrelevant information with the topic): Is social media bad for your child's mental health? by youthmentalfoundation.org; Coping with Social Media with BDD – BDDF by bdd.foundation.org 2. Authority, Accuracy, and Purpose (non-academic): Coping with Social Media with BDD – BDDF (bdd.foundation.org); Facts About Cyberbullying (Annapolis.gov); Is social media bad for your child's mental health? (youthmentalfoundation.org); Cyberbullying Linked with Suicidal Thoughts and Attempts in Young Adolescents by Sharon Reynolds (no information about the writer)
Student I	<ol style="list-style-type: none"> 1. Authority, Accuracy, and Purpose:

Note. The table shows the quality of information literacy using C.R.A.A.P. criteria in the final essays.

The tendency to use scholarly or academic references was getting less especially for Students H and I. It is also supported by their performance which had few increases on information literacy- from the outline and drafting process which are 71.7 and 60. Another interesting finding is that most students still had a major issue with currency although the references provided were already academic, which shows the quality of authority, accuracy, relevance, and purpose represented by Students A, B, C, D, E, and F.

In the relevance criteria, most students were able to find the relevant information supporting their topics. Only 2 students (H and I) had the issue to determine the appropriateness of the references due to their organization idea. For example, student G's topic was about the importance of education in developing countries. However, the reference used discussed technological advancement as a threat for developing countries which should be unsuitable to the specific topic being discussed as represented in this cited information below.

Picture 1

Student H's Issue on Relevance

As discussed previously along the lines of the constantly evolving technologies there is a high demand for those with specific skill sets in the working field, especially in developing countries as well as a growing concern for those fearing job replacement by technology (Mcclure). Education has already been noted to be able to give those without a skill set the ability to adapt to the changing world and allows those within developing countries to find job recruitment in more specific and plentiful fields within said country.

Note, Irrelevant information appears in the analysis.

The cited information above shows that the student was not aware that some information can be irrelevant or unnecessary and it could impact the organization in the writing although the information is still an academic reference. A similar issue was experienced by Student I to analyze the impact of cyberbullying on adolescents. However, the information to be cited is the body's image concern as seen in this quoted information.

Picture 2

Student I's Issue on Relevance

Health Foundation, it has been found that 40% of adolescents have reported feeling worried and discouraged about their body image after viewing images on social media platforms ("Is social media bad for your child's mental health?"). Due to this worry and Cyberbullying, most

Note, Irrelevant information appears in the analysis.

The cited information above also shows that Student I was not able to distinguish or select the specific information needed to be cited. This means that the skill of basic reading also influences someone to find relevant information based on the point of discussion.

Authority, accuracy, and purpose are the major issues found for several students. For example, the use of .com was already avoided by Students B and H, and they preferred using .org and .gov such as earth.org, youthmentalfoundation.org, and bdd.foundation.org. Another issue on authority and accuracy is also presented by Students C and D when the reviewer is informed specifically in the reference from "Assistance" and the reference was not disseminated which is "The Impact of Social Media". These two students also have the same cycle as Students B and H which is avoiding the use of .com without verifying the validity of the information.

The most problematic issue on authority, accuracy, and purpose occurred in Student I where several references are using .com although the instructions of the assessment require the students to avoid .com. The phenomenon shows there is a tendency for the students to use .com for easy access and time constraints to revise the references since the score of the information literacy in the outline is 25 which means that the habit of selecting and evaluating the information did not form at the beginning.

Discussion

The process of writing skills could build their confidence and foundation as scholars or researchers and help them grow to be more enhanced (Granruth & Balkenhol, 2018). In addition, the outlining activities involve their awareness to avoid plagiarism by using citations in the paraphrased or quoted evidence and the list of references (works cited). As a result, students practiced avoiding plagiarism and learned different citation standards in the beginning of the writing process (Pechinkina and Vepreva, 2023).

In the writing class, students were allowed to have consultation sessions with the instructors and the tutoring center to give more insight, feedback, or suggestions to help them improve. Thus, information literacy should be designed as a framework as suggested by the Association of College and Research Libraries which are authority is constructed and contextual; information creation as a process; information has value; research as inquiry; scholarship as conversation; and searching as strategic exploration (Association of College and Research Libraries, 2016). The outline trained students' ability to evaluate the ownership or the authority of the references, and this ability was enhanced in the drafting process to evaluate the accuracy of the information leading them to check the media used to publish the information as a part of the creation of the information provided. As the drafting process continued, students learned to value the information by providing proper citations while integrating the information into analysis. The writing process allowed them to be engaged more in dialogue or conversation with other scholars or experts in the academic community and encouraged them to be more strategic in their research and informational literacy skills. This means that

information literacy in a dialogical community grows students' learning behavior to be lifelong learners (Pinto et al., 2019). Students also practiced showing the credits to the authors by practicing the use of citations to avoid plagiarism required in academic institutions.

Although several issues on referential credibility still occurred in the final essay, the writing process from the outline to the final versions helped most students to be aware of the use of information available in the digital platform. This is indicated by the increasing number of journal articles used in the drafting process to the final draft although currency still became one of the issues. The issue on currency indicates that students just focused on the purposeful criteria which is academic publications without having comparative data or findings with the recent research published within 5 - 10 years before. This challenge was also aligned with Olukemi's finding that several students were not aware when the information needed was related to the currency (Olukemi, 2019). It means that the information contained in the reference presented may be contradictory with the recent issue on the topic being discussed although it was written by scholars or academicians. Thus, it is recommended to use recent resources to provide updated information and anticipate problematic access when the information is no longer available (Divecha et al., 2023).

Most of the students could distinguish between irrelevant and relevant information. This is due to the writing process from the outline in which students should have a framework to organize their ideas and provide a list of references that may support the proposed topics. This literature review could help students start their information literacy skills by using several search engines such as Google Scholar or Science Direct to select and determine the possible resources for their essay (Pechinkina & Vepreba, 2023). Other students who had some barriers on the relevance criteria signifying the need for effective reading strategies (skimming, highlighting, and annotating) and multi-text learning which could be the foundation of information literacy to cite specific information to be synthesized in the essay (MacMillan & MacKenzie, 2012; Darmiyanti & Taufik, 2021).

One note to be concerned that the overabundant information or resources could mislead several students to differentiate the media of the information. Although they probably could be aware of the different types of publications, the critical ability to verify the hyperlinks on the online resources and the availability of bibliographies was ignored. The students only focused on avoiding the use of commercial platforms without verifying the credibility and accuracy of the information provided. This may indicate that the process of information evaluation still becomes an emerging issue in the increasing number of digital platforms to transmit information globally (Parmini et al., 2023). As the practice of non-critical evaluation frequently happens, students may become highly dependent on online resources, and it is also aligned with Singh et al's finding that many higher education students use online sources as the first option which was followed by books and (electronic) journal articles (2020). This indicates that students are overexposed to the availability of online and free resources without examining the purpose and motivation of the information producers.

Conclusion and Suggestion

The writing process in academic writing has enabled students to be lifelong learners by continuously selecting and evaluating the information and the references that support the issues being discussed in their academic essays. At the same time, the implementation of information literacy in the referential part of academic writing reveals two major important points which are the issue of currency especially for high to medium performers, and the issue of accuracy, authority, and purpose for the low performers. Thus, information literacy skills in higher education especially at EFL should be the main focus, especially in the context of reading and writing courses. As a recommendation, the next research can investigate the relationship between information literacy and reading areas. The suggested focus could be examining the scaffolding activities of information literacy in the reading or writing areas as this research only focused on the examination of students' references in their academic essays.

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