Investigating plagiarism practices of International Class students majoring in Mathematics and Natural Sciences (MNS) in writing scientific articles

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Article Information

Abstract

Plagiarism is a common problem that exists in writing scientific articles. This research investigates views of plagiarism practices by students majoring in Mathematics and Natural Science in writing a scientific article. This research is qualitative descriptive, which applies thematic analysis. The research instruments were observation checklists, documents, and interview guides. The research subjects were eight students majoring in Mathematics and Natural Sciences. This study showed that students plagiarize due to missed information, keeping original ideas, and time constraints. Missed information about plagiarism, such as not understanding what constitutes plagiarism or how to cite sources properly, can also lead to unintentional plagiarism. Keeping the sense of original ideas without proper paraphrasing can lead to plagiarism. Time constraints can be a significant factor leading to plagiarism. When students or researchers are pressured to complete assignments, papers, or projects within a limited timeframe, they may resort to unethical practices like plagiarism to meet deadlines. This research found that students of Mathematics and Natural Sciences found difficulties regarding the time constraint in translation and properly citing and referencing sources. For further research, conducting a similar topic with a large-scale sample for presenting quantitative research designs on students' attitudes toward plagiarism practices in Mathematics and Natural Sciences is recommended. The upcoming research also could investigate the level of papers' similarity and then follow up through training to avoid plagiarism.

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1. Introduction

In 21st-century learning, student outcomes and support systems emphasize three core contents and outcomes. Career, life, learning, innovation, and digital literacy skills exist. Learning and innovation skills include critical thinking, communication, collaboration, and creativity (4C) (Trilling & Fadel, 2009). Communication is one of the four abilities that students must possess to demand 21st-century learning outcomes. Communication is a method of sharing information that takes many forms, including speaking and writing. Writing is one of the four language skills that can be used to assess a country's literacy development. Writing is an activity that should be integrated into all aspects of student education. At the undergraduate level, every student is required to write scientific articles. Scientific articles are a sort of academic writing product that students at universities or colleges must accomplish. Scientific articles contain research evidence explaining the information published or archived in journal repositories. It is required for students for undergraduate and postgraduate to get published in journals to increase the nation's competitiveness (MOEC, 2019).

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Scientific writing is based on research and systematic thinking by an individual or group adhering to scientific principles. To address scientific rules in writing scientific writing, each university has its guideline with one subtopic to avoid plagiarism practices.

Plagiarism is obtaining or attempting to obtain credit or the value of a scientific work by quoting a portion or the entirety of another party's scientific works or works recognized as research studies without properly and adequately stating the source. Plagiarism is academic fraud; it can be regarded as a deception or an attempt by students to make unlawful use of unethical and unacceptable means in their academic work (Eaton, 2021). It demonstrates unethical or fraudulent behavior (Magubane, 2018).

All universities have paid close attention to the issue of plagiarism. It could be a reaction to various academic traditions. According to Roig (1999), student plagiarism practices appear to be influenced by academic environmental factors. The natural environment and society, with its customs, can form a person's ethical pattern, which requires an adjustment of one's behavior. The environment has shown itself to influence student behavior in this case. Every study program has its environmental character (UNM, 2019). Academic culture is particularly layered and consistent, as disciplinary and student culture. It has its own set of expectations, attitudes, goals, and views (Magubane, 2018).

Plagiarism can be in the form of intentional and unintentional. Unintentional plagiarism is when someone copies something without realizing it (Fatemi & Saito, 2020). When someone intentionally plagiarizes, they do it knowing they are passing off someone else's thoughts as their own (Helgesson & Eriksson, 2015). The prevention and control of plagiarism in tertiary institutions are preventive so that there are no plagiarism actions in the college environment carried out by the Leader of the Higher Education concerned and repressive actions given to plagiarized actors to restore the academic credibility of the college concerned. Also, the provision of guidelines on the procedures for preparing written works embraced by every field of science, technology, and art is usually known as the interlude style (MOEC, 2010).

Educational institutions and students should have the same understanding of plagiarism; collaborate to prevent plagiarism practices. The reality says the opposite. Several universities are not bothered by scientific articles that are submitted to a scientific journal (Sariffuddin et al., 2017). As information technology advances and the academic calendar becomes ever more crowded, writing scientific articles is still very difficult. In every field of science, cultural kinship allows for differences. In addition, plagiarism is distinguished based on several driving factors (Abbas et al., 2021). First, the causative factors are a lack of skills, education system pressure, and awareness. Second, are the inhibiting factors due to technological advances, legal gaps, and lack of efficient oversight. Next, the basic factors include the personal characteristics and attitudes of the academic community. Furthermore, strategic and intervention factors are role models, supervision, national/international coordination, and awareness raising. Finally, the outcome factor is the regeneration of plagiarism and negative attitudes.

Some research related to plagiarism that occurs in academics exposed the academic fraud reviewed in the field of social sciences and non-social ones. Plagiarism may be on the rise in the social sciences, and one particularly severe case was recently discovered (Martin, 2007). In non-social sciences or the areas of Science, Technology, Engineering, and Mathematics (STEM), plagiarism instances may plagiarize due to academic or cultural reasons (Leonard et al., 2015). This research was applied in Mathematics and Natural Sciences instead of STEM due to the accessibility of the participants. Therefore, this research aims to explore reasons for students majoring in Mathematics and Natural Sciences alleged plagiarism practices. This research proposes a research question: Are the students alleged plagiarism practices intentional or unintentional?

2. Method

2.1. Research Design

This research design is qualitative and uses the case study method. It refers to research that generates descriptive data, such as people's written or spoken words and observable behavior in its broadest meaning. This research design was chosen as it is consistent with the study's objectives, where the focus of qualitative research is the meaning people place on things in their lives to understand how people see things, empathize, and identify people in the study (Taylor et al., 2015).

This research applied the case study approach that enables researchers to comprehend the how and why of modern events, problems, and situations without exerting any control over them. It is used to investigate new phenomena in-depth and intensively to gain knowledge and understanding about them (Tomaszewski et al., 2020; Yin, 2017). It is a method that relies on practical experience to investigate a phenomenon in a real-world context. Case studies also are relevant to questions that require some social phenomenon. A case study investigation is technically unique in that it has many more variables of interest than data points. Due to the need for data to converge in a triangulating manner and multiple sources of evidence, it also benefits from the earlier development of theoretical hypotheses that serve as a guide for data collection and analysis.

2.2. Research Subject

The researchers interviewed eight students from one of the universities in Central Sulawesi who submitted their assignments with a similarity higher than the minimum percentage. The participants of this research are International Class program students majoring in Mathematics and Natural Sciences. General sampling strategies used in qualitative research are criterion sampling, theoretical sampling, stratification sampling, snowballing (friendship pyramiding), and convenience sampling (Braun & Clarke, 2013). In this research, the researchers applied convenience sampling to determine the subjects of this research. The convenience sampling technique refers to a sample selected because it is accessible to the researchers and convenient for academics or
other students (Tracy, 2019). Typically, convenience sampling involves selecting a subset or all of those who respond to an advertisement for participation.

2.3. Data Collection
Qualitative data collection and analysis are established on observations, documents, and interviews. These data collection activities are typically carried out for a long-time frame within a local setting. These data types were processed in some manner; for example, transcripts and corrections must be made to audio recordings, raw field notes must be expanded and typed, and photographs must be documented and analyzed (Miles et al., 2014).

The researchers collected data using some steps; the first is observation using an observation checklist. The observation provided a clear data collection plan, making it a common approach. It can describe the time commitment and conditions involved in the research focus (Tracy, 2019). The researchers observed plagiarism practices in a scientific article. The next step is collecting and checking documents, which refer to English scientific article soft files submitted by students to scientific journals of study programs over the last year. Then, the researchers checked the similarity level of scientific articles using Turnitin App.

The last step is an interview using an interview guide with a semi-structured interview. In a semi-structured interview, participants are asked open-ended questions before being asked follow-up questions to delve deeper into their answers and the research topic (Braun & Clarke, 2013). This activity aims to collect information directly from research subjects by asking several questions that can lead subjects to the required information for this research. This research applied semi-structured interviews for data collection, which offered a guideline for the information needed and the topics required to be covered. If interviewees spontaneously provide the necessary answers in response to earlier questions, further questions are not necessary (Coolican & Coolican, 2017).

2.4. Data Analysis
Using thematic analysis is advised for qualitative research (Coolican & Coolican, 2017)—more details data analysis by the stage of thematic analysis (Braun & Clarke, 2013). The process of thematic analysis involves several stages. Here is a breakdown of each stage:

- **Transcription:** This stage involves accurately and completely transcribing the information from the data sources, such as interviews, focus groups, or textual data. It is essential to ensure the accuracy of the transcripts by verifying them against the original records.
- **Reading and Familiarization:** In this stage, researchers read and reread the transcribed data to become familiar with the content. The goal is to comprehensively understand the data and note any information that might interest the analysis.
- **Coding:** Coding is the process of systematically categorizing the data into meaningful units, which are often referred to as "codes." Researchers review the entire dataset, assigning relevant codes to specific data sections.
- **Searching for Themes:** After coding the entire dataset, researchers gather and assemble all the codes that are related to each other thematically. This involves identifying patterns and connections between codes and grouping them into potential themes.
- **Reviewing Themes:** At this stage, researchers create a "thematic map," which visually represents the tentative themes, subthemes, and their connections. This helps in understanding the overall structure of the analysis and ensures that themes are coherent and well-defined.
- **Defining and Naming Themes:** The analysis is an ongoing process, and researchers continue to refine and improve the details of each identified theme. Themes are defined with clear boundaries, and researchers give them meaningful names that capture their essence.
- **Writing – Finalizing the Analysis:** In the final stage, researchers engage in the last round of analysis. They select strong and convincing examples from the data that support each theme and analyze these chosen extracts in-depth. The results are then connected to the research question and relevant literature. Finally, an academic report of the analysis is produced, presenting the findings, interpretations, and conclusions.

3. Results and Discussion

3.1. Missed Information
This research showed that students experienced missed information on plagiarism definition from their senior high school's teachers and their seniors. This issue may lead to unintentional plagiarism. Students did not realize they misconducted due to missed information regarding the clear definition of plagiarism.

"Our teacher said, there was not plagiarism. Plagiarism is like we copy the results of other people without any changes at all." (Interview with Student 2)

The above statement shows that the initial knowledge of the plagiarism term was obtained from high school teachers. The act of plagiarism that students can understand is copying all the results of other people's research without changing it at all. Therefore, they did not realize that paraphrasing without mentioning sources is plagiarism.

They think plagiarism is written to replace the name and place of others' publications.

"Our seniors expressed that in writing a scientific paper, as long as we do not simply replace the author or change the location of the previous study, it is not plagiarism" (Interview with Student 3)

Based on the above statement, the student defines plagiarism following their seniors about the plagiarism definition. Unfortunately, their senior provided missed information about plagiarism when writing a scientific work. Simply replacing the author's name and location of publication is severe in academic writing.

Missed information about plagiarism, such as not understanding what constitutes plagiarism or how to cite sources properly, can also lead to unintentional plagiarism. Some people plagiarize, but they think using borrowed words
to improve the problem introduction should not be plagiarism (Yilmaz, 2007). A researcher needs to be aware of plagiarism rules and guidelines to avoid inadvertently using someone else's work without proper acknowledgment. To prevent unintentional plagiarism, it is important to educate students about the different forms of plagiarism, including direct copying, paraphrasing without proper citation, and self-plagiarism (Clarke et al., 2023). Familiarizing students with citation styles and understanding when and how to use quotes, paraphrases, and summaries with proper attribution can help avoid plagiarism. Additionally, utilizing plagiarism detection tools and seeking feedback from peers or educators can be valuable in ensuring the work is original and properly cited. By being vigilant about plagiarism and adhering to ethical writing practices, writers can maintain academic integrity and uphold the standards of intellectual honesty (Fatemi & Saito, 2020).

3.2. Keep the Sense of Original Ideas

The student considers there should be no plagiarism in the articles. This is based on the strong reason the student made the research results in scientific articles. However, students also realize that several theories or strong arguments are cited as the basis of their research, which are impossible to change.

"I think the theory cannot be paraphrased." (Interview with Student 4)

The student misconduct in writing their articles, but only in a few parts to keep the original ideas from the cited authors. Students also said these actions were unintentional actions caused by student ignorance.

"I am accused of plagiarism, but it is unintentional. A few parts I copy and paste to keep the original ideas from the cited authors." (Interview with Student 5)

Keeping the sense of original ideas without proper paraphrasing can indeed lead to plagiarism (Sharma & Verma, 2020). Plagiarism is considered unethical and can have serious academic, professional, and creative consequences (Patak et al., 2021). To avoid plagiarism, it is essential to properly attribute the original source whenever the students use someone else's ideas, words, or creations. Paraphrasing, summarizing, or quoting with proper citations are common methods to give credit to the original authors (Bahadoran et al., 2020; Shi, 2010, 2012). Remember, using someone else's work without permission is unethical and violates copyright laws in many countries. It is crucial to respect the intellectual property rights of others and ensure that the students always provide proper credit for the ideas and works we use in our own writing.

3.3. Time Constraints

Time constraints can be a significant factor leading to plagiarism. When students or researchers are pressured to complete assignments, papers, or projects within a limited timeframe, they may resort to unethical practices like plagiarism to meet deadlines. There are some ways time constraints can contribute to plagiarism. Individuals with limited time to conduct thorough research may be tempted to copy and paste information from existing sources without proper attribution. This can result in accidental or intentional plagiarism.

3.3.1. Translation

The translation process in limited time from Indonesian to English is another difficulty experienced by students from the Mathematics and Natural Sciences Department. When students write scientific articles in English, they expect to have an extended submission deadline. The students expressed some of the difficulties they experienced when writing scientific articles, as follows:

"The difficulties I face in translating the assignment from Indonesian to English, especially since there are many scientific words, especially for Math which are very difficult to transfer into English in a given time." (Interview with Student 1)

The student found difficulties during the translation process due to the many scientific terms in Natural Sciences, such as Biology, which are difficult to adapt from the local language to English translations.

"I am still not very good at English written form, I need extra time to finish my writing due to the difficulty translation process from local language to English, especially for scientific terms in Biology." S2

Another student said that the translation process is difficult due to their lack of English writing skills. The student reported that extra time is required to understand Indonesian content before translating it into English.

"Our lecture is not full in English, and my limitation is also not proficient in English. I spend more extra time to comprehend the content in Indonesian before translating it to English." (Interview with Student 3)

Translating specific terms under time constraints can indeed increase the risk of unintentional plagiarism, especially if the student is pressed for time and relies heavily on existing translations or online resources without proper attribution or verification. Plagiarism occurs when someone presents someone else's work or ideas as their own without giving proper credit (Helgesson & Eriksson, 2015; Shaw & Olson, 2015). Students who work under tight deadlines may be tempted to plagiarize (Park, 2004). Students use automated translation tools without thoroughly verifying the originality of the translations can lead to plagiarism (Park, 2004). This can lead to incorporating pre-existing translations or content from other sources, which may be copyrighted or protected by intellectual property laws.

To avoid plagiarism in translations, it is crucial to follow some strategies. Students should deeply understand the subject matter to provide accurate and contextually appropriate translations (Neubert, 2000). Rely on trustworthy reference materials, glossaries, and dictionaries for translation assistance. When using existing translations or content, paraphrase the information and provide proper attribution to the original source. While automated translation tools can be helpful, they should be used as aids, not as the sole source for translation. Always review the translated content to ensure accuracy, coherence, and originality. If the time constraints are too tight to ensure a high-quality translation, communicate with the lecturers for more
reasonable timelines. In summary, students should prioritize accuracy, originality, and proper attribution, even when working under time constraints, to avoid unintentional plagiarism and produce high-quality translations.

3.3.2. Properly citing and referencing sources

The students experience time constraints in finding related sources. Time constraints in finding related sources can be a significant challenge, especially when conducting research or seeking information on a specific topic.

“I find difficulty in properly citing sources regarding accomplishing my writing assignment. It is difficult to seek information on a specific topic” (Interview with Student 6)

Properly citing and referencing sources takes time and effort. Referencing management software can save time and effort formatting sources (Neville, 2016). When time is scarce, individuals might skip or overlook the citation process, leading to plagiarism. When time is limited, individuals may prioritize completing the task quickly over producing original and well-researched work. This mindset can lead to plagiarism as a shortcut to meet the quantity requirement. Rushing through the writing process leaves little time for editing and proofreading, increasing the chances of inadvertently leaving in unoriginal content. To avoid plagiarism despite time constraints, individuals should begin working on assignments or projects as soon as possible to allow ample time for research and writing. Create a schedule and outline to manage time effectively throughout the writing process (Day, 2023). These strategies can help manage citations and references more efficiently. These strategies can help identify unintentional plagiarism and provide opportunities for corrections.

4. Conclusion

Plagiarism can also result from missed information, such as failing to comprehend plagiarism or how to cite sources correctly. To avoid accidentally using someone else's work without giving due credit, a researcher must be aware of the laws and principles of plagiarism. Learning about the various types of plagiarism, such as self-plagiarism, self-quoting, and direct copying, is essential to prevent plagiarism. Avoiding plagiarism can be made easier by becoming familiar with citation styles and knowing when and how to utilize quotes, paraphrases, and summaries with proper attribution.

Plagiarism might indeed result from sticking with the original ideas without proper paraphrasing. Using someone else's ideas, works, or other intellectual property without their consent or proper credit is known as plagiarism. It is regarded as unethical and may harm one's academic performance, career, and creative output. Every time students borrow someone else's thoughts, words, or works, they must correctly cite the original author to avoid plagiarism. Common techniques for crediting the original writers or creators include paraphrasing, summarizing, and quoting with relevant citations. Keep in mind that using someone else's work without their consent is unethical.

Students should prioritize accuracy, originality, and proper attribution during the translation process to prevent unintended plagiarism and generate high-quality translations. Students should start working on assignments or projects as soon as possible to give themselves enough time for research and writing to avoid plagiarism despite time constraints. To efficiently manage time when writing, make a schedule and an outline. These techniques can aid in more effective reference management of references and citations and using reference management software to save time and effort. Learn about plagiarism and the value of academic integrity.

It is advised that future studies be conducted on a topic related to this with a large sample size to present quantitative study designs. The upcoming research can be on students' attitudes toward plagiarism practices in Mathematics and Natural Sciences. The forthcoming study may also look into how similar the articles are, with training to follow to prevent plagiarism.

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