

Investigating the Connection Between Sense of Belonging and Academic Dishonesty

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Abstract—This work-in-progress research paper discusses issues of academic integrity which have long been a concern of education researchers and academic institutions within all fields of study. Academic integrity (AI) violations can consist of a broad range of student behaviors that are considered dishonest, including but not limited to plagiarism, copying others' assignments, and paying for others to complete their work. A plethora of researchers have attempted to identify what underlying factors lead students to commit AI violations, and have identified several potential factors, including a lack of self-control, students' ethical views of AI, perceived opportunities to commit AI violations, involvement in extracurricular activities, and students' social groups.

Another topic that has in recent times become a focal point of education research is students' sense of belonging within their field of study. Researchers have identified several factors that contribute to students feeling less welcome within higher education, particularly within Engineering and Computer Science. Students who feel a lower sense of belonging have been identified as being at higher risk of performing poorly with their studies and retention rates for these students are historically lower. Despite this, little research has been conducted to examine where issues with students' sense of belonging and their incidences of AI violations overlap. In this study, we attempt to try and better understand this relationship between students' sense of belonging and AI violations by attempting to answer the following question: **Can students' sense of belonging within their discipline influence their propensity to violate academic integrity?** We take up a student centered, restorative position, and choose to understand the cognitive underpinnings behind students' choices to violate AI, with the goal of identifying if student outreach and more inclusive practices within Engineering and Computer Science can be utilized to prevent instances of AI violations. To accomplish this, we are employing a qualitative interview-based study of first-year students studying Computer Science at a large public university in the northeastern United States. We plan to analyze transcript data collected during interviews using Grounded Theory and Narrative Analysis methodologies. Our goal with this study is to draw awareness to additional underlying causes behind students deciding to violate AI, with the hope that this research will encourage academic institutions to employ a more preventative approach to handling AI issues by ensuring all students feel welcome and included within their chosen field of study, thereby helping prevent AI violations before they happen.

Keywords—Computer Science Education, Academic Integrity, Sense of Belonging

I. INTRODUCTION

Work In Progress: Academic integrity issues have been a concern of education research and academic institutions within all fields of study for a long time. Academic Integrity (AI) violations can consist of a broad range of student behaviors consistent with dishonest academic behavior; these include but are not limited to plagiarism, copying others' assignments, utilizing unauthorized materials during exams, and paying others to complete their work [1]. AI has become an even more paramount issue of late given the prevalence of online learning within academic institutions. Online learning has also become even more popular recently due to the recent COVID-19 pandemic. While many institutions view AI from a punitive perspective, our goal is to try and identify what factors influence students to feel the need to commit AI violations. Our goal is to provide institutions with a pathway to a preventative, restorative approach that can help fix the underlying causes behind students committing AI violations.

One factor we initially identified in this process was students' sense of belonging within their discipline. Sense of belonging has become a focal point of education research within recent years to develop fairer more equitable learning environments. Researchers have identified several factors that contribute to students feeling less welcome within higher education, particularly within Engineering and Computer Science, including: gender identity, racial or ethnic identity, nationality, ability status, first generation student status, enrollment status, transfer student status, and living situation (on or off campus) [2]. Students who feel a lower sense of belonging have been identified as being at a higher risk of performing poorly with their studies and retention rates for these students are historically lower. Despite this, little research has been conducted to examine where issues with students' sense of belonging and their incidences of AI violations overlap. Connections between students' academic performance and issues of academic integrity have been identified, as well as links between students' sense of belonging and their academic performance, but a direct link between sense of belonging and AI violations has not been identified.

Following from this, we are conducting a qualitative, interview-based study aimed at answering the following research question: **Can students' sense of belonging within**

their discipline influence their propensity to violate academic integrity? We are conducting this work specifically through the lens of educators hoping to achieve more equitable outcomes for Computer Science students.

II. BACKGROUND

Much of the existing literature aimed at understanding students' propensity to violate Academic Integrity (AI) has been focused on analyzing AI from a punitive perspective, looking to develop methods of preventing AI or punishing students rather than understanding systemic factors that influence their decisions to violate AI. As a necessary first step to this research process, we identified literature discussing AI violations and students' sense of belonging with the goal of developing a theoretical framework in which to situate our future research and provide a framework that can be applied to future collected data.

One specific paper stood out to us as we began reviewing existing literature regarding AI violations [1]. In their work, Glanzer et al. propose a conceptual model for why college students choose to violate AI. The authors identify five specific factors they have found that lead students to violate AI, including a lack of self-control, students' attitudes towards cheating, opportunities to cheat, academic preparation, and involvement in leisure activities such as clubs and fraternities/sororities. While these are certainly factors that can lead students towards AI violations, the authors' arguments for these factors are potentially harmful for students, as the authors take up a position of viewing the students as being at fault for these factors rather than taking a holistic approach to examining why these students end up violating AI. Another paper we identified within existing literature that identifies reasons for students to choose to commit AI violations identified yet more factors [3]. A number of these factors included "not enough time", "will fail otherwise", and "can't afford to fail." Parallels can be drawn between these factors and research regarding students' sense of belonging, which will be covered in the next paragraph. Underscoring these factors are inequities that some students will face in university that impact their sense of belonging. In our theoretical framework, we will connect these factors to students' sense of belonging to construct a path from inequity to AI violations and a lack of sense of belonging.

As part of a larger literature review of literature regarding AI violations that has not been fully completed and published, we identified a number of themes present within AI literature. These themes include Honour Codes, Faculty Attitudes Towards AI, Student Attitudes and Factors, Cultural Impact on AI, Academic Integrity Policies, Teaching Academic Integrity, Course Designs to Promote AI, and Online Learning. Honour codes proved to be one of the more potentially harmful methods of discouraging AI. Many of the authors who discussed honour codes focus on ideas such as peer accountability and reporting, while failing to consider the damaging nature these policies may have for underrepresented academic groups [4,5,6].

Sense of belonging, the other part of our research goal, has been discussed substantially within existing literature. The National Survey of Student Engagement has developed an extensive framework to identify what factors contribute to students' sense of belonging [2]. Some of these identified factors that contribute to sense of belonging include: gender identity,

racial or ethnic identity, nationality, ability status, first generation student status, sexual orientation, enrollment status, transfer student status, and living situation (on vs. off campus). All these factors have been shown to play a major role in influencing how involved students feel within their chosen discipline and therefore their sense of belonging within their field of study. Literature regarding sense of belonging has also investigated the effects this can have on students' desire to persist in their field, their motivation, and their success rates within their courses. Within Computer Science Education, there have been several extensive studies conducted to evaluate students' sense of belonging. One such study published in 2021 found minority, women, and LGBTQ+ students were far more likely to report a lower sense of belonging and were far less likely to persist within computing [7]. Additionally, this study identified further factors for sense of belonging including membership, affect, acceptance, trust, and desire to fade (blend in within their cohort).

While there has been work conducted to study student's propensity to violate AI, no work has been done to relate this to students' sense of belonging. In the following section, we will present a theoretical framework to connect these two factors and provide a theoretical underpinning for the study we conducted.

III. THEORETICAL FRAMEWORK

In an effort to ground our work in existing literature surrounding AI violations and sense of belonging, we present our proposed theoretical framework utilized for this study. It is first worth noting that the authors for this paper have approached this study from a student-centered restorative approach. We understand that inequities exist within educational systems and are looking to address these inequities through our research by way of encouraging educational practices and policies that foster restorative, beneficial education environments for all students. We acknowledge that issues of academic integrity are serious and should come with consequences for students who commit them, but we are not looking to investigate AI violations that have already occurred. Instead, we are interested in understanding what causes students to commit these violations in the first place and how we can prevent them from occurring. Our proposed framework has been developed from a social-constructivist lens; individuals do not learn in a vacuum and the act of constructing knowledge from information provided to students is an individual learning experience that is influenced by the experiences of others [8]. The framework consists of a synthesis of several existing frameworks regarding AI and sense of belonging, drawing connections between identified factors for both. As we have identified little prior literature aimed at identifying the connections between these two elements, we have attempted to bridge the gap between AI violations and sense of belonging and are using this as a lens from which to conduct this study.

We draw from existing frameworks a number of factors for students' sense of belonging [2,7,9]. These three frameworks include the NSSE 2020 Sense of Belonging scale [2], Mayfield et al.'s sense of belonging indicators within introductory Computer Science courses [7], and Godwin's Engineering Identity framework [9]. These three perspectives to sense of belonging complement one another by providing different

lenses from which to view students' identity and sense of belonging; the first provides several demographic factors that can be identified that influence how students' sense of belonging can be impacted by factors outside of their control and outside the control of university administrations. This framework also provides a viewpoint to identity that is focused specifically on Computer Science students. The second provides us a look at how inherent bias within an academic program can manifest in a student's beliefs regarding their place within the program. For example, acceptance and trust are both factors that are developed directly from actions taken by university administrations and other students within a school [7]. If a student faces discrimination either implicit or explicit at their school, they may feel a lack of trust for their peers or their professors, thereby weakening their sense of belonging. Mayfield argues that the actions of students' peers, professors, and others within Computer Science frame their view of the field both positively and negative, and therefore students' identity formation and sense of belonging within Computer Science arises directly from others' behavior. From this, we can see there may exist possible paths towards students' considering committing AI violations, which we will explore in this section. This second framework also provides a view on students' identity formation that is not exclusive to Computer Science or engineering, and therefore brings in ideas present within other disciplines, giving us a broader understanding of students' sense of belonging. Finally, Godwin's Engineering Identity framework provides an overarching framework for identity that allows us to tie ideas from all three frameworks into each other, as well as connect the idea of sense of belonging into AI.

For our AI framework, we have adopted two existing frameworks for factors that influence students to commit AI violations [1,3]. In these frameworks, a few parallels can be drawn to the factors for students' sense of belonging. For example, Glanzer et al. identified that academic preparation plays a role in students deciding to violate AI. When viewing this from the perspective of sense of belonging, we can apply demographic factors that may highlight underlying inequities among specific groups of students. For example, a student who is not provided a physics or calculus course in high school may not be as prepared as their cohort when reaching an undergraduate engineering course. Another factor identified for contributing to AI violations is membership [3]. A student with a low sense of belonging may not feel as though they have a place within their discipline; according to this framework, this may increase their propensity to violate AI. From this, we can see that strong connections already exist between these frameworks. To strengthen this further, we have identified three main parallels between identity and AI frameworks.

- Students with a low sense of belonging will have lower feelings of membership within their field. From this, their willingness to violate AI will potentially increase.
- Students with lower opportunities for academic preparedness due to a variety of belongingness-related factors such as first-generation student status will potentially feel a greater need to violate AI to succeed.
- Students who have violated AI previously will potentially feel a lower sense of belonging within their discipline and their

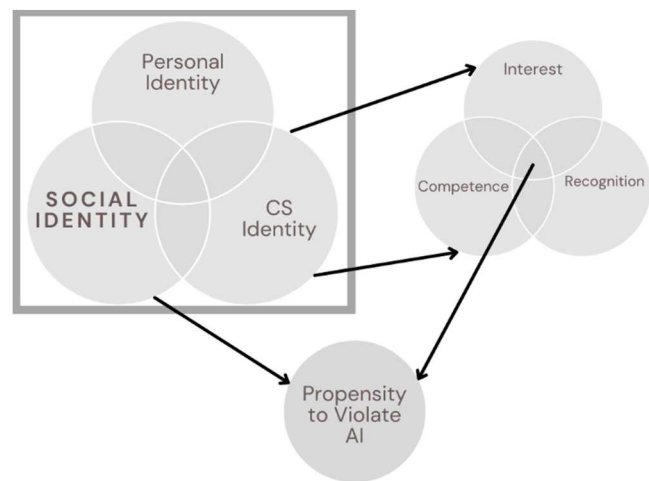


Fig. 1. Our theoretical framework: lower levels of Social and CS identity will cause an increase in students' propensity to Violate AI

program and will thus feel a greater need to violate AI once more.

To strengthen the connections that exist between these frameworks, we have applied these three parallels within the context of Godwin's engineering identity framework [9]. Within Godwin's framework, student identity is composed of the intersectional relationship between personal identity, social identity, and engineering identity. Engineering identity is further composed of interest, competence at engineering-related skills, and the recognition one receives from their peers and instructors. While Godwin designed this framework to be used to look at students' identity as engineers, we have changed this framework to look specifically at students within Computer Science. Additionally, we view students' propensity to violate AI and their Sense of Belonging as factors integral to students' identity within their discipline.

As can be seen in Figure 1, the parallels we have identified fall in several the fields given within Godwin's framework. Low sense of belonging and lower feelings of membership are directly related to social identity and recognition as an engineer. Within Godwin's framework, this impacts students' interest and competence with engineering, which we have identified as being related to students' propensity to violate AI. Competence within engineering or computer science are also factors we have identified as being related to AI violations. Finally, if students have previously committed AI violations, this may potentially impact both their social identity and engineering/computer science identity, further damaging their sense of belonging and creating a "feedback loop" where-in students continue to struggle within their discipline and have a further increased likelihood of violating AI. In Figure 1, we present a modification of Godwin's framework [9], showing the relationship between social identity, Computer Science (CS) identity, and propensity to violate AI. By continuing this work and studying populations of Computer Science students, we aim to validate this relationship and highlight the underlying causality of these connections between students' identities and their likelihood to violate AI. Our hypothesis is that lowered senses of social identity and lower levels of competence, recognition, and interest within their discipline will increase students' likelihood

to commit AI violations, which will potentially further impact their sense of belonging and therefore their identity.

IV. METHODS

Our goal for continuing this research is to apply a qualitative lens to the problem of AI violations among students, as much of the existing literature regarding this issue attempts to look for quantitative patterns among students. To accomplish this, we are employing an interview-based study technique. We plan to interview a group of non-first year students within Computer Science at a large public research institution in the northeastern United States. Interviews will last for approximately one hour. During the interviews, we will provide students with loosely guided questions and ask follow-up questions when students made a statement, we consider pertinent to the study. Our questions are designed to ascertain students' feelings about their program, their fit within the program, how they feel they are viewed by their peers and professors, and what their thoughts are regarding AI within their program. Specifically, we will ask them if we think their peers committed AI violations and why they think a student would wish to do this. We designed these AI related questions in such a way as to allow participants to speak freely without feeling as though they are admitting to violating AI themselves. We plan to collect audio recordings of each of the interviews and employ automated transcription software to provide us with transcripts for our analysis.

To analyze the transcription data, as well as supplemental notes taken by the interviewer during each of the interviews, we will employ several analytical approaches. We are adopting a two-step analysis method [10] by first conducting a within-case analysis of participants statements, then applying a cross-case analysis to identify parallels between the statements made by each participant. In our initial pass of each participant's data, we will utilize a combination of narrative analysis and thematic coding [11] to identify potential codes and patterns of discourse within the data, rather than directly applying the factors we identified in our framework. By doing this, we are attempting to eliminate any potential bias present within our own conception of sense of belonging and AI. Additionally, this gives us an opportunity to validate the framework we have developed and look for evidence towards its efficacy. This research will be conducted pending approval of our IRB application currently on file with our Institution Review Board.

V. IMPLICATIONS

AI violations are a common and growing concern among both researchers and instructors on a global scale. Students who attempt to violate AI potentially face dire consequences from university administrators that will severely impact their ability to succeed within their discipline. Additionally, students who do violate AI potentially lose out on the benefits of their education. While we have been unable to find concrete data regarding rates of AI violations among institutions, it is something we are cognoscente is a serious problem faced not just within our own institution. Within our own institution, rates of AI violations have been a topic of much concern among instructors and university administrators for a number of years. However, due to a lack of concrete research looking into the exact causes of AI

violations, attempts to handle them have been relegated to punitive measures taken after violations have occurred.

Our hope with our research is to identify underlying causes behind students feeling the need to violate AI; by ascertaining these causes, efforts can be made by university administrators and educators to mitigate these causes and therefore prevent AI violations from occurring. Our hope is that by approaching AI violations from a student-centered, holistic, restorative approach that we can benefit students rather than punish them after they have already committed these violations. By eliminating students' perceived need to violate AI, our hope is that academic institutions will become a fairer, more inclusive environment for all students regardless of factors potentially out of their control. Our concern is that issues with AI violations unfairly target specific populations of students, thereby increasing issues with inequalities within our education system. Additionally, it is our concern that the majority of the factors that may influence students to violate AI are outside of the students' control. For example, the demographic factors we have identified such as gender, ethnicity, and LGBTQ+ status [2] are factors outside of the students' control. Should a connection exist between these demographic factors and these students' feelings regarding their own need to violate AI, this presents a serious potential issue of inequality present within our education system. It is therefore important to discover these underlying relationships and work with academic institutions to help address these issues.

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