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Artificial Intelligence Implications for Academic Cheating: Expanding the Dimensions of Responsible Human-AI Collaboration with ChatGPT and Bard

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Cheating is a growing academic and ethical concern in higher education. This article examines the rise of artificial intelligence (AI) generative chatbots for use in education and provides a review of research literature and relevant scholarship concerning the cheating-related issues involved and their implications for pedagogy. The technological "arms race" that involves cheating-detection system developers versus technology savvy students is attracting increased attention to cheating. AI has added new dimensions to academic cheating challenges as students (as well as faculty and staff) can easily access powerful systems for generating content that can be presented in assignments, exams, or published papers as their own. AI methodology is also providing some emerging anti-cheating approaches, including facial recognition and watermarking. This article provides an overview of human/AI collaboration approaches and frames some educational misuses of such AI generative systems as ChatGPT and Bard as forms of "misattributed co-authorship." As with other kinds of collaborations, the work that students produce with AI assistance can be presented in transparent and straightforward modes or (unfortunately) in opaquer and ethically-problematic ways. However, rather than just for catching or entrapping students, the emerging varieties of technological cheating-detection strategies can be used to assist students in learning how to document and attribute properly their AI-empowered as well as human-human collaborations. Construing misuses of AI

generative systems as misattributed co-authorship can recognize the growing capabilities of these tools and how stressing responsible and mindful usage by students can help prepare them for a highly collaborative, AI-saturated future.

Recent artificial intelligence (AI) developments such as generative AI chatbots have added complexities to the many academic cheating challenges already faced by higher education institutions. The massive publicity and subsequent user attention to ChatGPT (associated with OpenAI and Microsoft), Bard (associated with Google), Bedrock (associated with Amazon), and related AI systems ensures that the issues associated with the systems will have substantial reach in academic arenas (Dotan, 2023; Floridi, 2023). Students (as well as faculty and staff researchers) have at their fingertips some powerful tools for generating content that can be easily presented in assignments, exams, or published papers as their own, whatever their contributions to its development. AI approaches are also producing some new cheating-detection strategies, with various "arms races" emerging as students invent and share counter-approaches through social media (Huang, 2023). This article examines the rise of generative AI chatbots in education and provides a review of research literature and relevant scholarship on the cheating-related issues involved and their implications for pedagogy.

The notion of "AI plagiarism" (the inappropriate use of AI-generated academic materials) is being refined as specific instances are recognized and trends are identified (Gillard & Rorabaugh, 2023; Khalil & Er, 2023; Koo, 2023). This article characterizes some of the reported educational misuses of ChatGPT, Bard, and related AI systems as forms of "misattributed co-authorship." It places problems with the authentic allocation of credit for the production of academic materials with these systems in relation to other collaboration concerns (involving human co-authors or contract cheating providers, for instance). The article examines the cheating-detection technologies and policies that are already implemented or being piloted; some of these approaches require added system capabilities or watermarkings that require sustained support from the developers of ChatGPT or other AI systems. Unfortunately, the considerable legacies of various punitive surveillance-style cheating detection strategies may steer institutions away from implementing the kinds of positive, collaboration-oriented approaches that may unleash inspired human-AI interaction. This article focuses on examples from US and UK settings, but many other nations have faced comparable concerns (Bygrave & Aşık, 2019; Costley, 2019; Pan et al., 2019).

Cheating issues are a part of students' lives. Students face a variety of powerful temptations to cheat from their interpersonal relationships (with unsanctioned help from fellow students). In turn, they also regularly interact with technologically-supported cheating-detection systems in their laptops and examination contexts (Keyser & Doyle, 2020). With generative systems such as ChatGPT and Bard, students can indeed feel empowered by being able to access formidable computing power in ways that directly benefit them in their academic production efforts. Many previous AI chatbots and related technologies were pre-programmed with a limited set of responses; however, generative AI systems such as ChatGPT and Bard are capable of producing responses based on the context and tone of the interaction (Floridi, 2023). However, this empowerment often comes at the cost of putting the authenticity and integrity of their work into question by some suspicious instructors and future employers, whatever the extent to which they used an AI system (Jimenez, 2023). The cheating-detection initiatives specifically directed toward AI-generated materials (described in an upcoming section) are in their very early stages (Crawford, Cowling, & Allen, 2023; Leatham, 2023; Ryznar, 2023), which puts academic participants in today's institutions at risk for serious and potentially damaging conflict. According to Dahmen et al (2023) the "conventional plagiarism detection tools… may not be sufficient and/or sensitive enough appropriately to detect plagiarism arising from chatbots" (p. 1187). Some faculty members have already warned students in their syllabi not to use ChatGPT, which can be counterproductive (Gillard & Rorabaugh, 2023); students may construe these warnings as a challenge and work to expand the "arms race" (Högberg, 2011). As outlined in an upcoming section, curriculum developers may choose to reconfigure their assignments so that ChatGPT usage is less of an issue (Tlili et al. 2023). This will take some concerted effort and resources, however, since classwork often involves "canned" textbook assignments and exercises that take considerable time to develop, evaluate, and disseminate.

STUDENT COLLABORATION WITH AI-ENHANCED SYSTEMS

ChatGPT (Generative Pre-trained Transformer), is a language generation model capable of generating text in various genres (short essay format, itemed list, poem, etc.) based on its training and the input it receives; it has undergone a number of iterations since its first release in 2022 (Thorp, 2023). According to a recent survey, social media commentators on ChatGPT's capabilities have reportedly focused on its functions of "creative

writing, essay writing, prompt writing, code writing, and answering questions" (Taecharungroj, 2023). Google's Bard has taken some different technological approaches to generative AI, but has many of the same functions (King, 2023). Frightening headlines such as "ChatGPT: The AI Chatbot that Threatens the Future of Human Jobs" have galvanized public attention on the prospects for AI (Danialypour, 2023). A major newspaper labeled ChatGPT, Bard, and related AI generative system developments as being "as big as the printing press" in "reshaping" our everyday lives (Ball, 2023), and Dahmen et al. identifies them as "potential game changers" for medical research (p. 1187).

Higher educational institutions are in the business of inspiring and motivating students, so AI systems such as ChatGPT present a knotty challenge. The institutions must balance their concerns about the misuse of these systems with efforts to equip students to engage successfully with AI-enhanced systems in the workplace and community. The prospects of generative AI systems for establishing productive collaborations with humans are expanding as individuals explore their capabilities in formal educational and workplace contexts as well as for entertainment (McCormack et al., 2020). Many students who are attuned to science fiction themes and "cyborg" configurations are already highly motivated to work with ChatGPT and Bard in collaborations, even as "digital twins" that play substantial roles in their productive efforts (Lund & Wang, 2023). Many future-oriented institutions are beginning to accept the challenge of utilizing constructively these new technologies while orchestrating the kinds of authentic student evaluations that are currently demanded by employers and educational certification boards. Dai et al. (2020) contend that "Enhancing students' readiness for an AI-infused future should be a goal of current and future educational programs" (p. 2). Perspectives that construe AI systems as collaborators can be construed as "imagin[ing] a future where we work together with AI systems, each building on the unique strengths of the other" (Sarkar, 2023). Serious dangers of letting ChatGPT, Bard, and other AI systems drive and shape academic processes to the exclusion of innovative human-human collaborations are also emerging, though, as many students may soon assume that AI entities are less stressful and more dependable collaborators than enigmatic and even problematic human beings.

Whatever lofty goals are projected for human-AI collaboration, generative AI systems provide opportunities for students to produce academic material in ways that present difficulties for distinguishing their own efforts from AI-generated contributions. Scientific and medical research directors, along with research publishers, are facing comparable issues of authentic-

ity of submitted work (Eysenbach, 2023; Stokel-Walker & Van Noorden, 2023). The journal *Science* is reportedly releasing the policy that scientific publishing must remain a "human endeavor" and that papers with AI systems as co-authors "will constitute scientific misconduct, no different from altered images or plagiarism from existing works" (Thorp, 2023). Various scientific and research societies have yet to allow for the formal recognition of ChatGPT as co-author in their official statements, including the International Committee of Medical Journal Editors and Committee on Publication Ethics (ICMJE/COPE) guidelines (Sallam, 2023). Access of health-related information with ChatGPT by non-specialists has triggered special concern on the part of medical experts (Sarraju et al., 2023). Tolchin (2023) calls for the independent review of such health-related ChatGPT materials since "use of large language model chatbots is both a deviation from standard practice and introduces novel uncertain risks to participants" (para. 8).

In efforts to counter the changes ChatGPT and other AI systems have engendered, an assortment of certification boards and accreditation councils are weighing in on how to handle ChatGPT misuse in examination contexts. In the UK, the Joint Council for Qualifications (JCQ), representing major examination boards, published guidance for teachers and assessors on "protecting the integrity of qualifications" in the light of AI-related developments. The guidance stated that students should be compelled to produce some of their coursework materials "in class under direct supervision," continuing that students who misuse ChatGPT and related AI systems "will have committed malpractice, in accordance with JCQ regulations, and may attract severe sanctions" (Leatham, 2023). As experience with such AI systems grows in academic settings, student reaction and feedback will also influence how student-AI collaborations are analyzed and the extent to which the notion of "cheating" is involved. Some educators have projected that if higher education institutions are to fulfill their aims of reaching thousands of students throughout the globe for instructional and assessment purposes, educational programs will require new forms of cheating detection, since even medical exams are reportedly being passed with ChatGPT and Bard efforts (Purtill, 2023).

ACADEMIC CHEATING IN PERSPECTIVE

Student cheating has long been characterized as an "ongoing issue" in academic evaluation (Pathak, 2016, p. 315), with "scandalous" levels of cheating often suspected or identified (Klein, 2020). Technologically-sup-

ported academic cheating has taken on a number of dimensions in the past decades, adding new dimensions to the moral ecologies of higher education. Lipson and Karthikeyan (2016) describe "innovative mechanisms and insidious ploys in academic deceit" (p. 48). These include plagiarism (Zhang, 2016), collusion (human collaboration on assignments that is not approved by instructors), and use of services that complete courses for a student (Malesky et al., 2016). Definitions of "cheating" are problematic to develop, and institutional policies can differ as to what kinds of technological access are restricted (Burgason, Sefiha, & Briggs, 2019; Burke & Bristor, 2017). For example, the use of *Grammarly* by students has been questioned (Thi & Nikolov, 2022); the editing and proofing tools of Grammarly are seen in some contexts as providing an unfair advantage in the production of academic work. However, in recent years the kinds of tools that *Grammarly* provides have become integrated as standard features into many word processors and even search engines. Decades ago, the use of calculators in classroom exams was considered a form of cheating in many contexts (Dick, 1992), effectively altering the educational experience and undermining appropriate evaluation of students. Even iPads were considered in some contexts as potentially disruptive in terms of their impacts on classroom interaction (Perry & Steck, 2015). As AI system capabilities become integrated into various search engine, design, and document production applications, the kinds of issues they present for academic integrity are becoming more diffuse yet increasingly critical to define and resolve.

Below are several dimensions of AI generative system misuse in context of previous cheating-related phenomena:

1. **Misallocation of Credit:** Collaboration among humans as well as with artificial entities can be difficult to manage, and often results in inefficiencies as well as unfairness (Paul & Mukhopadhyay, 2022). Misattribution of co-authorship for "reasons other than merit" is reportedly common in academics, and "increasing awareness, for transparency and for more explicit guidelines and regulation of research co-authorship within and across research areas" is becoming more of a necessity (Cutas & Shaw, 2015, p. 1315), especially given how these misattributions can reinforce bias (Goodman, 2023). In many research arenas, ghost and honorary authorships (in which credit is not allocated in relation to contributions) are considered as problematic by research directors and publishers (Pruschak & Hopp, 2022); the use of ChatGPT and Bard can extend these concerns by including AI-enhanced entities in co-authorship

roles. Responsible collaboration (whether or not AI is involved) also requires some oversight on the quality of one's collaborator's contributions along with acknowledging the extent and quality of one's own contributions. The prospects that many AI system outputs will be accepted as correct without exploration of their sources and other justifications thus provide considerable concerns (Tolchin, 2023).

2. **Impersonation:** Methodologies for impersonation are also a part of the cheating realm, as paid professionals or skilled amateurs complete assignments or take exams for students. For example, ChatGPT capabilities include impersonation of vocal characteristics and style (Marks, 2023), which can present challenges for authentic assessment and may increase institutional reliance on various anti-cheating surveillance tools (described in an upcoming section). Not long ago, students impersonating other students in order to take examinations was indeed possible, but was relatively rare (Moeck, 2002). However, impersonation has become a serious issue for universities implementing online or hybrid programs (Boafo-Arthur & Brown, 2017). In response to these concerns, Berkey and Halfond (2015) state that "An online program cannot claim to be truly worthy of academic recognition without strong assurance that students are being fairly and effectively assessed in their learning" (p. 1). As instances of specific impersonation challenges, some versions of ChatGPT can produce answers to problems in the fields of accounting, business law, and computer programming as well as produce text that could serve as answers to short essay questions in many disciplinary contexts (Mok, 2023).
3. **Contract Cheating:** Paper mills and contract cheating organizations provide another set of academic cheating variants. Even before ChatGPT delivered custom materials to students, availability of tailored academic productions through these organizations was widespread (Amigud & Dawson, 2020; Yorke, Sefcik, & Veeran-Colton, 2022). More informal varieties of academic paper and examination answer exchanges take place online as well as through various student associations and social media platforms. The kinds of output that ChatGPT and other AI-enhanced applications provide may generate problems for these contract and informal services; a major application of ChatGPT is content generation along with transformation into genres that are acceptable for many academic assignments and exercises (Anders, 2023), which may make some contract cheating installations obsolete. Today, use of

> ChatGPT, Bard, and related generative AI systems is often inexpensive or even free of charge; however, in the near future ethical issues involving income disparities can arise as AI system usage becomes too expensive for certain individuals.

An alternative perspective to cheating detection reframes these three challenges in terms of human-AI collaboration. Construing engagements with ChatGPT, Bard, and related AI systems as forms of co-authorship rather than simply as sources that are accessed and integrated into an academic production underscores the active and responsive elements that the systems can provide in intellectual efforts. As the complexity of workplace and community problems increases, collaborative effort is needed to work toward solutions (Jandrić et al., 2022); students should be equipped to engage with others in productive ways. An unfortunate by-product of these AI developments over time is that students might feel it less necessary to learn and practice basic writing and design skills, focusing rather on the kinds of skills involved in editing and revising ChatGPT or Bard results so as to appear like their original productions. Mindful and reflective collaboration can aid in efforts extend the dimensions of human-AI collaboration and to allocate appropriate levels of credit for academic contributions (Garcia, Wrench, & Punyanunt-Carter, 2022; Veles & Danaher, 2022). Appropriate allocation of credit can be difficult to ascertain: "after a writer and a model takes turns in writing a story and iteratively edits it, how can one tease out and characterize the model's contribution to the writing, or how well it served the writer's needs?" (Lee, Liang, & Yang, 2022, p. 1). Instructors will need to design discipline-specific questions and prompts for students who engage with ChatGPT and Bard so that they benefit intellectually from their human-AI collaborations as well as recognize the limitations and constraints of these interactions. If the modes of AI-sensitive cheating-detection outlined in the next section are used to assist students in their reflection processes (and not just to catch cheaters), more accurate allocations of authorship credit may be produced.

EMERGING AI-SENSITIVE CHEATING-DETECTION STRATEGIES

Assortments of outsourced cheating-detection systems are emerging that claim to deal with ChatGPT concerns. For example, the proprietary system Turnitin, reportedly used by 62 million students worldwide, has reportedly been upgraded with capabilities to detect and flag ChatGPT mate-

rial (Hsu, 2023), though details have not been released. Some of the anti-cheating technologies (as described below) will require some sort of added system capabilities or watermarking that will require support from the developers of the generative AI systems involved. Securing such support will become more problematic as the numbers and kinds of widely-used AI systems increases. Recently-disseminated strategies for detecting whether ChatGPT was utilized in a particular academic production include the following:

1. **Watermarking ChatGPT-produced materials**: OpenAI researchers are working on ways that ChatGPT productions can be watermarked so that they can be identified as ChatGPT-produced even if somewhat modified (Eysenbach, 2023). Whether this watermarking can be formulated so that more dramatic revision of the materials would not impact its informational value is still uncertain (Darlington, 2023). Providing these watermarks would be the responsibility of the AI system developers, which would require their sustained participation over time.
2. **Using ChatGPT itself to identify ChatGPT materials:** ChatGPT and other generative AI systems can often identify some of their own materials through a variety of methods, capabilities that will also require some sustained maintenance on the part of system developers and implementers. Khalil and Er (2023) proposed a two-step approach for cheating detection given these capabilities: "first, verifying the origin of the content, followed by a similarity check."
3. **Measuring perplexity and burstiness**: Metrics for identifying generative AI content are emerging (Yu et al. 2023). For example, GPTZero and some related systems are designed to measure a document's "perplexity" and "burstiness." Perplexity refers to the complex or random aspects of a document and measures how well the AI system's language model can predict the next word in a word sequence. Burstiness refers to patterns of diversity in sentence structure, which can indicate whether a written text is machine-generated or not. Documents with high perplexity are more likely to be written by a human because their patterns are complex and less well recognized by the GPTZero (based on its training set). Documents with high burstiness are more varied in structure, which reportedly makes them similar to novel human productions (Bowman, 2023; Gillard & Rorabaugh, 2023); AI-

produced documents tend to be more uniform. Measurements of perplexity and burstiness can give some direction in terms of how a particular document compares with ChatGPT materials, but are reportedly not intended to provide definitive results.

4. **Versioning:** Requiring students to retain every version of a document (so that extensive cut-and-paste operations can be examined) would provide some clues as to the input of AI systems in the document. With versioning, reviewers of a document for a student assignment or potential journal publication would be able to "move backward in time" and observe the evolution of the document, comparing the changes in perplexity, burstiness, or other metrics across different revisions of the text. Abrupt changes might reveal patterns or anomalies that could indicate ChatGPT or other AI system usage. By systematically retraining document verions, students can also be prompted periodically to reflect on the kind and quality of their own input in relation to that of ChatGPT and their human collaborators (if any), conveying specific addenda regarding the collaboration processes involved.
5. **Establishing thresholds for ChatGPT-generated content**: For universities, journals, and research hubs to establish "thresholds" for acceptable levels of AI-generated content (Anderson et al., 2023) has been proposed as a way to mitigate concerns about the misuse of AI-generated content. Simply citing ChatGPT or Bard as a co-author on research documents is already being used as a formal way to acknowledge its contribution, with a number of publications allowing for such attribution (Stokel-Walker, 2023). However, such blanket acknowledgements do not provide the detail that allows for the sensitive reflection of the system's as well as the human's contributions to the production.
6. **Designing assignments so that ChatGPT use becomes transparent:** Assignment or assessment redesign so that ChatGPT use is an obvious and open part of the exercise can mitigate some of AI's negative dimensions for education. (Some specific examples are provided in the upcoming section on pedagogy.) For example, in a stage in the assignment students can be asked to compare their productions directly to ChatGPT or other AI system materials (as described for an MBA class in Mok, 2023). As the numbers and variety of generative AI systems increases, these assignment redesign strategies would need to be adjusted, adding new complexities to instructors' efforts.

Reframing the cheating-detection strategies just described as positive ways of supporting students in their initiatives to become more mindful and agile AI collaborators may help shift the discourse away from punitive cheating detection. For instance, making the results of ChatGPT watermarking analysis available to students as part of their assignment submission protocols can remind them of their interactions with the AI systems throughout their efforts. Preventive initiatives to aid students who are "at risk for being reported for cheating" (Gallant, Binkin, & Donohue, 2015) and proactive opportunities for mindfulness and reflection (Dalal, 2019, p. 175) may also serve a better social purpose than "catching" apparently nonconforming students and subsequently punishing them. Educational institutions impart critical lessons to their participants about their moral and social statuses in the world (Tomlinson, 2016); the methods of academic evaluation are especially relevant in the ways they normalize such processes as surveillance and selective prosecution in workplace or school contexts.

SOCIAL AND ETHICAL CONCERNS ABOUT CHEATING DETECTION

Even before ChatGPT, Bard, and other generative AI systems emerged, academic cheating-detection initiatives gained new technological dimensions in the advent of such AI advances as personal profiling and facial recognition. Profiling and facial recognition technologies have also engendered special challenges in terms of privacy concerns and other negative personal and social impacts (Heilweil, 2020; Hoffman, 2019; Marano et al., 2023). Transparency is often lacking in how these student cheating-detection processes are characterized for students. Basic information about the use of the mechanisms involved is often not provided to students (beyond brief statements in syllabi or student handbooks), even though institutions are obligated to report on various other educational and quality of life factors. Many academic conduct policies are unclear and possibly even intentionally ambiguous, leaving faculty with some discretion in particular cases (Zamastil, 2004). Many forms of cheating can indeed be inadvertent and rooted in mistakes or poor assumptions about assignments (Dow, 2015), and with new technologies such as ChatGPT and Bard the misunderstandings become more likely. Accusations concerning the use of these AI systems can have severe implications for students, whether or not they are ultimately exonerated.

Consider this reported scenario from the University of California-Davis:

> When William Quarterman signed in to his student web portal to check the results of his history exam, he was shocked to see a cheating accusation from his professor attached to it. His professor had used artificial intelligence detection software, including one called GPTZero, after noticing his exam answers "(bore) little resemblance to the questions" to detect whether the college senior had tapped artificial intelligence to give his take-home midterm exam a boost, according to school records provided to *USA TODAY* by Quarterman. The professor was right, according to the software.
>
> She gave him a failing grade and a referral to the University of California, Davis' Office of Student Support and Judicial Affairs for academic dishonesty. Quarterman denied he had any help from AI but was asked to speak with the university's honor court in an experience he said caused him to have "full-blown panic attacks." He eventually was cleared of the accusation. (Jimenez, 2023)

Impacts of the "cheating" designation are indeed severe; students who are interviewed concerning the possibility of cheating and who are unable to defend themselves can face a loss of morale (Duncan & Joyner, 2022). Students who confess to cheating or who are formally designated as cheaters without their confessions can face enduring academic and social struggles.

Since the ramifications of being labeled as potential cheaters may be severe for individuals, conscientious attention to the social and ethical issues involved is imperative for system developers and implementers (Taylor, 2013), whether or not AI capabilities are utilized. However, the basic reliability and validity of cheating-detection systems in higher education contexts are in question (Majeed et al., 2017), with relatively few major assessment efforts underway. The amount of data collected in cheating detection systems can be substantial and the students often ill-equipped to mount administrative or legal challenges. What complicates the analysis and testing of these cheating-detection systems is that cheating can rarely be "proven": often, the admission of guilt on the part of individuals who are faced with some amount of evidence is what ends the case in question. Students may unintentionally provide some physiological clues as to their inclinations to deceive, often known as "leakage" (Verplaetse et al., 2007), though these

expressions (such as profuse sweating) are not conclusive in establishing guilt. A relatively small proportion of academic cheating cases go as far as a formal legal hearing (institutional administrative hearings are more common), so precedent in terms of what would be acceptable is quite sparse in comparison with some employment or military contexts.

Cheating-detection outsourcers have so far faced little legal and social opposition despite practices that are potentially problematic in terms of privacy and fairness. For example, Turnitin has successfully fought many legal attacks through the past decades (Muriel-Torrado & Fernández-Molina, 2015). The "third party" structures of university-outsourcer relationships have often served to deflect some of the concern that system biases could be exposed and the higher education administrations put at risk. The cheating-detection systems cannot be fully "tested" themselves; with facial recognition systems, there is no way to prove that a glance at a smartphone was directly related to some sort of inappropriately-aided intellectual outcome. Students are indeed nearly helpless in fighting high tech organizations that have only an outsourcing relationship with the higher education institution as a whole. Even if a ruling against the particular practices would be put into place, new practices emerge quickly and different proprietary organizations would take on the institution's anti-cheating agendas.

Reasons for students to be concerned about technological cheating-detection initiatives include potential forms of bias as well as privacy. Bias is indeed difficult to prove on conceptual as well as practical levels, but the lingering impacts of suspicions about bias can be disempowering. Accounts such as the following in *The Guardian* are capturing the response of some students:

> In early 2021, Amaya Ross, an African American psychology student who recently completed her third year at Ohio State University, was gearing up in her dorm room to use Proctorio for the first time to take a practice biology quiz. She knew she needed good lighting, and made sure it was the middle of the day. But despite her best efforts, she couldn't get the software to detect her face. (Corbyn, 2022)

Students rarely have the financial and legal support to challenge their examination contexts. The underpinnings for a class-action approach for those negatively affected would take years to put into place, and some of the system outsourcers involved are directly fighting back with countersuits (Corbyn, 2022). The resources needed to analyze the considerable amount of

data pertaining to the cheating-detection system in question and how it was utilized over time in an institutional context provide foreboding obstacles to those who would seek to litigate or work with various governmental agencies to document bias or unfairness.

FUTURE DIRECTIONS: FOSTERING HONOR CODE DISCOURSE AND UNIVERSITY-AI SYSTEM DEVELOPER INTERACTIONS

ChatGPT, Bard, and other AI systems are presenting disconcerting challenges to educational institutions that currently rely on the authentic evaluation of academic effort. Rudolph, Tan, & Tan (2023) contemplate whether AI system misuse would lead to the "end of traditional assessments in higher education" (p. 1), potentially fomenting radical changes in how student work is evaluated. Students, faculty, and staff should be given the opportunity to discuss the implications of these academic changes and share their uncertainties. A way for faculty and students to start in facing cheating-related challenges is in examining their institution's existing honor code, discussions that research shows are often effective in containing cheating behavior (LoSchiavo and Shatz, 2011). Engaging in efforts to revise and enhance the code (if this is feasible) or at least explore how the current code relates to AI generative systems can help to clarify important ethical and academic concerns. For faculty to develop course syllabi statements that address ChatGPT issues from the particular angle of the course's objectives and disciplines as well as the faculty members' own perspectives may help to forestall communication problems. These honor codes and syllabi statements can begin to map the difficult concerns involved when finding appropriate places for the use of powerful new technologies in already packed and intense higher education activities. However, with AI developments occurring at a rapid pace, highly specific codes and statements can become outdated rapidly. Efforts to reinforce trust and create solid personal relationships among students, faculty, and staff may be the most effective approaches in the long run.

Whatever kinds of new cheating mitigation strategies emerge for these generative AI systems will be added to an assortment of technological cheating-detection approaches, many of which are AI-powered (such as facial recognition). These approaches can present unsettling long-term potentials for privacy as they are coupled with biometrics and profiling (Oravec, 2022). For instance, some research currently being done on decep-

tion integrates detailed information about students' biometric indicators and other personalized data in search of individualized patterns of signals about their deception-related intentions (Blitz, 2016; Traoré et al., 2017). These profiles may be stored and used over time as ways to ascertain whether the students are indeed conforming to particular standards of integrity. For instance, lists of subjects who are construed as "potential cheaters" as a result of their interactions with the cheating-related systems could be compiled through predictive analytics (Sprague, 2015). Higher education participants should work with AI system developers to communicate and realize their academic and ethical values pertaining to these technological developments. For example, the notion that using the profiling capabilities of AI to catch cheaters is somehow "fairer" than proctoring methods that are not technologically supported (as proposed in Daugherty et al., 2019) needs to be examined systematically, along with other assumptions about the superiority of AI-enhanced processes. False positives are certainly to be expected with such profiling approaches, forcing individuals to prove that they were not cheating, efforts that can be demoralizing and debilitating. Even more troubling are prospects for experimentation or entrapment with the systems on the part of the developers and implementers involved, for example, providing false feedback to subjects with the aim of testing the systems or enhancing subjects' responses.

With sufficient effort and increased communication with AI system developers, educational institutions can indeed implement humane and transparent ways of dealing with cheating and deception issues. In contrast to punitive cheating detection strategies, mindful and reflective approaches that emphasize human-AI collaboration can serve to empower students in their quests to become capable employees and community members (Garcia, Wrench, & Punyanunt-Carter, 2022). Stressing the model of human-AI collaboration as something that needs to be strengthened and enhanced runs counter to those perspectives that present these interactions as inherently being diminishing for the human involved (Sarkar, 2023). Faculty and staff can facilitate reflective and culturally-sensitive practices to counter the potential misuse of generative AI systems in academic contexts, imparting to students the values of collaboration and responsible attribution of credit.

IMPLICATIONS FOR PEDAGOGY

Faculty members and curriculum developers are being faced with challenges as to how to redesign exercises and assessments in light of the AI-

related cheating issues analyzed in this article. Instructors who have used particular pedagogical strategies with great success for many years may find it unsettling to adjust to these new circumstances and face the calls for revision of their teaching tools. The consequential impact of such demands is sometimes labeled as a "threat" (Skavronskaya, Hadinejad, & Cotterell, 2023, p. 253), especially as the changes could affect students' evaluations of faculty performance. The kinds of experimentation with new assignments and the sharing of results with colleagues that normally takes place over a period of years would need to be compressed into a shorter timeframe (Heimans et al., 2023), leading to potential mistakes and errors in judgment.

Below are some of the approaches that are underway for the revision of course materials in the light of generative AI system issues. These approaches reward students for being transparent in their uses of the systems and critical of the materials the systems produce:

- **Analyzing the deficiencies of AI-generated materials:** By performing such critical analyses, students can acquire insights about the standards and methodologies of particular academic disciplines. Kumar (2023) proposes that instructors **"**look at using such tools to train students on academic writing skills by specifically highlighting the shortcomings of such tools" (p. 30).
- **Source corroboration**; Students who are using ChatGPT or other systems could be challenged to corroborate the sources (if any) that the generative AI systems provide for the materials they produce. If students "crowdsource" the results of these investigations (sharing with their peers), they can effectively contribute to the common effort to produce accurate and properly-sourced academic productions.
- **Catching and sharing AI system "hallucinations":** Students can be challenged to examine the materials they receive in their interactions with generative AI systems for any specific "hallucinations" (system generated mistakes or fabrications). Azamfirei, Kudchadkar, and Fackler (2023) contend that "whether it's a new language model, an innovative monitoring technology, or a novel biomarker, we must be aware of our tools' limitations" (p. 2), and the fabrications constructed by some generative AI systems can have serious implications if not contained.
- **Problem finding:** Academic exercises and assessments can be focused on problem finding as well as solving already-framed problems posed by instructors and reinforced with AI system us-

age. Metacognitive introductions to the problem finding exercises as well as debriefings can enhance the intellectual value of these efforts.

- **Debating the AI systems:** By engaging in debate with ChatGPT or Bard, students acknowledge explicitly the system's contributions in contrast with their own. Through such deliberations, students are also empowered to recognize their own intellectual capacities rather than imply accepting the material that they receive online.
- **Reflecting on the quality of AI interactions:** Reflective exercises in which metacognitive as well as personal insights are elicited and shared can assist students in using the generative AI systems in ways that enhance their own intellectual capabilities rather than bypass them.

Some cheating incidents are reportedly related to students' boredom (Keyser & Doyle, 2020; Miller, Murdock, & Grotewiel, 2017), and the use of stimulating new AI applications may provide a way to make academic work seem more appealing to certain audiences. However, such novelty can be fleeting and more in-depth efforts to make the power of the generative AI systems fully available to students will be needed, such as those just described.

CONCLUSIONS AND REFLECTIONS

Generative AI systems such as ChatGPT and Bard are increasingly playing roles as co-authors and collaborators with students, performing some of the academic work that was previously conducted by human associates, instructors, or the students individually. Students who avoid the use of the systems may soon be severely constrained in their efforts since educational and workplace requirements are already expanding to match the enhanced capacities of human-AI collaborations. The kind of anthropomorphizing that may be linked with the notion of the "AI chatbot as collaborator" can seem like hyperbole but provides a useful counterpoint to the negative approaches that present AI developments as destroying humans' jobs and restricting their opportunities (Oravec, 2019). The current perspectives of many punitive cheating-detection initiatives in catching cheaters or predicting cheating behaviors are indeed problematic given this human-AI collaboration framework. Rather, efforts to mitigate cheating issues can be designed in ways that enhance students' recognition of how to document

their input in collaborations and recognize and attribute the contributions of others, both human and AI.

ChatGPT, Bard, and related generative AI systems provide a tempting opportunity for students to exhibit their technological prowess, and some may attempt to gain advantage on faculty members in the cheating "arms race," whatever policies are established. Blocking programs on university campuses will be nearly impossible, and many systems that are similar to ChatGPT and Bard are already emerging. Students already have their academic work monitored for cheating, for example with webcam surveillance during exams, so they may exploit these new AI systems in efforts to regain a sense of autonomy. Involving students in the development of policies governing the use of AI systems may provide new perspectives and insights about cheating as well as increase students' senses of responsibility. The current forms of student surveillance may make educational administrators believe that "something is being done about cheating" but also introduce new possibilities for bias and personal disempowerment. Few higher education institutions are undertaking methodical evaluations of their chosen cheating-detection systems: the technologies involved are often being used in academic contexts with little scientific justification for their efficacy or systematic examination of their fairness. By the time evaluations of anti-cheating systems can be assembled and conducted, even newer approaches will be made available and put into place, also without adequate examination. Institutional policies have provided students and faculty with only minimal guidance as to the privacy, fairness, and bias factors involved, with the status of the technologies in question as generally third-party and proprietary as an obstacle.

The premium placed in higher education on the integrity of academic productions makes the cheating-detection technological practices discussed in this article resilient and difficult to challenge. However, development of clear academic policies on issues such as how generative AI systems should be used in the classroom is a slow and often contentious process that is only beginning. Punitive and adversarial approaches to cheating detection have the potential to damage some aspects of the student-instructor relationship as well as inflame an adversarial arms race configuration. In contrast, emphases on mindful and responsible human-AI collaboration can enable students to benefit more fully from the extensive capabilities of ChatGPT, Bard, and related generative AI systems.

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