Boulder Faculty Assembly
UNIVERSITY OF COLORADO **BOULDER**

Proctorio Review at CU-Boulder Report

Report from the BFA Proctorio Review Subcommittee
Submitted to the BFA Executive Committee on 11/12/2021.

Subcommittee Members:

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Seth Myers, Teaching Associate Professor, Program for Writing and Rhetoric, Chair of BFA Academic Affairs Committee

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Committee Charge:

Boulder Faculty Assembly (BFA) Chair, Tiffany Beechy, and BFA Program Coordinator Lynne Howard, with the approval of the BFA Executive Committee, convened this Subcommittee in mid-August 2021. Due to changes in funding streams, Provost Russell Moore charged this committee with exploring the continued necessity for campus-wide subscription to the remote exam proctoring service Proctorio. Put simply, Provost Moore asked the BFA to recommend for or against the campus' continuing to purchase a blanket Proctorio license for all students in all classes. This Subcommittee was instituted to explore this question and make a recommendation to the BFA.

Executive Summary:

After thorough review of the information gathered from the faculty, the Subcommittee finds that there is not enough evidence to make a strong recommendation regarding the campus-wide subscription to Proctorio. Further study on the usage of this software and the intersections of ethical concerns, labor concerns, pedagogical implications, and the design of training documents is required to determine how Proctorio impacts our campus. This committee also recommends that further study includes consultation with an ethicist, someone from the Center for Teaching and Learning, and a selection of students who would be affected. We also recommend consultation with OIT and the bookstore to determine the impact of any decision on the staff required to implement such.

First, the Subcommittee reviewed OIT and Proctorio data regarding the number of students, courses, faculty, and others who have used Proctorio since 2019. While these data came from different sources and were difficult to synthesize, our analysis suggests that further study is needed to determine how significant a portion of our community would be impacted by any change to the existing Proctorio subscription. We also encourage consideration of often first-year and transfer students who enroll in large introductory courses outside of their schools or colleges. Such consideration would illuminate the perhaps disproportionate or unfair costs that would fall on particular units if the university were to end its campus-wide subscription. These considerations are discussed in more detail in the *Conclusion* of the full report.

In addition to the economic considerations, our conversations with faculty exposed a differentiated attitude toward the ethical, pedagogical, and even practical implications of this software. Although a majority of the faculty we met with enthusiastically use this software, they over-represented the small number of total faculty who use Proctorio. These faculty identified the strengths of this software as its generating flexibility for testing times, locations, and accommodations, and its deterring academic malfeasance. Other faculty we met with raised perceived (if not actual) privacy concerns, issues of bandwidth equity and access, and concern with the pedagogical implications of this kind of surveillance. These advantages and disadvantages are outlined in detail in the *Faculty Identified Strengths and Weaknesses* section of the full report.

Therefore, the committee finds there is not sufficient evidence to make any definitive recommendation regarding the campus-wide subscription to Proctorio..

Process of Review:

Given the compressed schedule for collecting data for, writing, and disseminating this report, this Subcommittee solicited a convenience sample of CU Boulder Faculty to hold informal conversations about the ethical, practical, and pedagogical effects of Proctorio software. Lynne Howard, Program Coordinator for the BFA, reached out to BFA representatives from the colleges and units that register the most use of Proctorio as well as to faculty representing the natural sciences, the humanities, and the social sciences. Given that Proctorio's services can provide evidence of cheating, we also met with the Honor Code Advisory Board.

We began by meeting with Aisha Jackson, Assistant Vice Chancellor and Assistant Vice Provost (AVC/AVP) for Academic Technology and Student Success on September 1, 2021. AVP Jackson provided the committee with quantitative data on the use of Proctorio. She also provided insight into the challenges and opportunities of different subscription models.

On September 8, we met with the Honor Code Advisory Board members Heidi Bustamante, Teaching Associate Professor in Integrative Physiology; Terri Wilson, Assistant Professor in the School of Education; and Shiv Mishra, Professor in Computer Science.

On September 29, we met with Leeds School of Business faculty: Associate Professor Chuan He, Associate Professor David Hekman, Teaching Assistant Professor Kevin Schaub, Teaching Associate Professor Elizabeth Stapp, and Teaching Associate Professor Don Oest.

On October 6, we met with Karen Gebhardt Director of the Online Economics Program, Teaching Assistant Professor of Math Elizabeth "Boo" Grulke, Professor Dirk Grunwald of Computer Science, Teaching Assistant Professor Patrick Newberry from the Baker RAP, and Assistant Professor Alessandro Peri from Economics.

These conversations were wide-ranging and driven by participants' contributions. However, we did ask faculty members how they used Proctorio and why, what worked and what didn't, what, if any, concerns they had about using it, and what kind of training they sought.

In addition to these conversations, we also received email communication from some faculty who didn't use this software, and we referred to the report provided to the campus by the College of Engineering & Applied Sciences (CEAS) Remote Exam Working Group in July 2020.

We were satisfied with this process, although we observed that faculty who used this software enthusiastically were over-represented in our convenience sample. And, again due to the abbreviated timeline for this report, we were unable to meet with student, staff, or administrative representatives.

Thus, we offer this report not as a complete survey of faculty attitudes, but rather as representative of the general attitudes of faculty. More comprehensive study would be required to authoritatively determine the ethical, practical, and pedagogical considerations of Proctorio software.

Usage and Cost:

Definition of Online Proctoring Software

Proctorio, and similar online proctoring software programs, offer the ability to remotely proctor students taking exams online. Proctoring methods can include a lockdown browser and/or automated (AI) proctoring, and the programs typically have the ability to record video, audio, screen, and web traffic. Such proctoring programs are generally used by faculty to:

1. proctor assessments remotely, at any time or location, at scale, including exams given in classrooms;
2. verify student identity prior to starting an online assessment;
3. lock down an online test environment (e.g., number of monitors; browser tabs; ability to print; use of clipboard, right click, or download);
4. deter students from engaging in undesirable behaviors; and
5. review behaviors flagged as not meeting the testing expectations configured by the faculty member.

Exam proctoring software has been in use on the CU Boulder campus since Fall 2014 with Proctorio usage beginning in 2016. Prior to the COVID pandemic, use was limited and mainly confined to courses in the Leeds School of Business, the College of Arts and Sciences, and the College of Engineering & Applied Sciences (Computer Science). From 2017-2019, there were approximately 4000 users taking about 29,000 exams on Proctorio. With this limited usage, the Office of Information Technology (OIT) needed to individually configure courses for Proctorio.

At the onset of the COVID pandemic, classes pivoted quickly to the online/remote environment. As a result, more faculty began utilizing online proctoring software. CU Boulder licensed Proctorio for the entire campus utilizing CARES funds. Proctorio was chosen as the online proctoring platform based on its prior usage on campus, FERPA compliance, and 24/7 live chat support. Proctorio was also reviewed by the IT Security Office and the Digital Accessibility Office as a part of the procurement process. The campus wide adoption of Proctorio allowed OIT to more easily manage Proctorio, as it no longer required configuration on a course by course basis. OIT also offered training and guidance for faculty on use of Proctorio (https://oit.colorado.edu/services/teaching-learning-applications/proctorio).

Requests to OIT for assistance with Proctorio have been low (with an exam ticket ratio of 1.1%). The most common student technical issues were failures during the pre-exam check due to a webcam, connection, or screen share problem. No common technical issues have been reported by faculty.

AY20/21 and Fall 2021 Usage

Gaining an accurate idea of Proctorio use from Fall 2020 to the present has proved difficult due to differences in reporting of values between Proctorio, OIT, and the Office of Data Analytics (ODA). An attempt at a rough estimate of usage, based on available data, is provided in Tables 1 and 2, below. As noted in the final section of this report, further investigation of usage data is necessary to understand how many faculty and students would be affected by any change.

Table 1 focuses on a cursory overview of the total number of unique Proctorio users (test-takers), and number of instructors and courses using Proctorio. The number of Proctorio users is presented in rows 1-3. Row 1 presents the number of unique Proctorio users based on data provided by Proctorio. (Note that Proctorio assigns a unique global identifier to each user that runs from August to the following

August and then resets.) In row 2, those numbers are expressed as a percentage of the total number of unique individuals in Canvas courses (based on data from OIT). Since the number of individuals in Canvas courses includes non-undergraduate students (e.g., graduate students and staff), and since most usage of Proctorio appears to be in undergraduate courses, in row 3 the numbers are also expressed as a percentage of the number of enrolled undergraduate students (based on data from ODA).

In Fall 2020 and Spring 2021, there were 48 departments using Proctorio in an average of 240 courses (representing approximately 7-8% of courses on Canvas) with 14,265 and 12,377 students enrolled in those courses in the fall and spring semester, respectively. Proctorio was used by 358 instructors in Fall 2020, 309 in Spring 2021 and 109 in Summer 2021 (representing approximately 12% of faculty each semester). Proctorio reported a total of 329,013 assessments proctored with each user averaging 16.5 assessments.

Incomplete Fall 2021 numbers were also provided and represent numbers as of 10/19/21. OIT expects these numbers to increase as the semester progresses. The current Fall 2021 numbers indicate the same number of courses using Proctorio as in Fall 2020 (223; 7% of the total number of Canvas courses) with an apparent slight decline to 9,373 users, although this number is expected to increase. There also appears to be a decrease in the number of instructors using Proctorio (164; 6% of instructors).

***Table 1**. Cursory overview of enrollments and Proctorio usage from Fall 2020 to Fall 2021. Proctorio data were provided by Proctorio to OIT. Proctorio user indicates an individual taking an assessment using Proctorio. Canvas usage data provided by OIT. Individuals in Canvas courses include non-undergraduate (e.g., graduate students and staff). Canvas courses include non-undergraduate courses. Undergraduate enrollment data were obtained from the Office of Data Analytics website (www.colorado.edu/census).*

	Fall 2020	*Spring 2021*	*Summer 2021*	*Fall 2021 (as of 10/19)*
*Number of **unique Proctorio users** (test-takers)*	*14,265*	*12,377*	*2,229*	*9,373*
*Number of unique Proctorio users expressed as a percentage of the total number of unique **individuals in Canvas courses** (includes non-undergraduates)*	*27% of all 53,830 Canvas users*	*34% of all 36,313 Canvas users*	*18% of all 12,296 Canvas users*	*22% of all 42,608 Canvas users*
*Number of unique Proctorio users as a percentage of **undergraduates***	*41%*	*35%*	*NA*	*26%*
*Number of Canvas **instructors** using Proctorio out of total number of Canvas instructors*	*358 out of 3005 (12%)*	*309 out of 2813 (11%)*	*109 out of 820 (13%)*	*164 out of 2800 (6%)*
*Number of Canvas **courses** using Proctorio out of total number of Canvas courses (includes non-undergraduate courses)*	*223 out of 3360 (7%)*	*251 out of 3344 (7.5%)*	*251 out of 3344 (7.5%)*	*223 out of 3175 (7%)*

Table 2 attempts to break numbers down by college/school. Similar to before the pandemic, usage of Proctorio was predominantly by courses in the Leeds School of Business (47% of students and 61% of courses using Proctorio) and the College of Arts & Sciences (51% of students and 33% of courses), with some use by the College of Engineering & Applied Sciences (1.8% of students and 2% of courses), the College of Music (0.4% of students and 1% of courses), the Program in Environmental Design (0.6% of students and 0.6% of courses), and the College of Media, Communication and Information (0.2% of students and 0.4% of courses).

***Table 2**. Cursory overview of enrollments and Proctorio usage by College/School in AY20/21. Proctorio data were provided by Proctorio to OIT. Proctorio user indicates an individual taking an assessment using Proctorio. Canvas usage data provided by OIT. Individuals in Canvas courses include non-undergraduate (e.g., graduate students and staff). Canvas courses include non-undergraduate courses. Undergraduate enrollment data were obtained from the Office of Data Analytics website (www.colorado.edu/census). NA indicates not available.*

College/ School	Number of students as % of F20 enrolled students (actual number in parentheses)	Average number of courses using Canvas AY20/21	Average number of courses in college/ school using Proctorio	Percentage of all courses using Proctorio	Sum of Proctorio users in courses	Average number of students taking courses using Proctorio as a % of total number of Proctorio users	Average number of students per course using Proctorio	Average number of unique instructors using Proctorio
Arts and Sciences	*46.3% (16,193)*	*2058*	*78*	*33%*	*10,532*	*51%*	*135*	*180*
Engineering	*21.5% (7520)*	*474*	*9*	*2%*	*275*	*1.75%*	*30.5*	*22*
Business	*12.4% (4337)*	*277*	*145*	*61%*	*14,351*	*47%*	*99*	*128*
Exploratory Studies	*7.0% (2448)*	*44*	*0*	*-*	*0*	*-*	*-*	*-*
CMCI	*6.5% (2273)*	*296*	*1*	*0.4%*	*24*	*0.2%*	*24*	*1.5*
Environmental Design	*1.6% (560)*	*52*	*1.5*	*0.6%*	*243*	*0.6%*	*162*	*2*
Education	*1.6% (560)*	*29*	*0*	*-*	*0*	*-*	*-*	*-*
Music	*1.4% (490)*	*53*	*1*	*1.1%*	*17*	*0.4%*	*17*	*NA*
Law	*1.6% (560)*	*NA*	*0*	*-*	*0*	*-*	*-*	*-*
Cross- College Programs	*NA*	*71*	*2.5*	*1%*	*19*	*0.15%*	*7.6*	*2.5*
Totals	***34,941***	***1,296***	***238***	*-*	*-*	*-*	*-*	*-*

Projected Usage

Although Proctorio usage may be expected to drop post-pandemic as classes return to in-person, data suggest usage may remain higher than pre-pandemic levels and possibly near AY20/21 levels. The Fall 2021 numbers (as of 10/19/21) are approximately 9400 users and expected to increase in the latter part of the semester. Given the Fall 2020 and Spring 2021 numbers (roughly 14,000 and 12,000, respectively), the Fall 2021 numbers may indicate a slight decline in usage. Conversations with faculty

currently using Proctorio (see below) suggest usage in large enrollment courses will continue. Complete Fall 2021 numbers and numbers from Spring 2022, when approximately 93% of classes will be in-person, will offer a better idea of continued Proctorio usage. However, regardless of whether some courses meet in-person, discussions with faculty indicate many will continue to utilize Proctorio (even for assessments taken in-person).

Cost and Payment Considerations

Prior to the pandemic, the cost of Proctorio was paid by students on a per course basis (~$22) or a negotiated per program Enterprise basis (~$30). From 2017-2019, most students paid for Proctorio via the Bookstore (with a $3.25 markup). During this time period, the total cost is estimated to be $88k (~4000 users * $22), although if students were taking more than one course using Proctorio this number could be higher. (Data on the number of courses each user was enrolled in were not available.)

In AY20/21, the University of Colorado Boulder paid roughly $114.5k for a campus-wide subscription (at a cost of $3.68 per user). Based on numbers provided by Aisha Jackson, members of OIT, and Proctorio, in AY20/21 there were roughly 25k unique Proctorio users (test-takers). If we conservatively assume each student was taking only one course using Proctorio, then the cost to students would have been over $550k. (Given many students were taking more than one course using Proctorio this number would actually be higher.) Using the current Fall 2021 numbers (as of 10/19/21 approximately 9400 users), students in the fall semester alone would have paid approximately $207k (at $22/course, assuming they are only taking one course using Proctorio) without the campus wide subscription.

If the University of Colorado Boulder does not continue to purchase a campus wide Proctorio subscription the cost will need to either be passed to individual colleges/schools or to students.

- If the cost is passed to colleges/schools, it should be recognized that this will likely impact some unequally. While Leeds and Arts & Sciences are the largest users of Proctorio, a number of students in their large enrollment, lower division courses that use Proctorio come from outside the home college/school. For example, Engineering students take courses in Math, and business minors, coming from a variety of colleges/schools, take courses in Leeds.
- If the cost is passed to students, it should be recognized that the financial burden on students as a whole may exceed the cost of a campus-wide subscription. Additionally, OIT will use more FTE time to manage individual course configurations than they do currently with the campus wide subscription, and the CU Bookstore will need to again manage collection of payments with an additional markup passed along to students.

Faculty Identified Strengths and Weaknesses:

From our informal conversations with faculty and email correspondence, six themes emerged.

1. **Flexibility and Accommodation.** Faculty who used this software identified flexibility as being a major benefit. These faculty asserted that with Proctorio they felt comfortable offering online exams within a longer exam window than with face-to-face exams, which gives students more flexibility timewise. In addition, they argued that students who travel for school-related or other purposes need not schedule make-up or alternative exams. Finally, they mentioned that students with documented disabilities can be more easily accommodated. Proctorio obviates the need for on-campus testing spaces with limited distraction.

   They also identified the flexibility of the software itself as a benefit. With Proctorio, faculty can set the sensitivity of the monitoring to include or not, video monitoring, requests for room scans, AI eye movement tracking and the like. Other remote exam proctoring services are much more limited in their design.

2. **Deterrence.** Proctorio uses artificial intelligence algorithms to flag behavior, set in advance by faculty, that may indicate academic dishonesty. It is then up to a human proctor to review the data that Proctorio has recorded. To this end, this software provides a deterrent to cheating but also evidence that may indict or exonerate student behavior.

Faculty who use Proctorio and the members of the Honor Code Advisory Board, asserted that the data collected by Proctorio did not provide sufficient evidence to find students responsible for academic dishonesty. However, when confronted with Proctorio evidence, the faculty we spoke with said that students would either describe plausible scenarios or they would admit to malfeasance. In these cases, faculty were able to determine on their own whether or not a student cheated. The members of HCAB who see cases in which students deny cheating said that while Proctorio data may inform a larger set of evidence, they would feel uncomfortable using such data alone to determine guilt.

Faculty also asserted that Proctorio might be most effective when used with in-person proctoring. With administering exams in larger classes, it is unrealistic for instructors (and their teaching assistants) to monitor every student, and this software can provide the needed observation. However, we note that AVP Jackson reports that wireless coverage in classrooms may not currently provide the needed bandwidth for large scale, on-campus use.

The greater effect of this software is that it seems to deter cheating. Faculty observed that while those students set on malfeasance would find a way to cheat, the idea that they may be caught convinced students on the verge of dishonesty to finish exams with integrity. Faculty also asserted that exams given outside of in-person proctored spaces without electronic proctoring gave clear, statistical evidence of cheating. Some faculty also mentioned that online proctoring protected the integrity of exam questions, which in some cases were used for ongoing educational research.

3. Faculty and Student Training. Another theme that emerged from our conversations was that the efficacy of this software required training of both the faculty and students who use it. Many of the faculty that we spoke with had been using Proctorio since before the move to remote instruction and had developed materials for their colleagues and their students. These materials teach faculty and students alike how to use this software. For example, students need to point their cameras at certain angles while taking a test, and they need to be reassured that only the faculty administering the test have access to the collected data.

We will here refer to the excellent and more comprehensive report on recommendations and best practices for remote exams written by representatives from the College of Engineering and Applied Sciences: https://colorado.edu/engineering/cu-engineering-implementation-plan. Their findings about Proctorio specifically will appear in the following theme, but this report emphasizes the need for faculty and student training for remote examination.

4. Privacy Concerns. Given that Proctorio has the capability to record student behavior on their computers and using their cameras, privacy seems to be a common objection to the use of this software. While our initial focus groups did not include conversations with students, we do want to recognize an online petition to discontinue the use of Proctorio based on privacy concerns: https://change.org/p/university-of-colorado-boulder-stop-use-of-proctorio-at-cu-boulder-over-privacy-concerns.

Faculty that we met with did not, however, share these concerns. They observed that Proctorio meets the requirements of FERPA compliance, and they claimed that with training students were confident that their privacy was maintained as well as the integrity of the test scores. One faculty member shared that having an online exam proctoring software that confirms a student's identity is

necessary for her program's accreditation (e.g., https://wcet.wiche.edu/policy/student-identity-verification/).

The committee would also like to recognize the anecdotal and unsubstantiated beliefs from faculty that Proctorio violates some kind of expectation of privacy.

5. Performance. In our conversations and over email, we received opinions referring to the possible negative effects of Proctorio on student performance. Colleagues believed that using Proctorio was itself a distraction, especially for students from under-represented communities. They identified the differences in access to the necessary bandwidth as a deterrent to focus, for one. Some students are not able to access the internet with appropriate speed from their homes, which is itself a disadvantage. These faculty also, anecdotally, referred to the anxiety that minute observation can amplify.

6. Academic Integrity. Some faculty we spoke with mentioned that the use of Proctorio undermines the importance and practice of academic integrity. These faculty believe that the more important pedagogical implications of academic honesty ought to be understood as an *a priori* benefit; they argue that faculty should encourage the intrinsic motivation of honesty for honesty's sake. Our colleagues also believe that the use of this software erodes the trust and rapport of the student-teacher relationship.

In conclusion, we have found a clear distinction between faculty who wish to continue to use Proctorio for remote or in-person examination, and those who don't and in fact object to its use. It is also worth quoting the CEAS report on best practices and recommendations for remote exams:

> "While the campus offers access to Proctorio, the remote exam working group does not recommend its use because of privacy concerns and reports from students that they feel that its use indicates to them that their instructor does not trust them not to cheat; instead, the remote working group recommends making use of video proctoring via Zoom in combination with other technologies, such as Canvas and Gradescope, to address potential issues of academic dishonesty without the use of overly invasive technologies, e.g., Proctorio. This recommendation is especially important given the mental health crisis mentioned above."

Looking Ahead and the Need for Further Investigation

Given the considerations detailed above, as well as the clear limitations of the findings of our initial focus groups and cursory report, we encourage the Provost's Office and CU-Boulder to conduct a more thorough assessment of the value and implementation of online proctoring software, such as Proctorio, on our campus. We also encourage the Provost's Office and CU-Boulder to seriously consider some of the broader implications of online proctoring software—a few key considerations of which are detailed below.

1. **Ethical Concerns**. Gleaned from our focus groups are important concerns over inequities and privacy.

   Accessibility. For instance, online proctoring software, like Proctorio, requires that students have access to laptop computers with cameras, as well as access to high-speed internet. Beyond the practical concerns raised above with the growing demands on CU's limited bandwidth, which may create problems for students taking exams on campus that are proctored by Proctorio, CU administrators and faculty should understand that for some students living off campus, purchasing a reliable computer or high-speed internet service can pose significant financial challenges. (And this says nothing about the expectation that exams be completed in secluded study spaces, which for many students—including non-traditional students with families or

students who are forced to share rental units with several roommates because of the high costs of living in the Boulder area.) In this context, faculty use of Proctorio may both create barriers to student success as well as countenance inequities on campus.

Discrimination. Further, software that utilizes face-recognition technology is vulnerable to various biases, which may disadvantage or discriminate against our BIPOC student population (see, for example, the recent articles in *Nature* and the *New York Times*).

Privacy. Moreover, worries about privacy with online proctoring software, like Proctorio, persist. Faculty in our focus groups explained that in order to prevent academic misconduct and maintain the integrity of their exams, they commonly require their students to present a photo ID to confirm the user is the actual student, as well as to provide a 360-degree scan of the room in which the student takes the online-proctored exam. CU administrators and faculty should recognize the potentially intrusive nature of such expectations. Several faculty in our focus groups acknowledged the privacy issue, but insisted that students are free to choose where they take their exams, that reasonable accommodations are offered for students who wish to opt out of Proctorio-proctored exams, and that these measures are no more intrusive than the in-person proctoring (which exposes students to the close scrutiny of faculty and graduate student teaching assistants). That said, it should be noted that a student petition at CU, begun some time ago, aims to ban the use of Proctorio for some of the concerns noted here.

Financial Inequities. Finally, in the event that University leadership decides against renewing CU's contract with Proctorio, and thus decides against paying the campus-wide costs of Proctorio—leaving these costs to be borne by individual academic units or their broader colleges or schools—CU administrators and faculty should understand that these costs may well be pushed onto students (as part of the additional costs of course materials). Such additional costs are likely to raise additional equity issues, especially when recognizing that individual academic units or their broader colleges or school will lack the same capacity for organized bargaining with Proctorio that CU may have, and thus are likely to face higher individual costs for the use of Proctorio's software. Moreover, in the event an academic unit or its broader college or school absorbs these costs (as opposed to pushing them onto students), it should be acknowledged that many courses serve students from outside particular academic units or broader colleges or schools, which would mean that the costs of using Proctorio for such students would be unfairly subsidized by the academic unit, or college or school.

2. **Labor Concerns and Pedagogical Implications**. Two potential and concerning longer-term implications of the widespread adoption of online proctoring software, like Proctorio, are the impacts it may have on traditional in-person learning and the work loads of faculty.

   Regarding the former, with the clear commitment that CU-Boulder has made to expanding its online course offerings and degree programs (see update on Academic Futures), with the growing demand among students for "flexibility and options in the online and hybrid campus experiences," as Interim President Saliman has recently stressed (CU Connections, 9/30/2021), and with the recent efforts of former CU President Kennedy to aggressively invest in online education (CU Connections, 4/30/2020), many CU faculty have expressed concern about how existing and future distance-learning initiatives may undermine the rigorous academic culture at CU—at whose foundation is in-person or on-site learning—and the quality of the learning experience of our students. The possible widespread adoption of Proctorio on our campus reinforces these broader concerns, as online exam proctoring shifts the space for learning from a physical classroom to diverse virtual spaces.

   Regarding the latter, adding to persisting concerns over the heavy teaching loads of instructor-rank faculty (and, more broadly, their role at research institutions like CU), a further worry with emerging classrooms technologies, such as online proctoring software like Proctorio, is that the

ability for faculty to monitor the exams of more students may serve as a rationale for increasing the enrollment caps on course offerings—which would increase the overall workload of many faculty at CU, including research faculty and GPTIs.

3. **Best Practices Training**. Irrespective of the decision CU administrators make about Proctorio as a campus good and about funding its use on campus, one of the key considerations that arose during our focus groups is that the continued use of Proctorio by our faculty demands sufficient and consistent training—for both faculty and students alike. OIT and various departments have already made notable progress in educating faculty about the helpful features and various shortcomings of Proctorio (through tutorials, handouts, etc.), and our focus groups revealed that many faculty using Proctorio in their classrooms proactively explain to their students the purpose of the software and help students learn how to use Proctorio to promote student success (through lectures, quizzes, etc.). Nevertheless, given the controversial nature of online proctoring software (for reasons already discussed), as well as the varying levels of familiarity and proficiency with Proctorio among faculty and students, the need for a systematic approach to faculty training on best pedagogical practices seems necessary.

4. **Need for Comprehensive Analysis**. What is abundantly clear is that the use of Proctorio and alternative online proctoring software on our campus demands further study. Among the key perspectives missing from our initial focus groups are those of students and relevant staff—not the least of which include:

    University of Colorado Student Government (CUSG) and Graduate and Professional Student Government (GPSG), whose members would provide invaluable insights into students' attitudes toward and concerns with online proctoring software;

    CU Bookstore staff, who would be responsible for fielding student questions about the purchase and use of this software, and who would be responsible for processing these purchase requests; and

    Disability Services Student Testing Center staff, who may well face increased numbers of requests for testing accommodations if the costs of Proctorio (or other proctoring software) become inhibitive when not paid for by the University, and if these inhibitive costs prompt faculty or their academic units to refrain from using the software—which provides a great deal of flexibility for faculty to accommodate the diverse needs of their students.

A subsequent and comprehensive study with key stakeholders would enable the Provost's Office to render a more informed decision about Proctorio and alternative online proctoring software that will likely become available in the future. Among the key stakeholders that should be part of this broader and ongoing discussion include the Office of Diversity, Equity and Community Engagement (ODECE), the Office of the Senior Vice Chancellor for Diversity, Equity and Inclusion, the Divisions of Student Affairs and Faculty Affairs, the Center for Teaching and Learning (CTL), Office of Information Technology (OIT), Office of Data Analytics (ODA), CU Bookstore, Disability Services, Student Conduct and Conflict Resolution (SCCR), the Honor Code Advisory Board (HCAB), CUSG and GPSG, as well as a wider representation of faculty and students.