

Academic Integrity and Rigor in Post-COVID Flexible IS Education

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Abstract

The COVID-19 pandemic forced many educators to quickly shift from traditional modes of instruction to distance delivery, facilitated by technology. As a result, many instructors made compromises in administering and assessing their curricula. Students studying in Information Systems and Technology (IS&T) programs at regional universities in the United States were surveyed to assess their perceptions and values relative to flexible higher education delivery, academic integrity, and rigor. The results of the study show although students in IS&T programs value flexible learning delivery, they indicate a strong preference for regular, synchronous instruction from their professors. Students also indicate that remote proctoring on assessments is easier to circumvent than face-to-face proctoring, and that they take advantage of this more often when they are examined remotely.

Keywords: IS ethics, academic integrity, academic rigor, information technology, undergraduate students, distance learning

1. INTRODUCTION

The COVID-19 pandemic forced universities to quickly shift to an online or hybrid approach to education. This required some compromises in both academic integrity and rigor (Gonzalez, 2021). In some cases, replacing formerly face-to-face, proctored exams with projects, presentations, or other assessments helped ensure academic integrity and rigor (Fleischman,

2020). In other cases, the best way to assess student learning continued to be via exams. But without effective remote administration and proctoring technology, the integrity of the exams is suspect (Shmelev, 2020). This research aims to examine students' values, perceptions, and behaviors as they relate specifically to their current experience as undergraduate students in American universities. Data collection is specifically focused on students studying

Information Systems and Technology (IS&T) at regional universities that primarily deliver undergraduate degree programs.

The ostensible outcome of this research is to equip university professors with information about students' desires and behaviors as they pursue degrees in a post-COVID world of competing influences. The factors include:

- Unprecedented levels of cost and debt to acquire a college education (Cappelli, 2020; Tuminez & Morse, 2023);
- Varied and sometimes loud voices questioning the value of a four-year college degree (Tuminez & Morse, 2023; Webber, 2016);
- Family obligations (Peters, 2011; Vokic, Bilusic, & Peric, 2021);
- Employment demands and opportunities (Vokic, Bilusic, & Peric, 2021).

Other similar issues also distract or dissuade students from pursuing higher education. COVID-19's disruption can be seen as both a positive and a negative for higher education, but it certainly created a catalyst for innovation in a variety of technologies and techniques for flexible education. Can flexible, rigorous, and valuable higher education be provided while maintaining integrity and rigor?

2. REVIEW OF LITERATURE

Much research, published before, during, and after the pandemic, has addressed flexible education delivery, academic integrity, and academic rigor. The literature reviewed here characterizes questions that educators must ask themselves to confront new realities in higher education.

Does the demand for flexible higher education warrant reprogramming existing curricula?

This question clearly pre-dates the COVID-19 pandemic (Thomas, 2014). However, it is now evaluated with greater impetus. In former times, students may have wanted and requested online course options. Pre-pandemic, students were more likely to accept denials based on explanations such as a lack of technology, interest, quality, or expertise (Bunn, 2019). Today, however, most universities accept that such explanations will not pass muster with students, their parents, and other constituencies of higher education (Faircloth, 2021). For most disciplines, flexible education is here to stay. Institutions that resist this assertion do so at their own peril (Xavier, 2021). Some students,

families, and institutions value and prioritize face-to-face and residential college environments and experiences. These are a valued part of the American collegiate landscape but are not the focus of this research. This study focuses on students at regional universities that focus on college degrees for career preparation and workforce development.

The current environment of higher education must evolve beyond traditional course delivery. This will include flexible modalities, manifested by an adaptation of the best learning and teaching techniques to embrace the intersection of technology, interactivity, and knowledge transfer, and assessment (De Klerk, 2021). Professors who wish to remain current, relevant, and effective educators within their disciplines must take up the cause of high-quality education in classrooms that simultaneously exist both everywhere and nowhere (Machado de Almeida, 2021)

Students and other stakeholders were already gravitating toward fully online and other types of flexible course delivery modalities prior to the COVID outbreak, and the pandemic opened eyes on many fronts regarding what is now possible (Tarchi, 2022). Rather than wrestling with questions of 'if' or 'when' flexible learning will come to campuses, it is time to begin (or continue) the redevelopment of curricula to employ the best aspects of flexible delivery. Faculty members have learned much and developed necessary flexible education skills and systems over the past three years (Gonzalez, 2021). All aspects of traditional education need not be thrown out to accomplish more flexible delivery now (Fleischmann, 2020), but refusal to participate in flexible higher education will not insulate instructors or schools from the offerings of myriad other institutions that do (Collin, 2020).

Can flexible education include maintaining integrity and rigor?

If the traditional, face-to-face environment defines rigorous education, can the same level of integrity and effectiveness be incorporated into instruction even as elements of flexibility are incorporated into course delivery?

In pre-pandemic times, technologies for interactivity and rich media delivery existed and were widely used (London, 2014; Bunn, 2019). Systems to deliver and remotely proctor exams also existed, however their effectiveness in most applications was suspect at best and ineffectual at worst (Cote, Jean, Albu & Capson, 2016; Dunn, 2010). Well-proctored, in-person exams have long been the standard for summative assessment of subject mastery in many

disciplines (Qureshi, 2021; Shmelev, 2020). Deficiencies in remote exam proctoring are often seen as the major impediment to delivering quality flexible higher education (Bentley, 2021). While some disciplines can resort to non-exam assessments, where cheating may be detected through means other than direct physical observation (Vasquez, 2021), many disciplines remain heavily reliant upon exams to determine student competency (Hussein, 2020). This is true for many subjects within the areas of Information Systems & Technology (Vasquez, 2021).

Competency is assessed via the demonstration of one's abilities to perform specific technology-related tasks (e.g., configure a firewall, write functional code, etc.). Ensuring the integrity of such demonstrations helps to ensure competency. Formative educational exercises can generally be administered asynchronously and/or remotely and still be assessed effectively, though students may not always complete their own homework and no mechanism may exist to detect this. Where summative activities can be assessed via projects, demonstrations, portfolios, or other non-exam artifacts or deliverables, competency can be demonstrated without sacrificing integrity or rigor (Fleischman, 2020). But in cases where exams are needed to determine a student's level of mastery, adequate proctoring is still necessary. Remote proctoring tools have matured significantly in recent years, however ample evidence shows that faculty and students continue to have reservations and concerns about these systems' effectiveness and validity (Hussein, Yusuf, Deb, Fong, & Naidu, 2020).

Can exams delivered at a distance be proctored effectively?

Remote proctoring of college exams is not a byproduct of the COVID pandemic. Remote proctoring traces its history back more than a decade (Bergstein, 2013, Kolowich, 2013). In more recent years, and certainly advanced by the pandemic, virtual testing technologies have accelerated in capacity and sophistication (Vasquez, 2021). Instructors can now remotely view students' computer screens, the rooms in which they are testing, and the resources (both physical and digital) that they are accessing (Scarbecz, 2021). Broadband internet connections in the U.S. are generally ubiquitous enough to enable most college students to complete remotely proctored exams in a place that can deliver live video, screencast, and sound simultaneously (Atoum, 2017). This does not include all students though. Depending on the proctoring techniques and tools employed, some students will not have the necessary web

cameras, computer monitors, speakers, microphones, software, and other tools necessary to support a rich-media proctoring environment (Hussein, 2020). Universities may choose to provide the needed technology, but costs, delivery time, and logistics become prohibitive in many cases (Scarbecz, 2021).

Because of these challenges, some faculty members may choose to use exams that are simpler to administer, such as multiple-choice exams in a learning management system. The same teachers might otherwise prefer exams where a more hands-on demonstration of learning is required. Such changes in assessment compromise academic rigor (Qureshi, Chaudhery, Patil & Correia, 2021). This is not to say that one type of exam is less rigorous than another. But when faculty are limited by their ability to administer and proctor certain types of exams, suboptimal examinations may compromise assessment of student learning and competency (Vasquez, 2021).

These limitations can likely be overcome as technologies for remote proctoring continue to improve, and as internet connectivity and speeds continue to increase. However, there is one additional shortcoming that will continue to be an obstacle: acceptance and legality (Hubler, 2020). Many students accept that exam proctoring requires subjecting oneself to extensive observation. But the COVID pandemic raised questions and legal objections regarding how much observation is permitted and tolerated. In a 2022 legal case in Ohio, the court found in favor of a student who objected to what he perceived to be an unreasonable search of his bedroom, where he sat for a remotely proctored college exam. In his decision in *Ogletree v. Cleveland State University*, Judge Philip Calabrese ruled: "Mr. Ogletree's privacy interest in his home outweighs Cleveland State's interests in scanning his room. Accordingly, the court determines that Cleveland State's practice of conducting room scans is unreasonable under the Fourth Amendment" (Bowman, 2022). Thus, even as more effective technologies are created to ensure academic integrity and rigor on exams, legal constraints and social tolerance may limit the ability to use those tools.

With this review of literature as a foundation, the purpose of this study is to understand information systems students' perspectives on academic integrity, rigor, flexibility, and learning delivery in post-pandemic higher education.

3. METHODOLOGY

This study uses a survey design to understand students' observations, preferences, and values relative to flexible learning delivery in post-pandemic higher education. A survey design provides a quantitative description of some fraction of the population, that is, the sample through the data collection process of asking questions (Fraenkel & Wallen, 2012). This method was applied in the collection of data from information system student's attending regional colleges in the United States.

Research Questions

An online survey was developed to examine three research questions:

- RQ1: Which course delivery modality do students prefer?
- RQ2: What are students' perceptions of the impact of flexible learning on academic rigor and integrity?
- RQ3: Do students take advantage of flexible learning delivery to the detriment of academic rigor and integrity?

Students received the survey comprised of seven questions on the topics of course delivery modality, academic rigor, and integrity (see Appendix A).

- Q1: Please sort the following course delivery modalities into your order of preference:
 - Modality 1: Online Asynchronous
 - Modality 2: Online Synchronous Weekly Class
 - Modality 3: Livestream Synchronous Twice Weekly Class
 - Modality 4: Hybrid Online + Once Weekly Face-to-Face Class
 - Modality 5: Traditional Twice Weekly Face-to-Face Class.
- Q2: If you could choose only one course delivery modality to take classes, which would you choose?
- Q3: Which course delivery modality have you found to be the most academically rigorous?
- Q4: When you have taken courses that have allowed remote exams, what type of proctoring has been used? (Indicate all you've experienced)
- Q5: When completing exams remotely, how easy is it to circumvent proctoring?
- Q6: When completing exams remotely, how often have you circumvented proctoring to use resources that were not allowed?
- Q7: When completing exams in person, how often have you circumvented proctoring to use resources that were not allowed?

Invitations to complete the survey were sent to 773 undergraduate students studying in Information Systems and Technology programs at state-funded, predominantly undergraduate, regional universities in the United States. Only undergraduate students were invited to respond. Demographic questions were intentionally omitted to keep the survey brief and to maintain focus on modality preference and rigor/integrity. This decision is discussed in the Limitations section of this paper.

Survey invitations were sent out to students via email. Instructors verbally invited students to watch for the email and participate in the survey. No incentives were offered to students. The survey remained open for 30 days during the spring semester of 2023.

4. FINDINGS

Three hundred and two (302) complete survey responses were received, yielding a response rate of 39%. Survey questions 1 and 2 were mapped to RQ1, survey questions 3, 4, and 5 to RQ2, and survey questions 6 and 7 to RQ3.

RQ1: Which course delivery modality do students prefer?

On survey question 1, students ranked their preferred course delivery modalities. Hybrid online with weekly face-to-face class sessions (Modality 4) was the clear favorite, with 186 out of 302 students ranking this course delivery mode as either their first or second preference. The next closest preferred modalities were traditional face-to-face classes (Modality 5), and online courses with synchronous weekly sessions (Modality 2). Ninety-four students ranked traditional classes as either their first or second preference, and 93 ranked online/synchronous in first or second place—about half of those who ranked hybrid delivery as their top preference.

Conversely, online/asynchronous (Modality 1) and synchronous livestreaming courses (Modality 3) were consistently ranked among the least popular options on survey question 1. Online/asynchronous delivery was ranked fourth or fifth by 131 respondents (43.4%), while synchronous livestreaming was ranked in those bottom two spots by 139 students (46.0%). Traditional face-to-face classes, appears to be the most polarized delivery method. Although 94 students ranked traditional face-to-face classes in their top two preferences (only 39 of those 94 ranked this delivery method first in their list), 97 students ranked it last in their order of preference. Thus, a relatively bimodal distribution

exists for traditional on campus, in-class teaching. This lends strength to the argument that educators must continue to facilitate flexibility into their course delivery, with evidence that student still do want to come to campus or at least interact synchronously with their instructors on a regular basis.

Table 1 summarizes the distribution of students' ranked preferences relatively to the five course modalities listed in the survey.

Course Modality	Students' Ranked Preferences				
	1st	2nd	3rd	4th	5th
Online, Asynchronous	31	36	104	54	77
Online, Synchronous	64	29	66	58	85
Livestream, Synchronous	27	41	95	71	68
Hybrid, Online + Weekly Face-to-Face	97	89	96	20	0
Traditional Face-to-Face	39	55	51	60	97

Table 1: Students' Ranked Course Delivery Mode Preferences

These observations are validated by students' responses to survey question 2, which is also mapped to research question 1 in this study. When allowed to select only one of the five proposed course delivery modalities, 144 (47.7%) preferred the hybrid course delivery method. Only 29 (9.6%) preferred traditional face-to-face classes as their first choice. Clearly the target student population values, and likely needs, flexible learning options. This assertion is supported by the fact that online/synchronous (62 respondents) and online/asynchronous (44 respondents) were the second and third highest ranked modalities on survey question 2. Here again, synchronous livestreaming was the least popular delivery method, with only 23 respondents (7.6%) indicating it as their primary preference.

These findings are consistent with pre-pandemic research, which showed that students who attend regional undergraduate-focused universities in the U.S. tend to be a very diverse learner group, and subsequently prefer both in-person support and flexibility in their learning activities (Gianoutsos & Rosser, 2014; Ishitani & Reid, 2015). The findings in this paper show that the pandemic has not changed students' values and

preferences relative to course delivery modalities, but rather, affirmed them as the technologies and expertise to meet those needs and preferences has improved and increased in recent years. Given that nearly half of survey respondents indicated hybrid learning as their first and primary preference, it follows that students likely need and value both personal learning interactions and flexible options for learning engagement.

RQ2: What are students' perceptions of the impact of flexible learning on academic rigor and integrity?

In response to this research question, students were asked which delivery modalities were the most and least rigorous, and what exam technologies or strategies they had experienced as students. On survey question 3, 129 students (42.7%) indicated that in their view, face-to-face learning is the most rigorous course delivery mode, while they perceive that online course delivery, whether synchronous or asynchronous, is the least rigorous (30 respondents, 9.9%). Though it was the least popular delivery modality, 83 students indicated that live streaming is the most rigorous, with the remaining 60 students (19.9%) declaring that all modalities were, for them, more-or-less equally rigorous.

When determining students' experience with exams in a flexible learning environment, students were asked to indicate all techniques that applied. The techniques listed on the survey included remote proctoring systems such as Proctorio, the use of live video applications such as Zoom, MS Teams, Google Meet, etc., and on-your-honor examinations with no proctoring. Students were not asked which of these techniques they preferred. Because students could respond by selecting multiple options, there were more than 302 responses to survey question 4. Almost all respondents (265) said they had completed one or more exams using Proctorio or similar software, 217 said they had completed un-proctored, on-your-honor exams, and only 61 said they had completed exams while being remotely proctored through video conferencing-systems.

On survey question 5, most students responded that it was either extremely (102) or somewhat (99) difficult to circumvent remote proctoring technologies. An additional 74 students felt that circumventing remote exam proctoring was neither easy nor difficult, while 27 indicated it was extremely easy. None said that it was somewhat easy. The reasons for this distribution likely vary, but likely include students' perceptions, values,

intentions, and past experiences.

RQ3: Do students take advantage of flexible learning delivery to the detriment of academic rigor and integrity?

In survey question 6, students were asked directly how often they have circumvented remote proctoring mechanisms when completing exams. This question assumes that students responded honestly, which was encouraged by assuring study participants that their responses were recorded completely anonymously and could not be traced back to them in any way. Their responses indicate that students largely act with integrity when completing exams remotely. Two hundred and eighty one of 302 respondents indicate that they have never (142) or sometimes (139) circumvented remote proctoring technologies when completing exams remotely. Only 17 admitted to cheating about half of the time, 15 admitted to frequent exam misconduct, and none indicated that they have almost always cheated on remote exams.

The survey does show some evidence that remotely proctored exams do compromise academic integrity, however. The total number of students who admitted to at least some degree of academic misconduct on remote exams was 171 (56.6%). In other words, more than half of students who responded to the survey indicated that they are not always honest when trusted to complete their exams outside of an in-person, proctored classroom—a disheartening, if not unsurprising, finding for any educator. Survey question 7 asks about exams students have completed in person. On this question, only 23 respondents (7.6%) indicated that they have sometimes cheated. None said they had cheated about half the time or more when taking in-person exams. Out of the 302 respondents, 279 indicated that they had never cheated when completing their exams face-to-face. This observation suggests that while the response group sees themselves as largely honest when completing their exams, they admit to being less so when they perceive that no one is watching, or when the probability of getting caught is lower.

To test this assertion, a standard Pearson correlation ($\alpha=0.05$) was calculated between survey questions 5, 6, and 7. Likert scale values were used to correlate the relative risk of academic integrity loss with students' responses. Findings indicate that there is only a weak positive correlation between survey question 5 and survey questions 6 and 7. Students' perceptions of ease of remote proctoring circumvention (question 5) correlate to their

admitted cheating behavior on remote exams (question 6) with a coefficient (Pearson's r) of 0.36. When proctored in a face-to-face environment (question 7), this correlation drops to $r = 0.29$. The data thus shows that when students perceive that cheating is easier, they admit that they do it more often. This claim is bolstered by the correlation between question 6 and question 7 ($r=0.52$). This stronger coefficient, while still not significantly large, indicates that with some degree of consistency students who admitted to cheating on remotely proctored exams are also students who admitted to cheating on in-person exams. This is unsurprising, but still important data-based evidence that students who are willing to cheat will do so more often in a remote proctored environment. Hence, as educators increasingly embrace flexible learning delivery, there must also be innovation in the ability to effectively proctor exams remotely (Garg & Goel, 2023).

Survey questions 5, 6 and 7 were also correlated with students' modality preferences indicated on question 1 of the survey. Only one meaningful relationship was found: students who strongly preferred livestream class delivery (M3) showed a somewhat elevated incidence of misconduct on remotely proctored exams (question 6, $r=-0.43$). Interestingly, this same correlation was not observed in students who indicated strong preference for either form of online course delivery. Students who preferred hybrid or face-to-face course delivery showed lower rates of exam dishonesty, though these correlation coefficients were too small to be very meaningful ($r=0.15$ and $r=0.27$, respectively).

5. LIMITATIONS

As with most survey research, a primary limitation is with question validity and the consistency of participants' responses. To address this, the data set was tested using Cronbach's Alpha, which yielded a test value of 0.614 (Fallucchi, Nosenzo & Reuben, 2020). This coefficient is expected given the varied correlations identified between the questions, the relatively small sample size, and the limited number of questions. Despite this, useable conclusions can still be drawn from the findings.

Because the survey sought to examine students' beliefs and values, their responses are inherently subjective and contextualized within their own experiences and value systems. It is unlikely that social desirability or confirmation bias influenced study participants because they knew they were completing the survey anonymously, however it

is important to acknowledge the possibility of bias in the data. Further study on these matters could be pursued through a qualitative approach. The survey group was limited to students at state-funded, regional universities. To retain objectivity, participants received no enticements for completing the survey, likely impacting the sample size. These decisions were intentional but do somewhat restrict findings. Therefore, the results may not generalize to other types of universities or student populations.

This research was also limited to students studying in IS&T courses. This may influence the results, given that respondents in this study are likely more comfortable with remote learning tools, and with computer technology, than the general college student population may be.

6. FUTURE RESEARCH

Additional study on academic rigor and integrity should address the demand for flexible course delivery within the context of the target student population. Based on these findings, it is evident that flexible learning options are not only preferred by students but also essential. The COVID-19 pandemic has compelled educators to explore innovative teaching methods while ensuring a meaningful learning experience. However, the urgency of pandemic era shifts in teaching delivery may have initially led to compromises in maintaining academic rigor and integrity. It is crucial for educators to address these compromises and find ways to embrace flexible learning without compromising academic standards.

Future research should focus on developing innovative methods and technologies that can uphold academic integrity in flexible learning environments. Such tools must strike a balance between accommodating students' preferences for flexible course delivery while maintaining necessary standards of academic rigor. Research can contribute to the design and implementation of effective tools and strategies that promote a culture of integrity in the evolving landscape of education.

7. CONCLUSIONS

For the target student population examined in this study, the data shows that flexible course delivery is both preferred and, for some students, needed. The COVID pandemic compelled educators to explore the possibilities of innovative teaching modes while simultaneously delivering meaningful experiences in teaching and learning.

While the urgency of the pandemic may have initially forced compromise in academic rigor and integrity, educators must address these compromises wherever flexible learning continues. Students indicate a preference for this flexibility, and in this study have admitted that they sometimes take advantage of it by cheating.

Increased academic rigor and integrity within flexible learning classrooms will be predicated upon faculty members' creativity and innovation. Going forward, educators and technologists must collaborate on tools for examining students' competency under conditions that will curb the circumvention of remote proctoring tools.

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APPENDIX A Survey

This survey was sent via email invitation to 773 students studying in information systems, or similarly related technology programs, at six universities in the United States. The universities selected were all regional, primarily undergraduate-focused institutions emphasizing bachelor's degree programs designed for workforce preparation and development. No enticements were offered to complete the survey. Respondents were informed that their participation was anonymous. Demographic and identity data were intentionally not collected. These decisions were made in an effort to maximize participation while limiting bias. 302 students responded to the survey.

Question 1.

Please sort (drag-and-drop) the course delivery modalities below into your order of preference, with the one you like the best at the top.

- Online, no synchronous class sessions
- Online, weekly synchronous class sessions
- Livestream, twice weekly synchronous class sessions online (MS Teams, Zoom, etc.)
- Hybrid, once weekly on campus class sessions
- Traditional twice weekly on campus class sessions

Question 2.

If you could choose only one course delivery modality to take classes, which would you choose?

- Same options as question 1

Question 3.

Which course delivery modality have you found to be the most academically rigorous?

- Online
- Livestream
- Face-to-face
- All have about the same level of rigor

Question 4.

When you have taken courses that have allowed remote exams, what type of proctoring has been used? (Indicate all you've experienced)

- Proctorio (or similar online proctoring)
- Webcam with Teams/Zoom/etc. proctoring
- No proctoring, on your honor

Question 5.

When completing exams remotely, how easy is it to circumvent proctoring?

- Extremely difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Extremely easy

Question 6.

When completing exams remotely, how often have you circumvented proctoring to use resources that were not allowed?

- Never
- Sometimes
- About half the time
- Frequently
- Almost always

Question 7.

When completing exams in person, how often have you circumvented proctoring to use resources that were not allowed?

- Same options as question 6