Tutoring Online During the COVID-19 Pandemic: Use of Critical Incidents to Improve Practice

A.E. Dreyfuss*
Learning Developer
New York City College of Technology, City University of New York
ADreyfuss@citytech.cuny.edu

Jose Armando Sanchez Diaz
New York City College of Technology, City University of New York
& Pace University

Barakat Adigun
Albert Einstein College of Medicine

Helen Baraki
Bard High School Early College

Thalyia Thompson
CHA Consulting

Recommended Citation

Tutoring Online During the COVID-19 Pandemic: Use of Critical Incidents to Improve Practice

A.E. Dreyfuss*, Jose Armando Sanchez Diaz, Barakat Adigun, Helen Baraki, & Thalyia Thompson

Learning Developer
New York, New York
ADreyfuss@citytech.cuny.edu

Abstract

Developing expertise in the practice of online tutoring is presented by peer tutors who provided support to students with synchronous sessions with the onset of COVID-19. The experiences and learning of peer tutors were probed through the use of critical incidents (Flanagan, 1954), and how weekly training meetings provided support to them, creating a collaboration among the tutors and the training manager.

Keywords: Tutoring Online, Peer Collaboration, STEM Disciplines, Critical Incidents, COVID-19 Pandemic

Introduction

The COVID-19 pandemic required innovation in providing academic support to students enrolled in STEM disciplines in higher education. While synchronous online support has been available at campuses prior to the pandemic (e.g., Rennar-Potacco, et al., 2017), after March 2020 academic support was forced to pivot along with the move to online courses and activities.

This paper examines the experiences of four peer tutors who provided support to students in the online environment. Their development as tutors helping students through synchronous sessions was probed through the use of critical incidents (Flanagan, 1954) and explored how weekly training meetings provided support to them, creating a collaboration among the tutors and the training manager, who jointly authored this paper.

New York City College of Technology ("City Tech") is the sole college of technology within the City University of New York (CUNY) system, with the largest enrollment of STEM students among all CUNY colleges. The tutoring component was funded by the Collegiate Science & Technology Entry Program (CSTEP), a state-funded, five-year grant serviced by the New York State Department of Education. The purpose of CSTEP is to increase the number of students from under-represented groups and economically disadvantaged backgrounds who are pursuing professional licensure and careers in mathematics, science, technology and health-related fields. Originally granted in the 2015-2020 CSTEP funding cycle, the program supported over 260 students on an annual basis. Notable accomplishments of the program have included over 50 graduates each academic year, and the creation of the CSTEP Summer Undergraduate Research Program (CSURP). The CSTEP Program was again awarded a five-year grant for the 2020-2025 cycle.

The tutoring component, an addition to the 2020-2025 renewal grant, proposed selecting tutors from that year's cohort of CSTEP students to serve as peer leaders of group study and as tutors in one-on-one sessions. The training was to include meetings of the tutors to discuss challenges and opportunities. Selected tutors were compensated for time spent tutoring and for the one-hour a week training. With the pivot to the online environment due to COVID-19, the anticipated in-person tutoring for Fall 2020 was now only possible online.

Models for online tutoring

Tutoring as an academic support mechanism in higher education has been seen as the "de facto" best substitute for seeking knowledge that is not understood by students. Yet there

is a plethora of options for help-seeking, encompassing both in person and online resources (Giblin, 2016). Tutoring, where a "more knowledgeable peer" (Vygotsky, 1978) helps a student to understand what is not clear, is usually viewed as an in-person session, though online tutoring has been available in some form since the 2000s.

Preparing tutors for their role requires their understanding of the relationship between tutor and tutee in terms of meeting the learner where help is needed. Both in person and online, asking questions (Hrastinski, et al., 2019) is a fundamental strategy that helps the learner/tutee formulate their thinking about what they know and do not know, and demands thoughtful listening skills from the tutor to guide the learner toward an understanding of the process of thinking about the task at hand.

Hrastinski (2020) notes the importance of students having access to the internet and any type of additional resources when trying to learn something and discusses the differences between synchronous and asynchronous delivery. He further suggests that videoconferencing is just as effective as face-to-face tutoring. "Tutors can work with up to five students simultaneously in separate windows, making it more cost-effective and enabling learners to work with mathematical problems at their own pace" (p. 3).

Johns & Mills (2020) focused on mathematics tutoring online. They surveyed mathematics learning center personnel and noted that, "Tutor training either focuses on mathematics content that the tutor will encounter and how to encourage students to construct meaningful understandings; pedagogical techniques, emphasizing questioning skills, metacognition, or study skills; or a combination of content and pedagogy" (p. 3). The platform used was Zoom, considered the most useful. An additional point supporting synchronous tutoring sessions is the possibility of receiving immediate feedback and the ability to engage in an extensive dialogue with tutors.

Moving tutoring online

The CSTEP peer tutoring program pivoted: the tutoring would be offered in synchronous sessions, depending on the student-tutors' schedules. Likewise, the training would be online, introducing techniques and learning theories that could provide the tutors with guidance on effective tutoring strategies.

In early September 2020, recruitment of tutors was by email sent to all CSTEP students, who were asked to complete a Google Forms document. Applicants were interviewed by the grant's Project Manager and the Training Manager via Zoom, individually and in pairs, depending on applicants' availability. Four academically successful students were selected as tutors, based on their academic record, interest, and enthusiasm for this new

opportunity. Their majors were Applied Mathematics, Bioinformatics, Biology, and Mechanical Engineering. All had transferred into City Tech and were nearing graduation with bachelor's degrees.

The tutors' responsibilities were to conduct weekly tutoring sessions, participate in the training, and write a weekly journal, which was shared in a private forum. To support this forum, a site was created on City Tech's "Open Lab," an open-source digital platform (https://openlab.citytech.cuny.edu), for which the Project Manager and the Training Manager received introductory training to familiarize them with functions of WordPress.

Tutoring schedules were arranged to accommodate each of the four tutors based on their availability. The tutors had a commitment of five hours a week: four hours of tutoring and one hour devoted to training meetings. The individual scheduling varied: tutoring sessions could be two-hour sessions twice a week on two different days and for one tutor, one four-hour session on a single day of the week. Tutoring sessions were advertised to the C-STEP program's students, and more widely to other departments at City Tech that focused on STEM subjects.

Although the peer tutors asked students to keep their cameras on during tutoring sessions, not all students complied. Most frequently, only one student showed up for a tutor's session at a scheduled time. While group sessions were expected, these rarely occurred. There was no direct link with instructors. Students brought their questions and problems that they did not understand in their coursework.

Training Sessions

The tutoring and training schedules in Fall 2020 began mid-September and ended mid-December, for a total of twelve weeks. The first weekly training session was two hours long while the other eleven sessions were one hour. Zoom was used as the platform for both tutoring and training, and during the training, cameras were generally on, although occasionally there were other people (children) in the tutor's room, so the camera would be turned off for a while. The Training Manager developed the sessions, creating a table "grid" to plan the time and timing (e.g., 2:00-2:15pm, 15 minutes); the Topic or Exercise (e.g., Introductions; Zoom features; Break; etc.); Instructions (details of the Topic or Exercise); and Materials (e.g., PowerPoint; handout, etc.).

The amount of time and each activity in the initial session (two hours) is noted:

- *15 minutes*: "Icebreaker" provided introductions and one "fun fact" from each participant: tutors, the Training Manager and Project Manager. This

exercise demonstrated the importance of introductions at the start of a tutoring session.

- *15 minutes*: Practicing a protocol by first asking for students' names and the context of the course before working on problems.
- *25 minutes*: Exploration and practice of Zoom features: use of the "whiteboard," sharing the screen, use of the chat function, and breakout rooms.
- *5 minutes*: Break - the importance of standing up at least every hour.
- *25 minutes*: Discussion and writing of possible "ground rules": what rules should be agreed to - using the Chat function.
  - The "chat" text was then turned into a document that was posted on the OpenLab site.
- *10 minutes*: Introduction to the first three levels of Bloom's Taxonomy (1956) and the types of questions that are typical for each level (PowerPoint).
- *15 minutes*: Discussion of expectations, the use of the OpenLab site for posting journals and providing resources and materials, and questions were answered.

The second session (one hour) started with a question: "What was one event in the past week that you enjoyed participating in?" This focused on the tutors in more than one role, and the responses were engaging and amusing.

- A review of the first week's tutoring sessions reviewed the types of questions students asked, what tutors found challenging and successful, how Zoom and its features worked.
- This was followed by the showing of a video of students who came to tutoring sessions unprepared and prepared (courtesy of 3CSN, California Community Colleges' Success Network, https://3csn.org/).
- A discussion of what the tutors observed and what they might do led to a discussion of the importance of feedback to assess learning. For this exercise, the chat function was used.
  - Two feedback mechanisms were shared (One-minute paper; Muddiest Point; Angelo & Cross, 1993) and the session ended with comments and questions.

The third session started with another question: "What was one thing in the past week that you enjoyed learning?" The responses were written in the Chat function and ranged from

"Creating a table in SQL database," "Feeling more confident talking to others," "Learning about microbes and writing reports" to "Getting better at parking."

There followed a review of the week's tutoring sessions.

- Then, using chat, tutors were asked: "What was one concept in the past week that your students had trouble with?" The responses were discussed to examine terms that were unfamiliar to students and how the tutors judged what was "easy" and "hard."

- A video on *Lecturing versus Asking questions* (courtesy of 3CSN, California Community Colleges' Success Network, https://3csn.org/) was shown and discussed ("How did the tutor support the student's learning?).

- A brief lecture on the concepts of scaffolding, language, and constructivism (Vygotsky, 1978), accompanied by four PowerPoint slides, was presented, followed by comments and questions.

The fourth session began with a chat discussion: "What was challenging for you this week and how did you overcome that challenge?" One tutor responded, "Time management." Another responded that their professor had passed away this week, "I was really in shock since Monday." A third reported that they took an exam and "wasted my time on the easy questions and left one question unanswered." One admitted that they were "staying with four cousins; it's crazy."

- These concerns led to a discussion of setting up a weekly schedule, including "fixed" and "flex" times. Existing City Tech resources were discussed, including the time management exercise in *The Companion for the first year at City Tech* (Sears, et al., 2020).

- The Chat function allowed time for reflection and composing thoughts as the tutors then discussed what challenges they had had with students' questions and feedback: "Sometimes they say they understood but you can see in their face they are confused so I try to encourage to point out what they don't understand." Another tutor noted: "I make them solve a similar problem and wait till they give me the final answer then compare it with my answer." This strategy of solving problems in tandem with students was then adopted by other tutors.

The following sessions followed a similar format of "icebreaker" and responses to questions posed among participants, and the introduction of resources, techniques, and learning theory. The difficulty of having the roles of student and tutor at the same time was discussed: "How difficult do you find tutoring while studying for your own exams?" One tutor responded that their time management skills have improved: "I have to set a time where I study for my classes and same thing for tutoring." Another responded, "I've been writing in my planner much more often. I never used it in the beginning of the semester because I wasn't really busy with anything. But now I do."

Mid-semester, the Training Manager and Project Manager discussed possible topics for further training and reflections on what had occurred thus far. The idea of a joint paper was proposed, followed by the development of "16 Questions," using the method of Critical Incidents.

Method

Critical incidents require questioning about incidents in specific contexts (Flanagan, 1954); they are defined as "critical events, incidents, or factors that help promote or detract from the effective performance of some activities or the experience of a specific situation or event" (Butterfield et al., 2005, p. 482). As Brookfield notes (1995), critical incidents allow for reflection on practice: participants in an activity or context provide insights into the practice through their experiences.

Critical incidents are typically collected through interviews, in person, individually or in groups, or by telephone (Butterfield et al., 2005, p. 483). The online environment for the tutor preparation meetings provided the bridge to another way of responding. The tutors (co-authors here) used journals (posted on Open Lab), and "Chat" functions on the Zoom platform to respond to questions probing critical incidents (see Appendix A), thus responding by writing. Another dimension to this study's use of critical incidents is that the reflections are over a matter of several weeks and are what is easily remembered, what stands out, as differentiated from questioning more immediate memories (Flanagan, 1954; Brookfield, 1995).

Pivoting: Writing a Paper

The tutors welcomed the opportunity to co-author a paper regarding their experiences as an extension of their tutoring experience. The practice of reading academic literature used three papers (Hratinsky, 2020; Hratinsky et al., 2019; and Johns & Mills, 2020) which were each read by at least two of the tutors, and their comments compared their experiences with

those presented in the papers. The responses to the Critical Incident questions integrated their understanding of the literature. What is presented here are summaries by the tutors of their responses to the Critical Incident Questions, and comparisons to the papers they read.

The tutors agreed that the weekly training meetings had positively impacted them; the sessions allowed them to find solutions to the issues they were facing. They realized that not only is the tutee learning from the tutor, but the tutor is also learning from the tutee as both are benefiting from the sessions. One tutor stated they liked the weekly training meetings because it kept them concentrated and gave them a sense of responsibility. Topics that resonated (Q. 4) as the most helpful were time management, assessment/feedback techniques including the "One minute paper" (Angelo and Cross, 1993), as well as the concept of constructivism.

The training format (Q. 2) is "really good, organized and helpful." "The training format helps me learn new ideas from everyone and I apply that to my tutoring session" noted a tutor.

Training helps to improve people's capability and performance. During each training session, we learn new ideas, discuss new topics, watch videos and discuss [them] with each other, such as how we know if students are prepared for tutoring or not.

During one of the training sessions, a topic we discussed was about how we can help students who miss class and ask a tutor to teach him or her. First, we can ask the student to get notes from a classmate, study and come back with specific/unclear questions. Students can meet the professor during their office hours.

We can know what was difficult by giving the student problems to solve, more challenging problem of the same type, asking about the concept behind the problem, to explain that to you in their words.

Training tutors to focus on asking questions, rather than delivering content has drawn my attention because it was one of the topics we discussed in one of our Friday meeting…was asking learners questions that makes them think; this is an important and effective way of developing knowledge. An example posed in an article (Hratinski, 2020) was, "How far have you come to solving a problem?" And in CSTEP tutoring we have tried to use questions such as, "What do we know already?" These two questions serve the same purpose. They help tutors understand learners' level of understanding on certain topics and also help learners think deeper and engage in the

discussion. Hrastinski, et al. (2019) also found that certain key words in questions, such as "explaining," had a significant effect on the length of responses and the type of words they used which also goes along with what we have talked about.

Journals (Q. 5) helped tutors to share their experiences with their colleagues and get feedback which helped them improve their tutoring sessions. A tutor mentioned how taking notes after each tutoring session helped them write a better and more informative journal. Another tutor said what has been useful to her about writing the journals is the fact that she "can read other tutors' replies to the journal, how the tutors help their students study." Writing a journal also helps to "reflect how I am as a tutor," said another tutor.

Many resources (Q. 3) were used, those that had been suggested in the training as well as others with which the tutors were familiar. For example, two tutors mentioned using YouTube and Khan Academy videos, as well as an advanced graphing calculator, Desmos.

[A paper] made me think about how much online tutoring has impacted the way students learn and the way we tutor. Whenever I have a student and I feel like they are getting stuck, it is so easy for me to just share my screen and show them multiple different educational websites that go more into depth about the subject that I am teaching. One big help has been Khan Academy because it has articles and practice problems for almost any subject you can think of. I tend to pull problems directly from the website or I tell students that if they want extra practice, they should use Khan Academy.

Discussion

Tutors had assumptions, fear and expectations on how online tutoring would operate. One tutor feared that it would be difficult to communicate and to be able to hold students' attention via the online platform, but those fears were allayed: students participated and asked questions consistently during the tutoring sessions. Another concern was that it is not easy online to point out exactly where the students made mistakes, perhaps by pointing to the step in problem-solving where there was an error. However, this was also seen as a possible benefit: "I guess this helps the students to find the mistakes on their own."

Other issues regarding tutoring online were the need for "sitting in front of my computer for two hours or so," which was tiring; and online tutoring was also susceptible to having an internet issue, or disturbances from the external physical environment, "noise from construction in the neighborhood."

Online tutoring "has been engaging for us because it allows us to share our knowledge, help students with their problem, relearning the material, and learning new ideas, words, and searching for meaning of unfamiliar words or rules." Tutors also mentioned that having the same students showing up for tutoring sessions "makes me feel like I'm doing a good job as a tutor and they are learning." Further, students mentioned the sessions helped them with their exam: "A tutee telling me what we went over during the session and the recommended resources helped her during her first exam that she was really nervous about."

Tutors' challenges included having difficulty in sharing their knowledge: they became aware that "we all learn in a different way and not knowing the right way to explain something to someone. It makes sense to me, but I need to word it in a way that it makes sense for the tutee as well;" not being confident during the beginning of online tutoring; and for one tutor who covered three science courses, "realizing how stressful it is to tutor different courses."

Tutors suggested different ways to improve tutoring performance, such as "coming up with better examples to explain complex topics," and to be able to explain things in more than one way, and to have more hours during tutoring session.

We tutors agreed that we have become better students. Tutoring reinforced prior knowledge as it "brought up some topics that I have forgotten about," and "it made me re-read materials I took years ago." Through the weekly training sessions, we "learned new things," and these also provided additional benefits: "Time management skills are better," and there were opportunities to ask for advice. For example, one tutor was enrolled in a C++ class and felt she wasn't understanding the material. A suggestion was that she approach another female student in the class: "…Get a female student's number from my C++ class after I complained; we started a study group on Zoom (Saturday and Sunday) and it is really helping."

Comradeship developed: As one tutor noted, "I remember a student sent me an email that he needed help with his math class on Tuesday but I have class then so I directed him to Thalyia by giving him her email because I see she has a tutoring session on Tuesdays."

What if one gave a party and no one came? The tutors were frustrated by the lack of attendance and opportunity to help more students. "I thought I was going to receive more students since classes are online," reported one, and another stated, "I expected to have to break up the amount of time [given to a student] and I thought I would have to use the break rooms as well, but I haven't had to do that yet."

We were surprised that not many students take advantage of tutoring. This also was seen in that students scheduled a session and then did not show up, nor did they email to let the tutor know they couldn't make it. Yet, as one tutor noted, "I keep getting the same

students every week and one of the students said to me, 'I wish you are my professor because you explain better step by step.'"

It may be that there is a disconnect between the times tutoring sessions were available, given students' more hectic lives and responsibilities. Giblin (2016) noted that students do make decisions to seek help, whether asking a person (even online) and accessing online asynchronous help. One solution may be an asynchronous tutoring method where questions can be emailed or otherwise transmitted to a tutor who can provide guidance; another method is to have a synchronous chat available whenever students need help, as mentioned by Hrastinski (2020). Tutoring can be through discussion boards or email where the tutors provide feedback on assignments; students would need to understand not to expect an immediate answer.

Conclusion

At the start of the COVID-19 crisis, an opportunity arose to support students through online tutoring, where tutors and staff learned how to work together in an unfamiliar environment, and support students' learning. The collaboration among participants in this pilot led to learning about how tutors dealt with their own challenges of tutoring a tutee online. Every tutor had their own way of conducting their tutoring sessions, yet each tutor had similar experiences. Hence, discussing ideas among tutors led to an improved tutoring environment as the semester progressed. Taking tips and advice from each other made the tutoring experience better as there were more ways and an expanding repertoire that tutors could implement to help a student master course content.

This paper is an outcome of the initial semester of online tutoring. In the Spring 2021 semester, only one of the authors here was able to continue as a tutor. She joined a new, larger group of tutors, also selected from C-STEP students, and the preparation of the tutors through the weekly online meetings followed a similar format as described here, based on the learning from the Critical Incident questions. However, by the second year of the pandemic, there was more familiarity with the online environment, and the tutors were more confident about using Zoom and its features. This led to a different final project, focused on questioning techniques, which was an online guide to tutoring, *Guidelines for Peer Tutors,* posted on City Tech's OpenLab: https://openlab.citytech.cuny.edu/groups/guidelines-for-peer-tutors/.

References

Angelo, T. A. & Cross, K. P. (1993). Classroom assessment techniques: A handbook for college teachers. San Francisco, CA: Jossey-Bass.

Bloom, B. (Ed.) (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals; Handbook 1: Cognitive Domain.* David McKay Company, Inc. Online at https://web.archive.org/web/20201212072520id_/https://www.uky.edu/~rsand1/china2018/texts/Bloom%20et%20al%20-Taxonomy%20of%20Educational%20Objectives.pdf

Brookfield, S. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.

Butterfield, L. D., Borgen, W. A., Amundson, N. E., & Malio, A.-S. T. (2005). Fifty years of the critical incident technique: 1954-2004 and beyond. *Qualitative Research, 5*, 4, 475–497.

Flanagan, J.C. (1954). The critical incident technique. *Psychological bulletin, 51,* 4. https://www.apa.org/pubs/databases/psycinfo/cit-article.pdf

Giblin, J. (2016). Factors influencing the selection of Academic Help Sources. Dissertation: Old Dominion University. https://doi.org/10.25777/4S31-QJ29. Available online: https://digitalcommons.odu.edu/stemps_etds/13

Hrastinski, S. (2020). Just-in-Time Online Tutoring: Supporting Learning Anywhere, Anytime. *Educause Review*. https://er.educause.edu/blogs/2020/6/just-in-time-online-tutoring-supporting-learning-anywhere-anytime

Hrastinski, S., Stenbom, S., Benjaminsson, S., & Jansson, M. (2019). Identifying and exploring the effects of different types of tutor questions in individual online

synchronous tutoring in mathematics. *Interactive Learning Environments, 29,* 3, 510-522. https://doi.org/10.1080/10494820.2019.1583674

Johns, C., & Mills, M. (2020). Online mathematics tutoring during the COVID-19 pandemic: Recommendations for best practices. *PRIMUS*, *31,* 1, 99-117. https://doi.org/10.1080/10511970.2020.1818336

Rennar-Potacco, D., Orellana, A., & Salazar, A. (2017). Innovations in academic support: Factors influencing student adoption of synchronous videoconferencing for online support in high-risk STEM courses. *The Quarterly Review of Distance Education, 18,* 3, 1-17.

Sears, J., Dreyfuss, A.E., Aguirre, L., & Liou-Mark, J. (2020). *The Companion for the First Year at City Tech.* Published by the Office of First-Year Programs, NYC College of Technology, CUNY. Current edition available at https://www.citytech.cuny.edu/fyp/companion.aspx

Vygotsky, L.S. (1978). *Mind in Society: The development of higher psychological processes.* Cambridge, MA: Harvard College.

Appendix A

Critical Incident Questions (developed by AE Dreyfuss, Ed.D.)

1. What do you remember about the recruitment and selection process?
2. What, so far, do you think of the training format?
3. What resources have been useful for you? [e.g., OpenLab; videos; Bloom's questions, etc.]
4. What topics have resonated for you?
5. What has been useful to you about writing your journals?
6. What has been engaging to you about the process of tutoring?
7. How effective has the scheduling been for your tutoring sessions? (What problems have you had?)
8. What has been affirming or puzzling or confusing about the weekly training meetings?
9. What do you consider your biggest challenge(s) as a tutor?
10. What has been your biggest success so far as a tutor?
11. What has surprised you so far?
12. What would you like to improve about your performance as a tutor?
13. What's the biggest difficulty in tutoring online in general?
14. What were some expectations you had of tutoring online as opposed to the reality you've experienced?
15. Has being a tutor and this process made you a better student? How?
16. What should be improved in the next few weeks?