# Cultivating an Additive Innovation Culture through the Communal Observations of New EXperiences in Teaching (CONEXT) Protocol

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*Abstract*—**This innovative practice work in progress (WIP) paper details the development of an observation protocol that was developed to promote pedagogical risk-taking and additive innovation. Our higher level goal is to create a self-sustaining community of pedagogical exploration through formative feedback driven by peer observation. This effort aims to break the mold of status quo professional development protocols with questions specifically designed to ensure educators are receiving targeted, desired feedback, while engaging observers to think about how they might apply something similar in their own classroom(s). Attempts to test this protocol unearthed deeper concerns about observations and faculty reluctance to be observed. This underlying anxiety and concern associated with observations needs to be addressed, particularly during the pandemic. In this paper we share our process of developing this protocol, our pilot testing of the protocol, barriers encountered in further testing of the protocol, and literature that explains faculty reluctance to peer observation protocols that will help guide future efforts.**

*Keywords—observation protocol, additive innovation, pedagogical risk-taking, faculty reluctance*

## I. INTRODUCTION

Recent work points towards an additive innovation approach to both inspire and transfer potentially transformative ways of teaching engineering [1], [2]. In this innovative practice WIP paper, we will share our research-informed development of the Communal Observations of New EXperiences in Teaching (CONEXT) protocol. This protocol is designed to help faculty learn from and inspire one another to take pedagogical risks in the classroom. The purpose of this work is to establish CONEXT as a classroom observation protocol that can be used more broadly. CONEXT uses an automated process that provides formative feedback. Our intent is that using CONEXT will help create a culture that embraces pedagogical risk-taking and additive innovation. The proposed observation process is designed to be voluntary and formative, but the feedback could be used for summative evaluation at the discretion of the instructor (e.g., tenure and promotion documentation).

Currently the primary way to evaluate instructor teaching is based on student evaluations. These evaluations alone are limited in helping us understand how our classes are promoting learning [3]. Researchers have demonstrated that student evaluations can be biased, especially towards faculty who are diverse based on their race, ethnicity, or gender [3]. We would like to promote the use of peer evaluation as a formative way to improve and assess our teaching.

## II. LITERATURE REVIEW

### A. Faculty Observations

There are three models of faculty observation that aim to improve teaching and learning, but have different purposes [4]. The first is the evaluation model where administrators or leadership observe faculty teaching for evaluative purposes. The second is the development model which occurs when staff with expertise in evaluation of teaching and learning (e.g., center for teaching and learning) can be used to observe faculty teaching and help improve teaching. The third is the peer review model which involves peers observing one another's teaching to help improve teaching of both the observer and the instructor through a more collegial process. In this paper we are focused on developing an observation protocol that aligns with a peer review model [5], [6].

The purpose, timing, and context are important to take into consideration when deciding on methods and approaches to observation [7]. Faculty observation may involve students, faculty peers, or both [8]. Observations involving students are often criticized because student judgements may be based on instructor personality rather than pedagogical effectiveness [8], and may be biased [3]. Recently greater emphasis has been placed on faculty peer observation which more appropriately addresses regulatory (e.g., accrediting agencies) and political demands for increased accountability and academic performance in higher education [4]. Observations can span from formal, required observations to evaluate one's teaching to more informal, voluntary observations that are used only to improve one's teaching [4]. In this paper we are focusing on

more informal, voluntary observations that will help promote additive innovation and pedagogical risk-taking. Observations are typically assumed to be productive, but can be ineffective and can lead to "hostility, resistance, and suspicion" [7]. For this reason, we are also trying to be intentional about our rollout of these observation protocols so that we can develop a culture conducive to collaborative learning from one another [9].

### B. Observation Protocols

Many existing observation protocols have been designed to observe instructors in pre-college, higher education and engineering education programs. Observation protocols of instructors and their classrooms are frequently used to provide feedback to instructors on the effectiveness of their teaching in the context of student learning, course goals, and pedagogy in the classroom. Application of different observation protocols vary based on context and needs.

Available pre-college observation protocols designed for science, technology, engineering and mathematics (STEM) aim to assist teachers in facilitating student learning and to inform and reform teaching methods [10-13]. Each of these observation protocols relies on ratings and scales to provide summative feedback to instructors. The observation protocols are extensive and require a significant time commitment for training.

Existing observation protocols designed for higher education have been developed with the intent of aiding faculty development and faculty-student interactions [14], [15]. Faculty development can take the form of identifying professional development needs and class time usage [14], while others emphasize understanding how instructors help their students [15]. Some protocols additionally highlight the need for accessibility and ease of use of these protocols, including short training times [14]. The approach taken in the Classroom Observation Protocol for Undergraduate STEM (COPUS) relies heavily on observer coding [14], much like pre-college protocols. The Kingsborough protocol takes a different approach and provides an example of an observation protocol that uses a rating system that is not explicitly numerical, rather it uses qualitative descriptions such as "needs improvement" and "effective" to describe its expectations [15]. The protocol also includes sections for commenting to allow for additional evaluation and explanation from the observer. Many of these protocols with rating systems require training prior to the use of the protocols, which limits usefulness for peer observations.

Higher education protocols have also begun to expand their usage to consider class modality (e.g., in-person, hybrid, and synchronous online). Gallaudet University has developed a protocol [16] for online and hybrid classes that is designed to follow Chickering and Gamson's [17] seven principles: encourage contact between students and faculty, develop reciprocity and cooperation among students, use active learning techniques, give prompt feedback, emphasize time on task, communicate high expectations, and respect diverse talents and ways of knowing. This effort brings to the forefront the reality that most protocols designed for in-person teaching cannot be effectively applied to online contexts. Other protocols for online classes take the form of checklists [18] or forms [19]. These protocols designed for observation of online teaching are different from past protocols in that observation questions are designed around whether the instructor met certain attributes using checkboxes or free-form answers. The faculty observation form at Central Piedmont Community College [18] provides space for additional qualitative feedback such as "what went well" and "what suggestions for improvement do you have." This is different from past observation protocols that have used Likert scales to evaluate faculty instruction. Training for online observations seems to be minimal if present at all, as the aforementioned protocols neglect to describe the length of time needed to train observers.

A narrowed focus on engineering education provides a limited perspective on observations conducted in that space. The development of protocols and faculty evaluations are most commonly centered around STEM as a group entity [10], [14], [20]. Engineering education protocols have primarily leveraged existing protocols adapted from the study of student attributes [21], observations of engineering within pre-college classrooms [22], or attempts to validate and evaluate faculty interventions [23], [24]. Faculty observation protocols are broadly used across STEM, including engineering, but there are few that directly and solely focus on engineering.

### III. THEORETICAL FRAMEWORK

A primary motivator for the development of the CONEXT observation protocol is to encourage pedagogical risk-taking and additive innovation among engineering faculty. Risk-taking contains elements of loss, significance of loss (emotion and gain), and uncertainty, a chance of loss for something to be risky [25]. Pedagogical risk-taking is different for all faculty, but can be summarized as trying something in a classroom setting where the outcome is unknown. Such risk-taking is more likely to occur when instructors are experiencing positive emotions [25] or when instructors feel safe exposing vulnerabilities [26]. Additive innovation is the combined act of sharing, adopting, and building on ideas of peers within a community of practice to create new innovations [2]. The process of additive innovation promotes sharing ideas and practices, scaling and sustaining those ideas, and propagating those ideas in other communities.

In this project we are developing an observation protocol that encourages faculty to engage in pedagogical risk-taking and to build on each other's pedagogical practices through additive innovation. We use these frameworks to situate this program because this effort ultimately aims to transform the ways that we educate engineering students.

### IV. PROTOCOL DEVELOPMENT

The development of the CONEXT protocol stems from an initial interest in observing risk-taking in the classroom, i.e., pedagogical risk-taking [2]. We adapted our ideas for CONEXT to accommodate the sudden change brought about by the pandemic and the shift to online teaching, believing that risk-taking in the classroom was inevitable for instructors quickly adapting and transitioning their class from in-person to online. The protocol was developed to be effective in both in-person and online teaching environments. Our review of existing observation protocols revealed critical insights that guided our protocol development. We took from each protocol what

aligned with our mission of an additive innovation cycle among faculty. We decided to use notes over rubric scores in an effort to ensure the protocol was formative, rather than summative, in nature and that it could be used without training on using the protocol. We also adapted the idea of making a publicly available protocol guide that was digital and used an automated process to hone in on our goal of a self-sustaining additive innovation community. We hope that sharing our development and lessons learned during development will help others interested in developing faculty cultures that value additive innovation and in developing peer observation within their specific contexts.
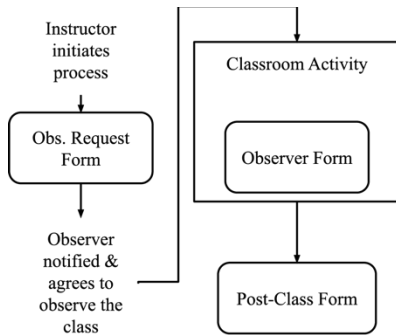


Fig. 1. Figure demonstrating process

Our review of observation protocols and work around pedagogical risk-taking were used to inform the initial development of CONEXT within the online survey tool Qualtrics. This prototype was intended to be pilot tested with instructors during the 2020-2021 academic school year. A process (Fig. 1) and set of questions (Table I) were created to guide the observers and the instructors as they engage in this peer observation process. In this we developed a process for observers to both provide critical feedback to the instructor, as well as engage them in thinking critically and creatively about their own classroom pedagogy.

The CONEXT observation protocol consists of three forms: observation request form, observer form, and post-class form. The items (questionnaires) on the protocol were developed based on critical questions and personal experiences. CONEXT starts with a pre-lesson questionnaire that is shared with the observer. The observer then uses a formative observer feedback form to provide instructor feedback. Embedded is a question that asks observers to consider what could be adapted from the observation in their own classes. Observer feedback is then distributed to the instructor prompting a post-lesson reflection.

## V. ATTEMPTED OBSERVATION PROTOCOL TESTING

The beta protocol was first pilot-tested by the team to ensure the automation was clean and that it worked well during an actual observation. There was one classroom test-run among our group to demonstrate the value of the program. Below are reflections from engaging with this observation from the perspective of the instructor (Nadia Kellam) and the peer observer (Adam Carberry).

*Instructor's Reflection:* I was trying something different in my Statics class where I had members of our industry advisory board (IAB) come to my Engineering Mechanics class and talk about imposter phenomena with the students. I had never done anything like this before in this class and wanted to get some input from someone else about how it went. I also wanted to be able to have a conversation with a colleague about the class and ideas on ways to improve it moving forward. I found the process easy and quick. It was helpful to reflect on the process afterwards. Honestly I felt a little nervous before the class about having a colleague observing this class as it was something I had never done before and I wasn't sure how the class would go. But that concern dissipated quickly when the class began. I could tell that Adam was there only to help me and my teaching. And then I was surprised that he was excited about what I was doing (talking about imposter phenomena with 2nd year students) and he discussed imposter phenomena in another 2nd year class that they were teaching. I had not considered that learning more about colleagues' classes could help us reinforce concepts and ideas across courses, which could be a powerful way to start changing our curriculum. This could be particularly helpful as we begin to introduce inclusive pedagogies into our classrooms to create a more inclusive environment.

*Peer Observer's Reflection:* I was excited for the opportunity to visit Nadia's classroom. I've been fortunate as an instructor myself to have been informally observed by my colleagues, but this was the first time I had a chance to pay it forward. I honestly didn't go into the observation with many expectations or preconceptions beyond what was shared with me through the pre-lesson questionnaire that Nadia completed. My goal was to listen and learn, while hopefully providing constructive feedback. I was pleasantly surprised by how much I took away from the observation. I had never considered attempting to leverage our program's IAB for class discussions.

TABLE I. DETAILS ABOUT CONEXT QUESTIONNAIRES AND FORMS

| Observation Request Form | What are your motivations for wanting to be observed? [e.g., want to improve my teaching, trying something and I'm not sure how students will respond, would like some feedback to include in my promotion and tenure materials, etc.] |
| --- | --- |
| | What are the learning objectives for the lesson(s) to be observed? |
| | What type of reaction(s) do you think students may have to the lesson(s)? |
| | How did you come up with the idea for the lesson(s)? |
| Observer Form | Feedback requested |
| | Feedback on strengths |
| | Feedback on potential improvements |
| | Thoughts on what you learned as the observer and what could be adapted into your own class or teaching methods |
| Post-Class Form | How do you feel that this lesson was successful or unsuccessful in attaining the intended goal/s? |
| | How did the students respond to the lesson? |

The panel was highly engaged and the students clearly valued what was being said by those currently holding positions they one day hoped to obtain. I also thoroughly appreciated the effort to take class time to discuss the topic of imposter syndrome. This is obviously a non-traditional topic in a Statics course, but one that has high relevance to our students. I was pleasantly surprised to see how many of the students in this course were also enrolled in the course I was teaching. I was impressed by the use of Pear Deck technology embedded in this class facilitated via Zoom. The combination of these observations has excited me to revisit how I embed community partners in my course, what topics I choose to discuss, and how I might leverage experiences students are having throughout the curriculum in my own courses. It has also encouraged me to explore the use of alternative technologies in my classes that were effectively implemented by Nadia.

## VI. LITERATURE TO HELP US UNDERSTAND RELUCTANCE

Pilot testing was followed by a call to peers within our unit to help us pilot the CONEXT protocol. These initial efforts were met with trepidation and reluctance to be observed during the Fall 2020 semester. This reluctance to be observed is not a new occurrence for higher education instructors, but was potentially exacerbated by the alternative modalities used in response to the ongoing pandemic. This reluctance to be interviewed also likely emerged as faculty were not experiencing positive emotions at that time due to the pandemic and social unrest driven by Black Lives Matter and Stop Asian Hate movements and likely did not feel safe exposing vulnerabilities. We decided to return to the literature to better understand this reluctance and to discover possible ways to move beyond this reluctance to being observed.

### A. Faculty Reluctance to being Observed

Not all faculty members perceive faculty observations positively. The evaluative nature of peer observation "generates strong reactions from those who are subject to it, ranging from the very positive to the very negative" [27]. Some faculty view observations as non-threatening and "regard peer evaluations as valid and useful means of evaluating teaching effectiveness" [28]. These faculty who view observations positively value receiving peers' feedback, see it as a mechanism for providing collegial respect [28], and leverage the experience as an opportunity for insights, reflections, enhanced quality of teaching, and a "critical [tool] for faculty development" [5].

Faculty members who are reluctant to engage in observation often claim that the process can be subjective, inadequate, and fail to distinguish between poor and good teaching [29]. Scholars argue that barriers to willingness to engage in peer observation include academic culture, time availability, and availability of protocol or observation guidelines [30]. Some observational setups can be intimidating and demotivating because results from a subset of the course can potentially be used for reasons other than faculty development (e.g., administrative and evaluative purposes) [8], [30]. This erodes collegiality and can make observations feel intrusive rather than constructive [8]. Additional concerns may arise regarding personal biases of the observer, tensions between the observer and the educator based on differences in teaching philosophies and values, possible gender or racial stereotypes, and salary inequities (between observer and instructor) [8]. These reasons may cause some faculty to "react to evaluations as carrying an implicit threat of punitive consequences, as opposed to valuing evaluation as a source of feedback for continual improvement" [8].

Reflective faculty peer observation protocols can also reduce faculty reluctance to peer observation in engineering schools [32]. This self-reflective faculty peer observation protocol enhances interest to be observed and is viewed as a positive and helpful tool for faculty professional development, which in turn improves teaching and learning.

### B. Strategies to overcome faculty reluctance

There are a variety of ways to overcome faculty reluctance to be observed by peers, including: 1) engaging faculty in developing peer observation programs, 2) providing training for evaluators/observers, 3) assuring fairness and confidentiality, and 4) building a trusting and constructive climate to avoid distrust and dissent [8]. Lawson underscores the importance of partnership, sustained observation, and democratic professionalism [31].

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The resistance to peer review was found to be associated with bad experiences of evaluation systems that both the observed faculty and the observer have gone through [33]. Thus, fairness and confidentiality should be central and showcased in communications about peer observation efforts. Similarly, there should be a shared understanding between faculty peers about the goal of peer review, whether it is primarily for the improvement of teaching and learning or to be used for evaluative purposes [29].

## VII. FUTURE WORK AND CONCLUSION

Current and future work will continue to seek faculty willingness to test the CONEXT protocol. Our initial efforts have led us to pursue additional data further exploring faculty reluctance to peer observations. We will begin a recruitment process that allows those willing to participate in CONEXT and those unwilling to participate in a follow-up to better understand the source of their hesitation or reluctance. Additionally, we plan to continue our dialogue with the broader engineering education community to consider ways to meaningfully integrate peer observations to improve teaching and learning and to encourage pedagogical risk-taking and additive innovation.

We will continue to describe our efforts to cultivate an additive innovation culture through the introduction of a new classroom observation protocol. Findings and lessons learned are intended to support the use and adaptation of the CONEXT protocol at our local institution and beyond as an additive innovation itself.

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