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Using Improvisation to Increase Graduate Students' Communication Self-Efficacy

By

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Abstract:

Utilizing the foundational principals of improvisation, we developed a practicum that gives early career researchers an opportunity to practice the skills necessary to successfully communicate their work orally to both public and professional audiences. Course evaluation data indicate that students find the practicum to be an effective route to increase both confidence and self-efficacy in their communication skills. Due to the instructor's emphasis on creating a supportive learning community, the practicum can only accommodate a small number of students each semester. To address this challenge, we developed a training institute for instructors to learn how to teach the practicum or incorporate a subset of the content into their existing courses and workshops. Similar to the practicum, we found a 2.5-day Training Institute to be an effective way to train faculty developers how to innovate and incorporate improv-based principles into their local programming.

Effective communication by Science, Technology, Engineering, and Math (STEM) professionals is crucial to building an informed and scientifically literate public (Holt, R., 2019). The ubiquitous nature of science and technology combined with easy access to information, both valid and invalid, means that the public must be even more critical of information they use in their decision making. This is particularly true for issues with widespread impact such as climate change, vaccination, and energy usage.

However, the skills that early career researchers must learn to effectively conduct research (*e.g.*, exacting attention to detail, repeating experiments multiple times, careful framing when discussing research conclusions, critiquing new information, maintaining objectivity) are different from the skills needed to communicate and connect with other people (*e.g.*, explaining why the work is important, telling a story, including only salient information (AAAS Communication Toolkit, n.d.). And while our universities do an excellent job of training scientists in the practices of their discipline, they often fail to produce scientists equally effective at communicating about their work to the public. In addition, although there are many

resources available on the mechanics of creating an excellent presentation or poster (AAAS Communication Toolkit, n.d.) there are few resources available to give speakers an opportunity to practice connecting with audiences.

At the University of Wisconsin-Madison (UW-Madison) we are working to address this gap in training in two synergistic ways. First, we are working directly with young scientists using improvisational theatre-based training to build their science communication competence. Second, we are training the people who educate scientists at other universities to do this work. Our results are highly encouraging, with participants reporting solid gains in both communication confidence and competence that they retain well after completing the practicum. We share details of both the graduate practicum and Training Institute here and offer this as a low-cost model with potential high returns.

Creating an improvisation-based graduate practicum about science communication

The goal of the practicum, which was developed in collaboration with a local theater company, is to teach early career scientists to communicate more effectively using improvisational techniques. Improvisation skills include spontaneous thinking, creativity, teamwork, listening, and positive communication. Moreover, improvisation focuses on storytelling, which can help scientists frame the information they present to the public in a more accessible and engaging way (Bruner and Minturn, 1955).

The practicum employs a “learn by doing” model in which students apply the skills of improv through low-stakes games and short scenes. An example of an improv game is the “Yes, and” Story Circle which teaches the basic improvisation rule of positive communication. Arranged in a circle, students tell a story one line at a time, starting each line with the phrase, “Yes, and.” This guides students to agree with whatever their classmate just stated, and then add an idea of their own to the developing story. The first person starts the story with one sentence (*e.g.*, “Once there was a goldfish named Marla who longed to see the ocean.”). Going around the circle each person adds a sentence that begins with “Yes, and...” (*e.g.*, “Yes, and... Marla lived in Kansas, so she needed a plan to get to the Atlantic Ocean.”). The “Yes, and” idea of first agreeing with the reality presented, and then adding to it is foundational to improv, and is used in every game and activity throughout the practicum.

The practicum focuses specifically on how improv skills connect to science communication, including teaching. After each new improvisational skill is introduced and practiced during a class session, participants discuss how these skills can be used to communicate science to audiences in both formal (*e.g.*, university classes and professional meetings) and informal settings (*e.g.*, science outreach events and public talks). For the “Yes, and” skill, students discuss how positive communication can be used in research meetings, when mentoring undergraduate students, and for increasing student engagement in their classrooms.

The content of the practicum builds week-to-week, and covers the following topics:

Week 1 – Building a supportive learning community

Week 2 – Positive communication and storytelling

Week 3 – Understanding and connecting to an audience

Week 4 – Using emotion and physicality in storytelling

Week 5 – Understanding the essential elements of a presentation or lesson

Week 6 – Framing a message for different audiences

Week 7 – Using language creatively to explain complicated concepts and avoid jargon

Week 8 – Perspectives on science communication from other professionals

Weeks 9 & 10 – Putting it all together in a format that best serves students' needs

The Improv to Improve Science Communication and Teaching (IISCT) practicum was launched in Spring 2015 and since then has been taught 9 times to 114 students. Although originally designed for STEM students, word of mouth advertising has resulted in the involvement of students from a broader range of disciplines, including education, engineering, social sciences, pharmacy, early-child development, psychology, veterinary medicine, and linguistics. This disciplinary expansion has proved invaluable to the class, as students learn to communicate with peers who may have a completely different understanding of terms and concepts that students might assume everyone knows. This experience can also help early career scientists communicate more effectively with scientists in disciplines outside of their own, which makes their contributions to interdisciplinary teams more valuable.

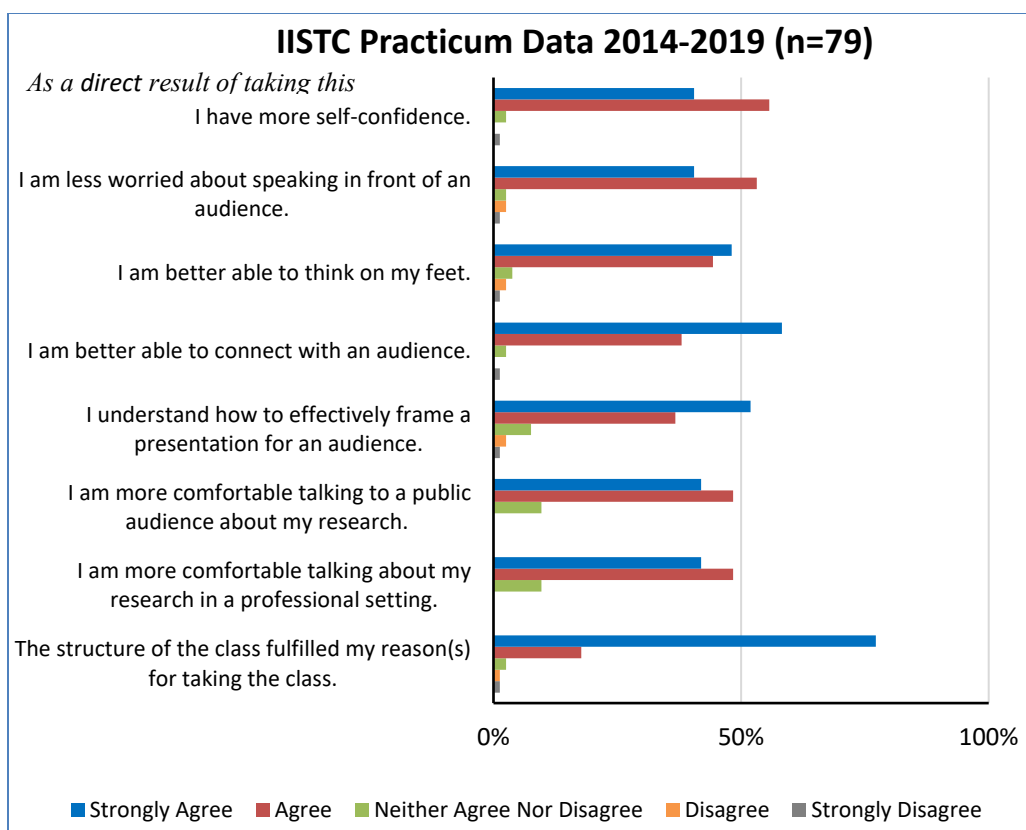
Creating a learning community for student success in the IISCT practicum

The IISCT practicum requires that the skills being taught are practiced in a small, cohesive learning community. Therefore, the practicum can only accommodate a limited number of students per class (enrollment is capped at 15 students) in order to create a supportive learning environment and enable full participation in the activities by all students. This limited class size is common to most improvisation-based theater classes.

In addition, unlike traditional content-focused courses, the IISCT practicum requires an instructor who is familiar and comfortable with improvisation and who can create an environment in which students feel safe taking risks. As can be seen from the evaluation data below, building a safe and welcoming learning community is a key aspect of the practicum, which allows students to stretch far outside of their comfort zones in order to improve their communication and interaction skills.

Impacts of the IISCT practicum on learners

Students were surveyed about their experience immediately following completion of the practicum. Course evaluation data from survey respondents indicate that the practicum is meeting the stated learning objectives (Fig. 1)



In the evaluation data, several students cited the supportive learning community structure of the practicum as a major component that helped them step out of their comfort zones and participate in challenging activities. These data support the pedagogical choice of spending the first two weeks creating a supportive learning community, which is strengthened and maintained throughout the practicum.

Long term impacts of IISCT practicum

In order to evaluate the longer-term impacts of the practicum, a survey was sent to all students who completed the practicum between Fall 2015 and Spring 2019. Of the 114 students, 55 students (48%) across all 8 semesters responded to the survey. Table 1 shows a comparison of immediate versus longitudinal data from the two sets of evaluations. Importantly, students reported retaining the skills that they developed during the practicum for extended periods of time.

Table 1: Self-reported learning gains/skills achieved and retained by IISCT practicum participants.

Skills gained as a direct result of completing the practicum	Post-Practicum Evaluation Data* (n=79, except ** below)	Longitudinal Data ^ (n=55)
Increased self-confidence	41% Strongly Agree	44% Strongly Agree

	56% Agree	47% Somewhat Agree
Improved ability to “think on my feet”	48% Strongly Agree 44% Agree	64% Strongly Agree 24% Somewhat Agree
Increased comfort talking to public audiences about research.**	42% Strongly Agree 48% Agree	53% Strongly Agree 29% Somewhat Agree
Increased comfort talking about research in a professional setting.**	42% Strongly Agree 48% Agree	38% Strongly Agree 44% Somewhat Agree

*Collected immediately post practicum. Practicum evaluation scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree

^ Collected 6 months - 4.5 years post practicum. Longitudinal evaluation scale: Strongly agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, Strongly Disagree

**Questions were added to the practicum evaluations beginning in Fall 2017 (n=31)

The longitudinal survey data suggest that students continue to utilize the skills they developed in the practicum in multiple communication venues: teaching in college classrooms (n=14), individual training or mentoring (n=29), and small groups (n=15). We asked the 45 respondents who indicated that they taught in one or more of these environments about the impact of the practicum on their teaching skills. The respondents indicated that the practicum helped them to do the following: (a) listen well to learners (87%), (b) use storytelling to help learners connect with material (88%), (c) adjust lessons to the needs of learners (77%), (d) use “Yes, and” when responding to questions or providing feedback to learners (93%), and (e) frame lessons appropriately for the level and background of the learners (77%).

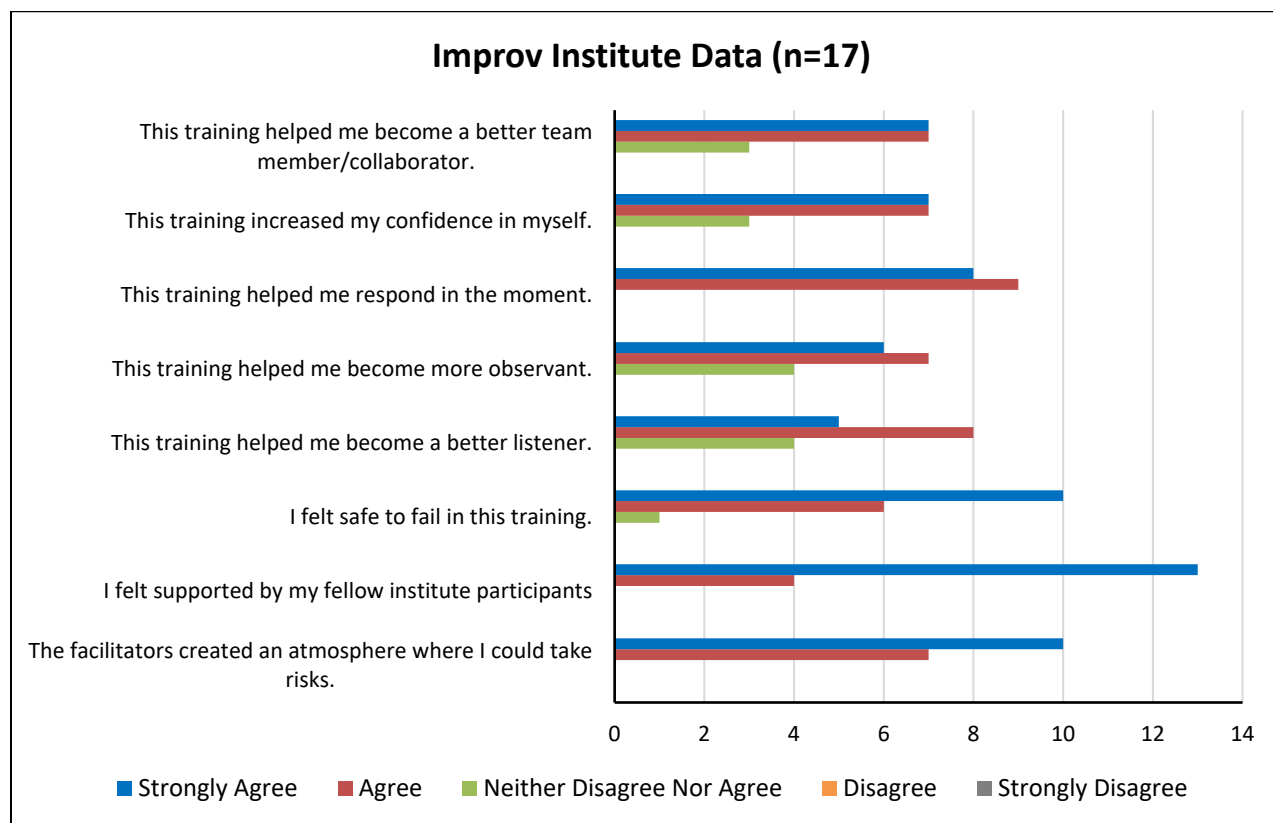
Finally, we included an open-ended question asking respondents to identify the most valuable aspects of the practicum for their professional development. Over 50% of the respondents replied that the practicum improved their general communication skills in the following ways: (a) using positive communication by saying “Yes, and”, (b) being clear and concise, (c) teaching them to use storytelling, (d) framing presentations appropriately, and (e) being able to think quickly on their feet. 25% of respondents replied that the practicum improved their teaching skills in the following ways: (a) creating a supportive environment, (b) saying “Yes, and” to students, (c) being comfortable with the unknown, and (d) being able to answer students’ unanticipated questions. Additionally, 11% of respondents stated that the practicum helped their research by helping them to be better listeners, develop a strong research narrative, and contribute positively in research meetings.

Taken together these evaluation data strongly suggest that the practicum meets the learning objectives for students immediately after the practicum and that learning gains are retained long after (*e.g.*, years for some respondents) the practicum has been completed. In addition, students are utilizing the skills they gained in multiple communication venues including teaching and training.

Development of the IISCT Training Institute

Our goal is to give as many early career researchers as possible access to this content, and so we developed an IISCT Curriculum Manual and an in-person Training Institute. The manual outlines all of the practicum activities and includes detailed instructions for leading them and creating a supportive learning community. Given the need for the instructor to be both familiar and comfortable with improvisation we developed the *IISCT Training Institute* to engage people and encourage them to implement the content at their own institutions and broaden the potential impact of our ideas.

The institute was held at UW-Madison in Summer 2016 with 8 attendees from 4 institutions and again in 2018 with 11 attendees from 6 institutions. The goal of the Institute was to give attendees the students' experience by leading them through content of the practicum on Day 1, while providing a metacognitive perspective and discussing the purpose and facilitation of various exercises. On Day 2, attendees were given an opportunity to lead an exercise from the curriculum while institute facilitators and participants provided constructive feedback. The institute ended with a half-day working session to explore how the attendees could teach the practicum or adapt its content to their own institutional needs. Combined evaluation data from a total of 17 Institute attendees from 2016 and 2018 is shown in Figure 3.



Attendees were asked to complete a short longitudinal survey 1 to 3 years after their participation in the *IISCT Training Institute*. Nine Institute participants completed the survey (a

53% response rate). 78% of respondents have implemented content from the institute and 22% plan to implement content. Examples of current implementation include the following:

- Incorporating improvisation activities into existing practicums in a variety of topics;
- Incorporating improvisation activities into existing workshops and trainings on various topics, such as addressing implicit bias in STEM and strategies to address challenging situations around identity or ability;
- Developing practicums specific to science communication for graduate students, undergraduates, and international students; and
- Creating science communication workshops or trainings for graduate teaching assistants, graduate students, faculty, and teachers.

As can be seen from the institute evaluation and follow-up survey data, most attendees gained the skills and confidence necessary to implement the content in their own educational settings. In addition, most felt that the content was valuable enough to invest the necessary time and resources into incorporating improvisation into existing programming, or to develop new practicums or workshops around the improvisational content.

Final thoughts

The goal of the IISCT practicum is to use improvisational techniques to teach early career scientists to communicate more effectively. As an extension, the *IISCT Training Institute* was designed to train faculty developers in both the practicum content and approach to ultimately reach as many early career researchers as possible. We found that graduate students' response to the improvisation-based professional development was overwhelmingly positive with > 90% of course evaluation respondents reporting an increase in confidence and an enhanced communication skillset as a direct result of taking the practicum. We are using levels of confidence as a proxy measure for STEM researchers being better at communicating their science to the public. Similarly, we found a 2.5-day Training Institute to be an effective way to train faculty developers at other institutions how to incorporate improv-based principles into their local programming.

This work highlights an innovative approach to increasing graduate students' communication self-efficacy, and it advances our understanding of the different contexts in which this training approach has value. Similar to Wieman's work with the Classroom Observation Protocol for Undergraduate STEM (COPUS; Smith, *et al.*, 2017) for classroom behaviors and instructional practices, perhaps one day there will be an observation protocol for the affective side of classroom practices. Ultimately, by using this approach, the investment required by any institution to advance the communication skills of their graduate students is moderate – staff time at the Training Institute and adaptation of local programming. In addition, this type of programming has the potential for huge societal impacts as researchers better communicate with their colleagues, students and the public.

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