

OUTTAKE

TRUST THE TEACHERS!

Conducting School-Based Research in a Rural Middle School When Building Relationships Face-to-Face Is Not Possible

**Khushbu Singh, Emily Sidnam-Mauch, Mehtab Iqbal,
Oluwafemi Osho, Sushmita Khan**
Clemson University

Philip Nelson
Winthrop University

**Kyra Derrick, Kelly Caine, Bart P. Knijnenburg,
and Nicole Bannister**
Clemson University

We are a team of university faculty, graduate, and undergraduate researchers investigating how to make cybersecurity education accessible and effective for middle school students. In particular, our project makes a trailblazing effort to improve adolescents' use of security "best practices" in their day-to-day online activities by linking artificial intelligence (AI) and cybersecurity principles to their mathematical underpinnings (Knijnenburg et al., 2021). Our team partnered with mathematics and computer science teachers from a rural, high-needs middle school to develop and deploy time- and

teacher-friendly learning modules that can readily be integrated into the existing curriculum for Grades 5–8.

To develop and deploy these modules, we planned to regularly engage in face-to-face activities with our research team, the teachers from our partner school, and the students. For instance, regular meetings with teachers, including participatory design sessions, formed an important part of our module development strategy. Our ethnographic method also required classroom observations, interviews, and documentation to understand student and teacher needs for module creation and implementation (LeCompte & Schensul, 2010). We planned to immerse ourselves in classroom contexts to investigate if and how the innovative AI, cybersecurity, and math modules changed students' understanding of and experiences and interactions with these concepts.

OUTTAKE INCIDENT AND ITS IMPACT ON OUR PROJECT

While our team was preparing to execute our research plan, the potential for face-to-face interaction and regular classroom observation was prohibited because of the impact of the COVID-19 pandemic on school operations. Dealing with unanticipated challenges that disrupt a well-designed study is a common occurrence when conducting school-based research. Researchers are becoming increasingly adept at designing studies that are resistant to these types of hiccups and generating thoughtful work-arounds when these situations happen. The COVID-19 pandemic rendered many of these go-to work-arounds obsolete, requiring a highly adaptive strategy to accomplish some of the most sensitive elements of our work. For example, the success of our project depended on forming a trusting, collaborative relationship with teachers and conducting in-depth interviews with adolescents who had never met our team. How could we continue with a collaborative module development and conduct meaningful research when the in-person methods we planned for our study were no longer feasible, given the health and safety challenges of the pandemic?

Our team had to answer questions like that one and make important decisions about module development and deployment while keeping regulations, as well as students' and teachers' health and safety, in mind. To resolve the problem of being unable to perform face-to-face data collection or module development, we had to build trust with teachers while negotiating the restrictions inherent in online interactions. In this paper, we reflect on the lessons we learned.

REFLECTION

We learned two key lessons through navigating the challenges of conducting school-based research during a pandemic. First, we learned that it is important to leverage partnership opportunities with schools by establishing teachers as decision makers in the research. Second, we learned that we could maximize effective engagement by creatively leveraging technology to conduct research and build relationships remotely.

Lesson 1: Make Teachers Decision Makers

Developing positive collaborative ties with teachers and students was an important aspect of our research (Christianakis, 2010). Teachers' participation in school-based research is often limited to managing classroom instruction, offering feedback, and assessing student work. Teachers are viewed as consumers and implementers of academic researchers' findings (Christianakis, 2010); however, in our project, teachers were involved as key decision makers from the beginning. The teachers' partnership proved instrumental for navigating pandemic-related challenges and developing effective research materials.

Through close collaboration with the teachers, we were able to better understand our research context, including the students' prior knowledge of the content. For example, our team collaborated with teachers on module development sessions. It was only through regular meetings with teachers that we were able to integrate AI and cybersecurity concepts within the math modules successfully. The teachers were keen to help us understand the school curriculum, develop lesson plans that attended to state standards for math learning outcomes, and develop engaging content for students. Teachers have a significant advantage over researchers when developing age-appropriate units due to their detailed understanding of students' experiences and learning needs, making their involvement in the decision-making process imperative. Our partner teachers helped us problem-solve, adapt, and iteratively improve our learning modules.

Recognizing the value of this collaboration, we knew it was important to find ways to support the teachers. We provided financial compensation to our two partner teachers through a Research Experiences for Teachers grant supplement from the National Science Foundation. We facilitated opportunities for professional development, offered instructional support, and provided incentives for other teachers in the school who implemented the modules. Additionally, we invited teachers to make decisions on how to best integrate the research-based curriculum of the modules in ways that met their existing goals for their students. The team consistently inquired

about teachers' preferred communication channels and the frequency and type of assistance they required to feel comfortable and successful in implementing the new modules teaching AI cybersecurity best practices.

In summary, we depended on teachers as decision makers and as subject matter experts. We were willing to be educated by them and learn the content from their points of view while supporting their efforts. Simultaneously, teachers were given the freedom to customize, change, and conduct module lessons as they saw fit. Because of the added flexibility, teachers had more control over their schedules and were better prepared to facilitate math, AI, and cybersecurity-related activities.

Lesson 2: Creatively Leverage Technology

To facilitate remote research and collaborative activities, we found creative ways to utilize technologies like Zoom, Miro board, Google Docs/Sheets, and WhatsApp. We met weekly with teachers via Zoom to overcome the health and safety challenges of meeting in person. Simultaneously, we used Miro board (an online collaborative whiteboard tool) to collaborate, discuss, and share ideas in real time. We used Google Docs and Sheets to manage the study logistics; these tools made it easy for teachers to collaborate by editing and updating files in real time. As a result, the whole team could keep track of updates, which helped team members catch up when they had to miss a meeting due to pandemic-related family obligations. Additionally, we constantly used WhatsApp to communicate in a semi asynchronous manner; this tool was useful for promptly identifying solutions to emerging issues such as module updates and concurrent data collection.

For instance, constant WhatsApp communication was instrumental in the development of a plan to reduce the friction of remote interaction when communicating with students. When the team decided to meet students via Zoom for interviews, we found it was not easy to form relationships with them in the brief time we had, especially given the remote medium. To overcome these challenges, we decided to include a silly photo and a lighthearted bio in the recruitment email to make students feel comfortable opening up during the interview. A strategy was developed and implemented within days because we were able to problem-solve through extensive WhatsApp communication.

CONCLUSION

Teachers' engagement in school-based research should not be limited to classroom instruction; instead, involving them equally in all decision-

making processes provides a distinct advantage. For example, when teachers see themselves as potential collaborators in educational research, academic teaching and learning can reflect a broader diversity of viewpoints, attitudes, and understanding. Teachers can inform the researcher about students' perception of the knowledge developed in the specific social environment by contributing their expertise and knowledge to the teaching and learning process. The knowledge obtained can lead to a more comprehensive understanding of the research activity than possible from a single disciplinary perspective. Furthermore, this form of inclusive collaboration fosters a more profound sense of trust and accountability. Additionally, exploring and understanding data from teachers' perspectives helps minimize researchers' subjective biases while providing contextualized interpretations of the data from stakeholders immersed in the research context. Working with teachers also helps assess the needs of schools, which contributes to developing more relevant and meaningful educational research experiences.

Researchers should support partner teachers through careful planning, clear communication, and a willingness to constantly review, learn, and improve together. Effective collaboration with teachers requires intentional investments from the research team, especially when face-to-face interactions are not feasible. When conducting remote school-based research, existing technologies can be used to find creative ways to collaborate, communicate, and build relationships in virtual settings.

In summary, we were faced with the unexpected challenge of conducting school-based research during the pandemic. We successfully navigated this challenge by establishing teachers as decision makers and creatively leveraged communication technologies to build relationships remotely. By pursuing collaborative partnerships and creative solutions, research teams become more resilient in the face of new constraints—even a global pandemic.

ACKNOWLEDGMENTS

This work is supported by a grant from the National Science Foundation (2039616). The authors would like to thank Lee-Ann Livingston and Kirstin Mobley for their invaluable contributions to this project.

REFERENCES

Christianakis, M. (2010). Collaborative research and teacher education. *Issues in Teacher Education*, 19(2), 109–125.

- Knijnenburg, B. P., Bannister, N., & Caine, K. (2021, August 8). *Using mathematically grounded metaphors to teach AI-Related cybersecurity*. *IJCAI-21 Workshop on Adverse Impacts and Collateral Effects of Artificial Intelligence Technologies (AIOfAI)*, Montreal, Canada.
- LeCompte, M. D., & Schensul, J. J. (2010). *Designing and conducting ethnographic research: An introduction* (Vol. 1). Rowman Altamira.

Copyright of Curriculum & Teaching Dialogue is the property of Information Age Publishing and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.