Technology We Can't Live Without!

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ABSTRACT

This panel is the evolution of seven years of *Technology that Educators of Computing Hail (TECH)* Birds of a Feather sessions, grew into popular panels [7–12], and a regular column in ACM Inroads [1, 21]. Leveraging our experiences of teaching during the pandemic, many of us have incorporated technology we were forced to rely on during our time online, making for an even *better* experience for our students. This forum will provide a chance for a seasoned middle school, high school, community college, and university educator to showcase the technologies they can't live without, what problems they solve, and how to use them.

CCS CONCEPTS

• **Social and professional topics → Computer science education**.

KEYWORDS

Computer science education; technology and teaching; tools

1 SUMMARY

The pace of technology for use in computing education is staggering; in recent years, *Zoom*, *Piazza*, *Gradescope*, etc. have completely transformed our teaching. We hope this forum will allow the presenters to dive deeply into the common use cases of their indispensable technologies, share any "gotchas" they've uncovered, and explain how others can adopt them.

2 PANEL STRUCTURE

After a brief introduction of the panel format and background, our presenters (ala veteran concert musicians) will take ten minutes each to give live demonstrations and reveal the configuration options required to make their technology "sing". When not presenting, the presenters will be answering questions in the chat; one of the benefits of hybrid conferences and Pathable!

We will support in-person and remote presenters; the latter will pre-record their demo, which will be shown by the moderator during their turn. The highlight of the panel is when the audience is invited (in the remaining 30 minutes) to interact, join the discussion, and share their favorite "can't live without" technologies as well. The moderator will alternate between selecting raised hands of in-person participants and remote attendees.

The overall format has worked well for many years [7–12] with a moderator and four presenters, bringing their perspectives.

3 DELNAVAZ DASTUR

I use **Pear Deck for Google slides** [3] to allow students to give me feedback during lectures, making it very interactive. I can take a poll, ask quick questions to get an understanding of students' thoughts about the material, or have students work at their own pace and complete questions on each slide. I can view student responses in real time on my laptop as they type and can give immediate feedback. Pear Deck has slide templates for different subjects; I use them for critical thinking as well as reflection questions at the end of a lesson. **Gimkit** [13] is invaluable to reinforce concepts; it has fun games where a class is either split into teams or works as one team to win the game. Each student has to answer questions correctly that the teacher has created or selected in order to win the game. I utilize **Screencastify** [18] to record short instructional videos, and **edpuzzle** [6] to assign videos for my students to watch. I can add short questions in the middle of videos to check for understanding of concepts, as well as trim or cut parts of the video. I can see how many times the videos were watched, played back, and which parts in particular were played multiple times.

Delnavaz Dastur is a seasoned Middle School CS Teacher at Stratford San Jose Middle School.

4 KIMBERLY HERMANS

Pair programming and interactive coding demonstrations are an integral part of my classroom, so I use **CodeTogether** [2] daily.

CodeTogether is a plugin that allows you to live share your IDE and coding sessions. I have a paid subscription (around fifty dollars a year) that allows me to share my IDE with my class, who can view and edit through a web browser. It allows me to call on students to contribute code and it allows students to copy and paste demonstration code for their personal use. Students can sign up for a free account that allows them to share their IDE with up to 3 other students.

Another tool I use in the classroom is **Thunkable** [22], a mobile app builder using a block based language that allows for in-browser testing. Students can also download the Thunkable app on a mobile device that loads and runs their projects. Other tools I use to help build community in my classroom include **Google's Jamboard** [15] and **Doodle** [5]. I use Jamboard as a way to get to know my students by asking fun questions, and students respond with pictures or text posted on a communal bulletin board. I also use Doodle in my class to have students sign up for things like presentations and snacks.

Kimberly Hermans is a veteran high school teacher, and teaches computer science in the Irvine Unified School District.

5 NERY CHAPETON-LAMAS

I use **Replit Teams for Education** for classroom management, and for mob / pair programming (especially online/zoom classes). **Kahoot** is great for reviewing in a flipped class, making for easy debriefs between questions or "what if" program scenarios. Like Kimberly, I also use **Google Jamboard** [15], which works well for discussions on culturally responsive contextual topics to setup for lab. **Google Sheets** is invaluable (since Canvas stinks for *specification grading*), I have a custom sheet with automatic tallying for end of unit/semester grades. Our clubs use **Discord**, so using it as our online classroom space to build community also helps pipe students into our *Women in CS* club and *EChALE* (Empowering Chicanx And Latinx in Exploring) STEM club. I've found **Google Voice** invaluable; it allows me to give students a cell number they can text, another option for communication that some prefer over Discord, Email, Canvas, etc. Finally, **Slack** is awesome for organizing our department and peer tutors, as it makes file sharing, communicating, and collaborating way easier than email.

Nery is a full-time tenured instructional faculty in Computer Science at MiraCosta Community College in Oceanside, CA.

6 ARIEL ORTIZ

Using a web IDE on a browser is a very convenient way of making sure all students in our classes have access to the exact same programming environment through their own personal laptop computers. If we are using Python in our classes, **Google's Colaboratory** [16] allows creating **Jupyter notebooks** [17], where we can mix code, text, LATEX formulas, and images. If what we need is a Linux environment, there are two options worth considering: **Cloud9** [20] through the **AWS Academy** [19] and **GitPod** [14]. Both these IDEs can be employed to program in any language that works in a text-based Linux system, including: C, C++, C#, Java, JavaScript, Python, Ruby, Go, and Rust. Cloud9 and GitPod allow us to install **valgrind** [4], which is absolutely necessary when teaching memory management in C/C++, in order to diagnose and remedy all kinds of memory-related issues, such as memory leaks

and array index out of bounds errors. All these tools are either open source software or free for academic use.

On another note, now that we're back to in-person classes, don't you miss having a second monitor like when you were teaching remotely from home during the pandemic? If you have a Mac laptop you can easily configure an iPad to work as an extended monitor while simultaneously mirroring your laptop's screen into the classroom's projector.

Ariel Ortiz has been a computer science undergraduate educator at Tecnológico de Monterrey in Mexico for more that three decades.

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