



## CASE STUDY: HOW TO USE ARDUINO FOR VIRTUAL LEARNING

Recently, we talked to Jens Andersen-Mølgaard and Isak Gjedbo, technology educators from Skanderup Efterskole in Denmark who use Arduino in their classrooms...and now in their students' homes with virtual learning. We caught up with them to find out how virtual learning has changed the way they teach, and how they're still successfully using Arduino kits to teach STEAM subjects.

*Arduino Education:* Hi, Jens & Isak! It's great to talk to you. Can we start by getting an understanding of how you'd normally use Arduino in your classroom?

*Jens Andersen-Mølgaard:* Arduino is great to us, as we can use it to teach basic technology including coding and programming to our 15 and 16-year-old students. The technology is perfect for creating creative and innovative DIY-projects, and our students love to make physical things from scratch. That's also why we love to combine 3D-printers with Arduino. We can make great projects such as arcade machines, sound- and lightboxes, moving robots like cars, among a lot of other things. One of our core subjects is "Design thinking", where we focus on prototyping and development by using trial and error. It's not just that we get interesting results when we use Arduino to do this, it's the outcome of the students' learning experience in the process that really matters.

We find Arduino is the most powerful and useful tool nowadays to teach 21st-century skills and to make kids understand technology. Arduino contains a lot of possibilities and functionalities, especially with all the different types of sensors. It means we can teach technology in a creative way that stimulates students' learning a lot.

***"I see great potential in using Arduino in every subject in schools, as technology finds a place everywhere in our daily life."***



[AE:](#) When schools were closed, what happened about the subjects you used Arduino to teach?

[Isak Gjedbo:](#) It all disappeared instantly. Students went home, we (the teachers) were sent home, and without the school's physical environment, we weren't even close to matching the education we were providing students before. But this is where Arduino showed its full potential. We knew that when you connect a few wires and find out how an electrical circuit works, you set a light flashing or an engine spinning for the first time, that's what has a great effect on students' interest and motivation to learn more. We often educate on the principle of learning-by-doing and getting hands-on, and we didn't want to lose that just because students had to learn remotely.

[AE:](#) What made you take the decision to use Arduino for virtual learning?

[JA-M:](#) Well, I have 29 students who had been sent home, and they were all slowly starting to get a bit tired of the same kind of homework and online sessions. They chose to come to our school to learn about technology and now they're losing months of tech education. Our students all have the same technology motivation, interest, and engagement, but only a few of them had physical technology at home. So it was clear to me. If they couldn't come to school and learn about technology, technology would have to go to them so they can learn from home – together, but separately.

And of course it can work from home! We use software that makes it easy for us to livestream to students and show them how to put different wires, connectors, and sensors together. It's just like being at school where we livestream what we're doing with our hands and project that onto the smartboard.

***“It is our belief that we can do it just as easily at home as we can when we are physically together.”***

The only difference in the learning process is the speed and guidance for each individual student – but that's nothing to do with Arduino. Online sessions simply require more time, no matter which subject you're teaching.

[AE:](#) How did you get it all set up?

[JA-M:](#) That's the funny part. I told my students that I was searching for a way I could get some physical technology to them. At the time, I didn't know what that would be but then one of my students suggested Arduino and it's just a great opportunity to teach my students at home. All our students have now got an Arduino Starter Kit and we're starting to teach the basics, which we'll follow up with doing some small projects.

[AE:](#) How are you teaching remotely using Arduino?

[IG:](#) We're using [Google Meet](#) and [Discord](#). Google Meet has the basic functions we need to communicate, see each other, and show our projects. With Discord you can create



classrooms and share screens and cams very easily. It also makes it easy for us to guide and follow our students at a fast pace, and it's also our students' preference, as they are used to this type of media.

**AE:** How have your students responded?

**IG:** Our students are excited and couldn't wait to receive their Starter Kit! A few were like, "Yay, this is great", and others were like "I'm excited, but will it be too hard for me to learn from home?" Of course, every student is different, but they are all excited to finally touch technology with their bare hands again. They missed that a lot!

**AE:** What have been your successes so far?

**JA-M:** We've been working with Arduino for 4½ years now, and our students have made some great projects such as a 2x1 meter arcade machine. They have also made different types of light panels, racing car and cases with motors. To me, success is when a student is so proud of their project that they want to show it to the world.

**AE:** What would your advice be for other teachers thinking about using Arduino for remote teaching?

**IG:** To be openminded and find the time to learn it. It can be very complex, but it's possible to do simple things and learn in small steps.

**AE:** Have you got any big plans for using Arduino in the future?

**JA-M:** A lot – I don't know where to start! Right now, I'm hoping to find some other schools to share this inspiration with. Knowledge sharing is the keyword here, as we should help each other to teach our kids and students about technology in the best way possible.

## **INSPIRED? THIS IS WHAT YOU NEED TO GET STARTED**

You'll need one Starter Kit per student. You can [find your country's distributor](#), or [buy the kit online](#) (or ask your students' parents to buy them).