



## **DigiEduHack Solution**

**Trento - Innovative learning beyond covid: collaborative tools in scientific labs and teams experiences.**

**Challenge: Trento - Innovative learning beyond covid: collaborative tools in scientific labs and teams experiences.**

**Challenge 2020**

## **Squiddy - Real time collaboration platform for lab teachers**



**Lessons in school can continue remotely, but the laboratories?**

Video <https://urly.it/38wvn> | <http://urly.it/38wvh>

Extend Google Meet or Zoom with a shared canvas containing a simulator for physics experiments, an electronic breadboard, a chemistry table, a code editor.. you named it! Squiddy makes it easy for students to share the same workdesk in the simulator

### **Team: Provolosi**

#### **Team members**

Simone Degiacomi, Lorenzo Framba, Sergio Facchini, Sebastiano Castellan

#### **Members roles and background**

##### **Simone Degiacomi**

He is a Computer Science Master student at the University of Trento. He is currently interning at Microsoft Estonia and I am looking forward to starting his career as a software developer. He loves hackathons and creating prototypes with friends.

##### **Sergio (Slava) Facchini**

A University of Trento student and a mobile app developer freelancer. He has 8+ experience in programming and IT technologies. He has developed various apps, some of which are very used by UniTN students (Trentastico and RoomTick).

### **Lorenzo Framba**

Bachelor's degree in Computer Science at the University of Trento. He worked on Deep neural Networks at FBK (TRENTO). he has been working as a freelance videomaker/photographer for 7+ years. He currently studies in a double degree program EIT digital in Data Science at UPM and Rennes 1.

### **Sebastiano Castellan**

Bachelor's degree in information and communications engineering at the University of Trento. He was a developer at Al maviva in the development and innovation department, He is attending the double degree program with EIT digital in visual computing and communication at Sorbonne and KTH.

### **Contact details**

<https://www.linkedin.com/in/sergio-slava-facchini-06496365/>

## **Solution Details**

### **Solution description**

During the hackathon we've built an online collaboration platform to help the lab teachers. It allows students to participate actively in digital labs as if they were in the same room.

The teacher can choose an online laboratory (simulator) among those suggested by our platform or to use any online site/html page. The professor can then group students into teams, define the goals to be achieved and make students actually work together. Students will access a shared web page where they can collaborate together, clicking each other screen, giving pointers on issues to fix and communicate through a video call.

Our platform is not only for schools. It can also be used by businesses to teach groups of employees how to use online software.

### **Solution context**

As students during the global pandemic, we find it very hard to apply what we've learning. This is particularly true for practical skills, which now are taught in plain frontal lessons via Zoom. Without laboratories during which applying these skills, we feel that we learn very little. The labs are all locked during the covid period, but the practice helps students to better understand the concepts of theoretical lessons.

We have noticed there are many online tools that simulate the laboratory experience, but they share common issues:

- It's very difficult to find them
- There is no site or service that collects the most useful ones or groups them according to

schools/university necessities

- The simulator are meant to be executed on only one computer
- No way to make students work together on the same simulator.

This problem is even more felt due to the lackage of the right online collaboration tools. We can't use zoom to make people build an electronic circuit tothether. Other software like TeamViewer does not allow more than two users to collaborate and make it hard for a supervisor to take a look at how the students are performing.

## **Solution target group**

Our main reference markets are high schools and universities, which are very penalized during the pandemic period.

We will start by focusing on schools that make great use of laboratories. Italian science and tech high schools would be great early adopters. The academic program is the same, shared across all the technical schools in Italy. This makes it easy for us to build new ad-hoc laboratories and reuse them across schools of the same type.

The market size? There are 1663 scientific schools in Italy and 3262 technical institutes that are well suited for our solution (source: <https://cercalatuascuola.istruzione.it/>). 10 million euro were allocated in 2020 alone in Italy for software, web software, applications, cloud spaces, e-learning platforms to schools (<https://www.miur.gov.it/>).

Schools mainly rely on companies that sell educational services, in the form of packages. Some examples are spaggiari, axios, medisoft, nuvola which are sold on an annual basis at prices based on the number of school students. We aim at partnering with them since they already have the contacts with the schools.

## **Solution impact**

Our solution impacts the way students build mental models of the concepts they are studying: by using our virtual environment they will experience a learning journey similar to the one in class. This can be measured in many different ways: for example, teachers can assign different kinds of homework based on similar ideas, and then see how much students struggle to find the solution. Moreover, working in a virtual environment requires teamwork: stuents will have to organize themselves to decide who performs each individual task in the simulation. How well they learn to work together can be asserted by frequently changing the formation of the teams, and comparing the results they accomplish.

Finally, Squiddy impacts the way students interact with teachers: students will ask more questions because they will have the possibility to actually apply what they learn and find gaps in their knowledge.

## **Solution tweet text**

A Google Doc experience that works on any website! Students will be able to share the same working station in a lab simulator and won't miss out on the opportunity to learn actively, in spite of these pandemic circumstances and remote classes.

## **Solution innovativeness**

We can start to analyze this approach by comparing our characteristics and compare this with the existing market. Let's compare it with the biggest competitors we can currently find in the market, that are Google Meets, Zoom, and TeamViewer, since our solution is covering multiple aspects. When managing groups, we see that Meets and TeamViewer have no implementation and only Zoom can handle it as much as we do. Furthermore, we also can have the group collaborate in real-time within the members, something that the only Teamviewer can do, and Zoom and Meets lack this implementation. We can also then see that something that makes us more special is the fact we can create a working bench ( and therefore a lab experience ) for groups, so each student will get the same opportunity to learn, without having to just watch the teacher doing it. This is obviously not present in any of the other 3 platforms we are observing as closer competitors. As a further note, we can also handle virtual machines for more advanced applications in a work field, which will then put us in a better position than the competitors, since we can provide a service to a much wider span of potential customers.

When we try to compare apples to apples, we immediately can see that our solution is covering an overall wider set of problems and therefore we think it is extremely original and different than the established market, because we take the best of both worlds, which is not only to cooperate with our classmates through a shared session of a lab simulator but also to have the teacher evaluate in real-time our progress and giving us real and concrete advice on how to improve in the selected lab lesson.

## **Solution transferability**

Our project was designed to be able to be used outside schools, for instance in business environments.. This is useful in training employees in how to use a new software.

It can support any type of training, in particular in the market of smart working. This can facilitate education and will give the opportunity to use software without installation and then accelerate the training process.

## **Solution sustainability**

Our solution is effective if there are many laboratories that students can interact with. Without the laboratories, teachers will be left in producing their own material; a difficult task for them, that would undermine the product adoption. Our first goal is to start building many laboratories webpages and select the best already online. To choose which laboratories, we will take a look at the official teaching guidelines for high schools. For example, in Italy, the public electronics high-schools all follow an official guideline of the same topics (electronics, computer programming, math...). Therefore, by creating a set of laboratories according to these topics, we will have a tool that is suitable for all the electronics.

We think that we can be trusted by companies that already sell services to schools today so that we can act as distributors throughout the country, instead in the medium and long-term vision the implementation of virtual machines and teaching solutions for companies will represent for us the greatest gain

## **Solution team work**

We are an energetic team that wants to have fun and innovate.

We are a set of friends with heterogeneous interests that have been collaborating for over 4 years.

Everything started when we all met each other at the University of Trento, when we combined our strengths and passions for problem-solving and competition-driven activities. We then integrated our group every year adding capacity and improving our network.

Each member of the team has a specific role that has mastered throughout the years and this makes us hungry for something that challenges our minds.

We have participated in more than 15 hackathons throughout Europe, winning and reaching the podium of numerous contests. We work well together due the ease of communication in our team, the willingness to change our mind, and constantly getting involved in new stimulating challenges.

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