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New digital tools to change our behaviours and save energy



How do I get people to change their habits? This is one of the challenges faced by developers of apps and ICT solutions aimed at boosting energy savings in our buildings. European researchers embraced this mission

Forming attitudes is hard. It may be exciting to start a new habit, but it's challenging to make it stick. This may often happen when we try to go green, consume less energy and constantly follow virtuous behaviours in the buildings where we live and work.

Digital tools such as mobile apps may give a helping hand. Several intelligent solutions are already available on the market, but research is still hunting for the most engaging tools for people with different ages, needs and jobs.

The EU project [eTEACHER](#) has embraced this mission. From the very beginning of the design of a saving energy application, the project has involved users of different buildings in Europe: from houses and offices, to hospitals and schools. The researchers are designing a tool that gathers and processes data on the end-user energy behaviour and then provide customised recommendations.



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Engineer **Gloria Calleja-Rodríguez**, from the international company Cemosá, which led the European consortium, shared the lesson learnt so far.



Gloria Calleja-Rodríguez, Engineer, EU project eTEACHER

Which were the main challenges you tackled in user engagement?

The main one was the wide range of backgrounds and ages: students, teachers, office staff, doctors, flat occupants, cleaning staff, patients, etc. To design our solution we collected feedback from all these people through interviews, forums and workshops. We thought it was important to hold face-to-face meetings. The pandemic has made it harder but we are tracking users' statistics, which show exactly how building users are using the tool. We are constantly updating our engagement plan, which involves the use of calls and digital media such as emails, appealing videos, and online surveys. Consulting the users from start to finish has encouraged them to take up our solutions.

What technical challenges are you facing during the demonstration phase and how are you dealing with them?

One of the main challenges is related to the wireless monitoring technology. We have data gaps during certain timeframes, some sensors send the same value over long periods etc. One of the reasons is that the device users connect and disconnect, but there are other technical problems: for example, the lack of signal coverage and the low battery autonomy. Wireless technology seems to have important advantages such as the price and easy installation, but it looks like it isn't ready for big buildings. The good news is that this kind of technology is developing very quickly. We have also noticed that the devices do not always meet commercial specifications. We are using different solutions to address the issues with sensors and data quality. These include algorithms for automatic data validation in the databases, developing a weekly maintenance plan for monitoring devices, checking data quality and sensors status periodically.

Another technical challenge that we addressed during the implementation phase was the interoperability with the Building Automation and Control System (the building's monitoring system), and the different eTEACHER data processing tools and user interfaces. The solution is based on developing a universal communication interface consisting of a common database, a synchronisation tool and an eTEACHER application programming interface (API).

How has COVID-19 impacted the demonstration and what solutions have you taken?

In addition to affecting user engagement, the pandemic has had a heavy impact on the use of the buildings. On one hand, offices and schools were less occupied as many people worked and studied at home; healthcare centres had lower occupancy because many appointments were solved by phone and the waiting time was minimised. On the other hand, residential buildings were used more than before. Additionally, the spaces were more ventilated.



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But we stay positive because our evaluation methodology is based on comparing control and study environments before and after the eTEACHER solution. Control environments are rooms that didn't get our tool, while study environments are similar rooms that have used it during the demonstration period. We assume that COVID-19 has impacted both kinds of environments and we compare deviation before and after, to obtain data on behavioural change and energy savings.

What kind of feedback have you collected from the users so far that can be useful for the future?

We are collecting quite different feedback, probably due to the range of users. Some of them are very happy with our tools while others report they don't have time to use it or they think the solutions are not mature enough. Several users who have the eTEACHER toolkit at the office are reluctant to use their smartphones; we have the same problem in the schools. So, even if it may sound a bit old-fashioned, a desktop version seems important to have.

Several users have shown their interest in having details about their use of energy. One of the most successful functionalities is our virtual 3D model building, where you can visualise information about comfort conditions and energy consumption. This shows how the user interface is important. As a conclusion, I would say that data collecting and processing is very important for providing interesting and reliable information for a building's users, but we also have to pay a lot of attention to how we show them that information.

Do you have any recommendations for those who want to replicate your idea?

The first piece of advice would be to focus on interoperability with building facilities, devices and the tools you're developing. You need to look into this from the very beginning of the implementation. The second recommendation is to ensure data quality by investing enough resources in monitoring devices and developing validation algorithms. I would also recommend involving building users in order to fine-tune the tools and the interfaces, and to carry out enough quality tests before giving the technology to them.

By youris.com

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