How to Develop Teaching and Learning through Technology?

Abstract
The Covid 19 pandemic has meant a before and after in the teaching-learning process in higher education, since teachers suddenly had to implement technologies that were unknown to them until then, often without knowing how to do it.

This module offers a global vision of the need to incorporate technology in the world of university education. First at all, the 8 workshops that make up the course are presented, and their essential objectives are defined, paying special attention to how the different contents should be implemented and worked.

The next point begins by explaining how learning objectives should be defined and measured, to later analyse what technologies can be incorporated, where they can be found, and how they can contribute to the achievement of the learning objectives.

The third point of the workshop deals with how to begin the design of the teaching and learning through the technology process, reflecting on the context in which it is applied, the procedure to be followed to use the technologies and the role of each of the participants.

Finally, it will be explained how to design authentic and engaging learning interventions to enhance the success of the teaching process.

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1 Introduction

The need to incorporate technology into the learning and assessment processes of higher education was clearly revealed during the lockdown of the Covid 19 in 2020. Until then, teachers were fully aware that the new digitization needs of society they had to be worked on in some way in the classroom, but they had not been forced to use certain educational technologies up to that moment.

In this context, many university professors found themselves faced with the problem of incorporating technologies without a previously planned design, without the necessary didactic and technical knowledge, and without the adequate means to develop their teaching work.

Despite this, many teachers still do not know how and when to use technology, which generates some anxiety and the feeling that they are not taking advantage of its full potential.

Using technology in the classroom just for the sake of it and without a specific purpose, or because it is fashionable is not a good option nor does it provide relevant results, so it must respond to a planned process according to specific needs.

This workshop aims to provide a solution to this problem by defining the learning objectives, reflecting on how technology can contribute to their achievement and identifying processes for the design of learning and the achievement of engaging activities.

Technology can become the "wings" that will allow the educational world to fly farther and faster than ever before-if we will allow it. (Jenny Arledge)

2 Teaching, learning and technology

2.1 Introduction to Teaching and Learning Through Technology Workshops

The use of technology in the classroom has been a reality for decades, so teachers have been implementing it, sometimes without the existence of clear development guidelines. During the Covid 19 pandemic, most of the world's teachers had to move to virtual teaching, sometimes without the necessary platforms or technological means and without a clear understanding of how to use these technologies.

After the end of confinement and the return to reality, it has become clear that more and better use should be made of technology in higher education, but statistics show that although everyone (institutions, teaching staff, users, community) sees the need for progress in this sense, the real use made of these technologies is very limited and sometimes they are used in an ancillary way or without taking advantage of their full potential.

The European "Prudmet" project arises with the aim of contributing to the improvement of the use of technologies in an effective way in the university classroom, and among its results, it proposes the development of a series of workshops for teaching and learning through technology (TTT).

The objectives of the TTT Workshops are:

- Promote the systematic design of learning
- Create awareness of advanced technologies for learning
- Allow tutors to understand how they can use technologies
- Enable effective implementation of technology in learning
- Ensure measurement of the impact of technology in learning – showing the gain
- Create champions for technology in learning

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To achieve these objectives, there have been developed 8 workshops that are supported by a process of mentoring:

- **Workshop 1:** How to Develop Teaching and Learning through Technology
- **Workshop 2:** How to work with others to create and distribute technology for learning
- **Workshop 3:** How to use Advanced Technologies for Learning
- **Workshop 4:** How to implement technology in learning easily
- **Workshop 5:** How to use technology well in the physical and virtual classrooms
- **Workshop 6:** How to show learning gain through technology
- **Workshop 7:** How to Lead Technology for Learning in HE
- **Workshop 8:** How to facilitate learning through technology for technologists

The process to be followed by a teacher interested in improving technology for learning is as follows:

Step 1. Use the TTT competency tool to assess your strengths and weaknesses

Step 2. Depending on your results, decide which workshops will best help you to improve – you might do just 1 or 2 or all 8

Step 3. Join a course group of staff to encourage and boost team working

Step 4. Try out ideas for your teaching and analyse which of them may best fit your training objectives.

Step 5. Put aside time to replan your course/module for the use of technology

2.2 Starting with learning first

Before introducing technology, it is important to be aware of the teaching-learning processes in our subjects to be able to link technology as much as possible to the expected learning outcomes to be achieved. For this reason, we need to reflect on answering the following questions:

- What do you want students to achieve through your module/course?
- What skills do need to be able to meet those learning outcomes?
- To what extent do your students hold these skills already?
- How will you provide students with the opportunity to build those skills?
- How will you enable students to demonstrate the outcomes?

Once we are clear on what those objectives are, we can then look at how we can include technology to help achieve them, reflecting on what technologies are used to demonstrate a skill in the workplace, what technological resources are used in that area of work, or what technologies exist to support the student's competence learning processes.

The fundamental problem in these cases is that there is often limited knowledge of existing technologies, so it is necessary to seek quality information to help us decide. In addition to searching the Internet or YouTube tutorials, which are usually the most common, it is more interesting in these cases to ask practitioners what they use, to work with the technical lead of your institution, to attend practitioner conferences, or directly sign up for courses and attend training to explore options.

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2.3 Beginning the design process

To make a didactic design that includes technology, several previous elements must be taken into consideration. First, all parties involved must be aware of the need to incorporate it and actively participate in creating a technologically friendly environment.

In fact, we must assess the available resources and the support that we can find in the institution for the use of the desired technology, the degree of preparation and motivation that teachers have to use technology, and students.

Specifically, in this case, it is necessary to understand the context of the student, their expectations regarding learning, the level of adequacy that this type of technology can have with that particular group and the technical skills and attitudes to use them.

It should be aware that technology is a tool at the service of pedagogy, and not on the contrary, which reinforces the idea that didactic objectives always go first.

The design process consists of four stages:

1. Define what students must learn, how technology can facilitate it, and what technology is most appropriate
2. Assess whether technology is accessible to teachers and students in terms of cost and skills, the impact it will have on learning (including transferability to the world of work) and future sustainability (if it is going to continue to be used, updates, reliability, etc.)
3. Implementation. At this stage, information will be collected to know the degree of satisfaction with the use of technology and the extent to which it favours the achievement of the proposed objectives will be assessed.
4. Redesign based on success in implementation by introducing the changes that are considered necessary for the future.

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2.4 Designing authentic and engaging learning interventions

Learning is optimal when is contextualized and situated in real-life experiences and authentic activities. In general, the more realistic and authentic the teaching experiences, the more engaging they will be. In this sense, some technologies are more engaging than others. For example,

- Using computer simulations and problem-based learning that creates near-authentic problem-solving scenarios and simulations.
- Enabling interactions and connections between people through digital technology.

3 References

Kimmons, R., Graham, C., & West, R. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education, 20*(1).

West, R. E. *& Allman, B. (2021). Designing Technology-Enhanced Learning Experiences. In J. K. McDonald & R. E. West (Eds.), Design for Learning: Principles, Processes, and Praxis. EdTech Books.* https://edtechbooks.org/id/designing_technology

Bates, T., & Poole, G. (2003). *Effective teaching with technology in higher education: Foundations for success.* Jossy-Bass, San Francisco

Bates, A. T., & Sangra, A. (2011). *Managing technology in higher education: Strategies for transforming teaching and learning*. John Wiley & Sons

Jonassen, D., Mayes, T., & McAleese, R. (1993). A manifesto for a constructivist approach to uses of technology in higher education. In *Designing environments for constructive learning* (pp. 231-247). Springer, Berlin, Heidelberg.

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