Preparing Future Teachers To Strategically Integrate Digital Media And Technologies Into Their Teaching Practices: An Insight Into Higher Education Practices At The University Of Luxembourg

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Luxembourg, the little country in Europe where I live and work, like many countries around the world, has understood that digitalization will transform learning and teaching practices over the next decades.

The Ministry of Education has, a few years ago, started to develop and implement digital education policies to encourage schools and teachers to develop educational practices for a digital age. They have also implemented digital education strategies to support the efforts of schools and teachers in that direction, by providing namely new curricular objectives and new teaching tools and materials (hardware, software, and digital learning materials).

The University of Luxembourg, where I am a senior lecturer, had

anticipated this socio-cultural transformation of the field of education since around 2005. The initial teacher training program for future K-6 teachers, called "Bachelor in Educational Sciences", has indeed been addressing this topic in courses about general teaching methods ("learning with new media", "teaching with multimedia tools", "education in the digital age", "educational technology strategies and scenarios"), but also in more domain specific courses ("ICT in mathematics education", "ICT in language education"). We have thus been trying to prepare future K-6 teachers for the strategic use of digital media and technologies in their classrooms for more than 15 years now.

Here I would like to tell you what we are currently doing in two "digital education" courses of that bachelor program, but also how and why we came to the teaching approaches that we currently use.

Education in the Digital Age

The first course, called "Education in the Digital Age", happens during the second semester of our 8-semesters long study program and is supposed to lay theoretical and conceptual foundations about 3 main themes: (a) the digital revolution and its consequences for culture, for learning and for education, (b) the new competencies requirements for teachers and for students, and (c) the strategic integration of digital media and technologies into educational practices.

We had been teaching this course as a lecture for a few years. However, we had observed, over the years, that (1) many students failed to pass the exam and (2) that a lot of them, when taking the second course a few semesters later, had forgotten most of these theoretical foundations or did not make the connection between the two courses. We also felt that lecturing students about the need to rethink education in the digital age was not isomorphic. These considerations have driven us to rethink and redesign (a) our teaching approach and (b) how we assess students learning outcomes.

Our current pedagogical approach combines various learning and teaching methods that require students to actively and collaboratively construct meaningful knowledge, and to share it in a community of learners. They are given “big questions” (i.e. questions where there are no simple and easy-to-lookup answers) and are instructed to develop meaningful answers, based on resources that we have curated for them and / or resources they have looked up themselves. These answers are shared with their colleagues (and us) in an online forum and discussed in class. We have tried to guide their inquiry-learning process more at the beginning (requiring them to read / watch learning material in advance to coming to the seminar) and less at the end of the semester (inviting them to search for relevant resources online themselves). They collect “evidence” of their own learning in terms of knowledge, understanding and application in their personal online digital portfolio. We provide them with an online portfolio platform hosted by the university.

Given that most of our students have not had extensive experience with active pedagogy methods before studying at the university and are more used to dealing with “small questions” or with reproducing answers to questions (both provided by their teachers), they have been somewhat struggling with our approach. However, we see that many students deeply engage with the proposed content, try to understand it and make sense of it. Learning is much more visible in our current approach then it was before, in the lecture hall, where it only became visible when we were grading the final written exams, when it is too late to scaffold students learning processes.

Educational Technology

The second course, called “Educational Technology” takes place during the sixth semester and builds upon these foundations by requiring students to use and apply their knowledge to design their own original educational technology integration scenarios.

More specifically, we ask our students (1) to actively explore real pedagogical problems, (2) to review existing pedagogical solutions and potentially useful technologies, (3) to develop an original ICT-enhanced pedagogical scenario and (4) to create a teaser video about their solution. For one of three scenarios, we ask them to implement it in a real school context and to briefly to document, analyze and evaluate the learning and teaching activities put into practice. At the end of the semester, they present their works to an authentic audience of peers and members of the school community.

The whole process is designed to engage students, have them work on projects of their own making, foster collaboration, provide authentic and professional practice-oriented learning, and allow them to apply theoretical concepts in a concrete problem situation, such as Bloom's taxonomy of learning objectives (Anderson & Krathwohl, 2001), the taxonomy of learning and teaching events (Verpoorten, Poumay & Leclercq, 2008) and technology integration strategies (Roblyer & Doering, 2012).

Over the years, we had seen that, when given the choice of the type of technology integration strategies, many students designed ICT-based learning and teaching scenarios that implemented a rather teacher-centered teaching model (Roblyer & Doering, 2013), very often using drill-and-practice instructional software tools or multimedia resources that are supposed to simply convey some information to pupils. These scenarios were often far from innovative, nor did they implement the disruptive potential of ICT in education.

Since 2018-2019, we have thus been asking our students to design and develop constructivist technology integration scenarios (Roblyer & Doering, 2013). Since then, we have observed that students are able to design rather attractive ICT-supported constructivist learning activities. Our students were quite surprised that such activities do not require

complicated and expensive tools, but that they can be implemented with standard productivity tools. We think that our teaching approach, aimed at developing the necessary competencies to design and implement meaningful and strategic educational technology integration scenarios, does lead to the desired results, especially when we add the constraint that these scenarios need to be in line with the constructivist tradition.