

DIYlab – Fostering Digital Competence, Student’s Agency and Learning

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1. Purposes

The “Do it yourself in Education: expanding digital competence to foster Student agency and collaborative learning – DIYLab” project¹, that is being implemented in primary and secondary schools of Spain, Finland and Czech Republic, seeks to explore the changes (and its educational effects) occurring in the last decade regarding digital competencies, especially in relation to the emergence of a culture of collaboration, that connects youth learning, technology and DIY (Kafai & Peppler, 2011).

To achieve the project's objective and ensure the sustainability of change driven by DIY philosophy and the use of digital technology, we are following a methodology based on the principles of collaborative action research (CAR). This paper focuses on the first steps of the CAR process and shows both how digital technology can be an agent of change in teaching and learning and the main challenges identified by teachers, students and parents in order to implement the project in the current curricula and schools’ organisation.

2. Theoretical framework

The unprecedented development of the digital technology promotes deep social, cultural and economic change and permeates all areas of life and society. From here arises the urgent need to understand and foster the skills required to make education and training better suited to the challenges of the knowledge society, to better equip citizens with key competences and, to develop a 21st century lifelong, life-wide and life-deep learning (Banks, Au, Ball, Bell, et al, 2007) skills policy and practice. Many of these skills are transversal – cutting across different subjects and school levels – and ICT can help to support them. Fostering such competences requires novel strategies and teaching approaches based on active modes of learning, such as collaborative learning, peer learning communities, creative problem solving, learning by doing, experiential learning, or the development of critical thinking and creativity. Digital competence is a core skill for life and employability. Today, the question is not whether technology should be used, but rather: how, where and for what educational goals.

Now-a-days- young people’s efforts to create and disseminate digital media have been associated with the growing do-it-yourself (DIY) movement (Spencer, 2005). Starting in the ‘90s (McKay, 1998) with arts, crafts, and new technologies (Eisenberg & Buechley, 2008; Knobel, M. & Lankshear, 2010), it is now being considered in curriculum contents (Guzzetti, Elliott, & Welsch, 2010), giving educators and students the opportunity to create, share and learn in collaboration (i.e.: Williams & Černočová, 2012).

¹ European Commission. Education, Audiovisual and Culture Executive Agency. 543177-LLP-1-2013-1-ES-KA3MP

What students and educational institutions need is authentic learning experiences to foster learners' critical capacity. This is not a goal that can be achieved by using only one platform or digital tool. Instead, true digital competence means using available devices with pedagogical approaches such as "flipped learning" and transdisciplinary inquiry-based projects, which guide young people to move from digital consumers to digital producers, becoming active and thoughtful learners. However, as recent research in educational change tells us (Hargreaves & Shirley, 2009; Sancho & Alonso, 2012) meaningful transformations can be achieved only by involving teachers and students in the decision process and anchoring new practices in the most promising aspects of teachers' professional knowledge.

3. Methods and modes of inquiry

Taking into account that the hardest limits of school change, including those promoted by technology, seem to be in the "grammar" of schooling (Tyack & Tobin, 1994), we have carefully considered the different elements that shape school, in Foucault (1994, p. 229) terms, as a powerful social *dispositive*. We have analyzed the official documents that prescribe the primary and secondary education curricula and the syllabi of the participating schools, particularly in relation to the target years (the 5th year of primary education and the 3rd year of secondary compulsory education). Using focus groups allowed the consortium to initiate a methodology based on the principles of collaborative action research (CAR):

A participatory, democratic process, concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with other, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of the individual persons and their communities (Reason and Bradbury, 2001: 1).

Focus groups (Kitzinger, 1995; Kitzinger and Barbour, 1999) were carried out in each country. Each school organized the groups by inviting teachers, parents and students to participate and by coordinating the timing. During the sessions, both school and university partners collaborated in guiding the discussions. The setting was open and informal and opinions were genuine, pertinent and relevant.

By carefully designing the formation period (second research step) and the implementation phase (third research step) around local practices we are developing a more sustainable project that takes hold in the schools and continues beyond the life of the project.

4. Data sources

The main data sources in this phase have been:

- Analysis of 13 documents of 3 European countries, prescribing or informing curricula and practice at national and school level.
- 15 focus groups

Educational level	Country	Teachers	Parent	Students	Total
	Spain	5 Primary 6 Lower Secondary	6 Primary 6 Lower Secondary	6 Primary 6 Lower Secondary	35
	Finland	8 Combined	10 Combined	8 Combined	26

Primary & Secondary	Czech Republic	8 Primary 7 Lower Secondary	5 Primary 6 Lower Secondary	10 Primary 6 Lower Secondary	42
Total	All countries	34	33	36	103

The documents were analysed according to the following categories emerging from the theoretical framework:

- Autonomous and self-regulated learning
- Interdisciplinary knowledge
- Digital competence
- Collaborative and problem-based learning
- Opportunities and limitations for anchoring the DIYLab programme to the curriculum.

The contents of the focus groups were transcribed and analysed using a series of categories, in line with those used for the analysis of official curricula and the school syllabi:

- Knowledge and evaluation of the notion of DIY.
- Autonomous and self-regulating learning.
- Interdisciplinary knowledge.
- Digital competence.
- Collaborative and problem-based learning.
- How to frame the project considering the formal aspects of the curriculum.
- Emerging elements befitting each situation.

5. Results

When brought together, the analyses of Spanish, Finnish and Czech curricula reveal three different contexts. The proposed Finnish 2016 curriculum demonstrates more affinity with the aims of DIYLab, with more emphasis on transversal approaches to competences and a comprehensive, two-pronged consideration of digital competence (as multi-literacy and ICT skills). However, this to be implemented reform sheds little light on what these official policies look like in practice. The Czech context, on the other hand, serves as a reminder that the local school context has a great deal of influence over how the curriculum is introduced and put into practice. Where the Czech national curriculum does not share the lexicon and principles of DIY learning, the school itself does and through local initiatives it has implemented measures that can support the project. The Spanish context also reveals a highly motivated school. The national curricula specifically consider, at policy level more than in practice, the development of digital competence and the use of technology, related with some DIY principles such as autonomous learning, among others, what providing additional support and incentive to the school.

The analyses also revealed how digital technology is promoted slow but substantial changes in teaching and learning processes. In each country, albeit to different degrees, digital competence today is of great importance. All three contexts (“Media Education” in the Czech Republic; “Multiliteracy” and “ICT competence” in Finland; “Information handling and digital competence” in Spain) recognize the importance of providing both technical instruction to pupils as well as a transversal space for the complex development and application of these skills. Our project recognizes and supports these issues and attempts to develop an effective and sustainable way to support change through the innovative development of transversal, dynamic and collaborative sites of DIY learning (DIYLabs).

We have identified the key strengths and weaknesses of the schools contexts to implement DIYLabs. It became clear that the subject-based dimension expressed by the school curricula presents a challenge when considering where to extend more interdisciplinary and integrated projects to foster meaningful learning, curiosity, creativity and learning for understanding. School communities also express concern about the physical and the schedules space needed to make the most of this initiative.

The results of this stage of the CAR set fundamental challenges for the following ones: the professional development of the teachers and the design of DIYLabs at school level. The formation process should correspond to formation models that teachers are familiar with, but share common elements:

- Be based on the exchange between members of the school and the university;
- Be linked to classroom practice;
- Take into account the personal and professional baggage and interests of all the participants;
- Promote reflection about what DIY learning is, and the philosophy on which the project is based.
- Specify DIYLabs at school level

At this stage, the biggest challenge we face is the task of imagining the new, of trying to develop a model that responds to the needs of each context yet manages to provide a comprehensive and innovative structure.

6. Scientific and scholarly significance

Our main contributions to this respect are to be found in our findings about:

- Autonomous and self-regulated learning. The role of the teacher is displaced or unsettled with the introduction of a model structured around self-regulated learning.
- *Inquiry-based teaching and learning*. When the pedagogical model shifts, assessment frameworks need to be addressed.
- *Transdisciplinary or interdisciplinary knowledge, links and connections*. DIYLab activities should support inquiry and spontaneity, not create another restrictive structure that competes with the rigid classroom schedule.
- *Digital competence*. Is not only for students! Teachers need training and assistance.
- *Collaborative learning*. The challenge of going from working in a group seen as a sum of parts.
- Opportunities and limitations for anchoring the DIYLab to the curriculum. Building on existing activities and practices has been identified as an optimal way to approach the design of the DIYLabs.

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