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Developing a DIY Lab in Primary, Secondary and Higher Education



Do It Yourself in Education: Expanding Digital Competence To Foster Student Agency And Collaborative Learningy European Commissiony Educations Audiovisual and Culture Executive Agencyy -71400ALLPA4A3541A4AESAKA1MP

UNIVERSITY of OULU
OULUN YLIOPISTO



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Authors

Summary report 2.6. “Developing a DIY Lab in Primary, Secondary and Higher Education”

P2 Authors (Summary report, Local report, University of Oulu):

Antti Peltonen, Mikko Ojala, Paula Airaksinen, Esa Niemi

Collaborators (Local report, Teacher Training school of The University of Oulu):

Kerttuli Saajoranta, Seija Blomberg, Pasi Hieta, Kari Kumpulainen, Terhi Ylöniemi

P1 Authors (Local report, Universitat de Barcelona):

Fernando Hernández, Maria Domingo, Xavier Giró and Judit Onsès.

P4 Authors (Local report, Escola Virolai):

Juana M. Sancho Gil and Anna Majó

Collaborators:

Isabel Beltrán, Ana M. Garcia, Alfred Garrido, Paloma Llaquet, Benet Martin, María José Miranda, Joan Carles Moreno, Alejandro Pérez, María Terea Pérez, Robert Pujol, Coral Regí, Maite Sillero, José Luís Tourón.

P3 Authors: Local report, Charles University/ ZŠ Korunovační (KORUNKA) (P5)

Miroslava Černochová Tomáš Jeřábek

P4 Authors: Local report, ZŠ Korunovační

Tomáš Komrská, Miroslava Černochová

Introduction

This report analyses and summarizes the design of the DIY Lab model in different educational contexts, which are primary school and a secondary school in Finland, Spain and the Czech Republic and two university groups in Spain and in the Czech Republic. The content of the report is based on information, what was collected to five project reports by project partners between July and December 2014.

The report is a summary and a resource for schools and universities, when they implement DIY Lab actions during next phases. With the help of this report the schools and institutions can now compare, and develop their own approach further, towards the core content of the DIY Lab. Because of this the report reflects more the development process than final conclusions. It is neither possible nor necessary to describe uniform DIYLab implementation plan.

The project plan outlines, that the ultimate goal of the project is to support student initiative, collaborative learning, future competencies and lifelong learning. However, these ideas are so general, that actions in the school requires, that the teachers have to plan and think things from more practical perspective..

The four key topics of the DIYLab specification are:

1. What is DIYLab philosophy and what are the pedagogical principles inside it?
2. From the vision to the classroom – What DIYLab means in our school (faculty/university)?
3. The tools, devices and applications etc.
4. Relation between DIYLab and curriculum/syllabus

The topics have been in discussions in five institutions and teachers, principals, faculty staff and university experts have given their contribution to the process.

The framework was discussed also on video meeting (October 2014): “Teachers’ Virtual Coffee Room”, where people from project schools and universities had a chance to meet and discuss. (Picture below.)



Origin of these four topics/themes for this report come from University of Oulu, which is responsible for the summary report. From the start it was known that there is some overlapping and some matters are impossible to categorize into one theme, neither the order of the themes is the only chronological order for the planning. Nevertheless the themes gives broader perspective for the planning and they reflects practical school life as a support for the implementation.

This report summarize teachers' thoughts and ideas from Spain, Czech Republic and Finland. In the report the plans of different countries are not in compared, but the preliminary analysis of the similarities and differences has been brought out as categorization, for clarifying the idea of the DIYLab and national originalities.

E.g. on Spain reports, they conclude the local report: “As reflected in this report, the set of goals of the formation for the introduction of the DIY philosophy in education and the design of the DIYLab have been achieved. The activities undertaken by primary and secondary teachers, the school administrators, together with the university researches, have enabled to concretize the plan of action in its organizational, pedagogic and technological dimensions, which will be put into practice in the next stage of the project (WP4).”

Both Spain and The Czech Republic had also university group as a part of the DIYLab. The frame work in university is very different from primary and secondary school, so these cases are presented separately. However, from the student point of view, the philosophy of the DIYLab rests on individual and personal learning, so the effect of the difference educational level and age is not as big as one may think.

From the organization and faculty perspective the implementation of the DIYLab is challenging, and new course of actions are needed.

1. What is DIY philosophy and what are the pedagogical principles inside it?

This chapter describes, how teachers and university experts have dealt with background ideas, methods and references of “the DIYLab-philosophy”.

1.1. Primary and secondary school (Spain)

The reflections on the DIY philosophy were based on practical examples that illustrated something teachers had learned by themselves throughout their life. The shared experiences were related to personal hobbies like sports and learning experiences both in formal and non-formal spaces. Sharing these experiences allowed us to start exploring some characterizations of the DIY philosophy, such as:

- Learning to know by yourself
- Starting from one’s own interests
- Narrate our own knowledge
- Share knowledge with others
- The interest and the need to focus on motivation
- The presence of failure in the learning process
- Skills and abilities necessary for independent learning.

Based on the discussions the items listed below are considered most relevant concepts:

- Self-knowledge
- Self-regulated learning
- Recognition
- Technology
- Self-confidence
- Learning vs. enjoyment
- DIY Community
- Motivation
- The inside and outside school
- The role of families
- The curriculum
- Evaluation
- Time and space variables

1.2. Primary and secondary school (The Czech Republic)

Six key requirements defined in WP01 were too general for our thinking about DIYLab design, therefore it was necessary to specify our inherent attributes which fit better in the pedagogical approach applied at ZŠ Korunovační and as well enrich it with DIY philosophy. When thinking about a shape of DIYLab at our ZŠ Korunovační we worked on the assumption to integrate DIYLab into didactic and organisational structure of teaching at our school into a conceptual framework of whole school with the aim to develop a current educational model of creative school. A pedagogical DIYLab concept DIYLab at ZŠ Korunovační is grounded

in following specifics that have turned into fundamental features for all activities which will be designed and organized in a DIYLab framework:

- **Self-production**
Self-production of simple aids, direct contact and work with material is really very valuable (looking for solution, inquiry exploration, designing)
- **Information Sharing**
Within carrying out activities information are shared, pupils develop co-operatively common guidelines, pupils design method and technique what and how help junior pupils to learn and to understand some curriculum and schoolwork
- **Self-organization**
Pupils learn and teach mutually each other, they learn also self-organisation and selfstudy (they teach each other, they learn to learn)
- **Testing effect**
Some activities incorporate elements of experimentation and features of piloting (how ideas can be accepted, attractiveness, effects of methods, gaming, etc.)
- **A teacher role: planning**
A teacher designs a procedure for making tools and devices, sharing products and experiences, and s/he organises a „test“ an impact of particular methods.
- **Implementation of new methods of learning**

Into classes there will be gradually implemented learning methods including specific methods directed to:

- the verbal skills – skills to make clear or to comment
- extending vocabulary – improvement and extension of vocabulary
- comprehension – text understanding (searching in text, writing comments, searching by elimination ...)
- learning by heart – mastering learning from memory
- improve concentration – improvement of concentration
- improve learning conditions – improvement of conditions for learning at home and in schools

The school educational program deals with some problems marginally. Within the DIYLab we pursue to extend types of activities which can result an effective learning and deeper motivation. The activities in our school will focus and concentrate on:

- **Creation of products for practice**
To exploit topics and activities of specific subjects in the curriculum (Fine Art, Work Activities, Computing etc.) to produce practicable feasible products, for example a production of learning/teaching aids for junior pupils, to design a procedure or guidelines for more effective learning. Primary school pupils can together with their teachers to assign tasks (Question: Why to we need for improvement of teaching effects?)
- **A new framework for project days**
Project days will be utilized for sharing experiences between classes, for transmitting guidelines and practice, for common experienting, gameplay and playing. We will test a new organisational scheme and concept of project days.

- **Parental involvement**

Application of parental experiences and ideas. We will open up and create opportunities for parents' engagement in all phases of this process (option of topics, tools, procedures; collaboration in a project day) – parent's involvement can serve as a criterion for quality assurance of activities.

1.3. Primary and secondary school (Finland)

Selected online videos, which were visible in local Moodle, were provided by the university, as a pedagogical background for the DIY philosophy. Themes of the videos originate from WP1 and project discussions. We found out that online forum discussions in Moodle were quite limited but the ideas from the background materials were on the table in later face to face discussions between teachers.

Background videos and online links reflect well also the basic pedagogical principles which were exploited in DIYLap plans. However planning and discussion were needed to apply the general pedagogical and methodological ideas to the school. Most of the following videos and materials are in Finnish. Names are translated for this report.

- Links and tips for project based learning and evaluation (<http://www.avoinvirta.fi/?p=61622>)
- Process evaluation as a tool for a teacher, a pupil and peers. (Ministry of Education, 2008)
- YouTube-video: Piloting culture. Sitra, the Finnish Innovation Fund, 2012
- ICT and pedagogical use. SlideShare. Matleena Laakso, 2014
- Article about creativity and learning in school, Helsingin Sanomat 9/2014
- Innovative and developing school by means digital technology. Video. Liisa Ilomäki (<http://www.ede.fi/moodle/mod/page/view.php?id=3612>)
- ICT and new 2016 curriculum. Video. Jukka Tulivuori, Ministry of Education, 2014. (<http://www.ede.fi/moodle/mod/page/view.php?id=3407>)
- Set of pedagogical models and sense of community in online learning. Video. Virpi Pietikäinen, 2014 (<http://www.ede.fi/moodle/mod/page/view.php?id=3284>)
 - Discovery learning. Hakkarainen (1998);Hakkarainen, Lonka, Lipponen, (1999;2004)
 - Problem Based Learning. Poikela, Poikela (2005)
 - Future Learning Environments. Kirsti Lonka (10/2014)
 - Flipped learning
 - ProjectBased Learning
 - Phenomenon-based learning.

1.4. University (Spain)

This sub chapter describes pedagogical elements of the planning process in university. The starting point for the project work in university is quite different, compared to the schools. Organizational structures, academic year, academic syllabus and more “loose” student groups build totally different scenario for DIYLab. Teaching staff has put lot of effort to open-minded thinking and self-reflection to find new and student-centered ways to implement DIYLab-philosophy.

The formation has been recognised by the Institute of Professional Development for Education of the *University of Barcelona*, responsible for the initial and permanent professional development of the teachers. This has enabled the attendance of other university teachers interested in the question. 19

teachers have taken part in the process, eleven of them directly involved in the DIYLab and eight interested in exploring the DIY philosophy in their educational practices.

After a debate regarding the personal experiences of the participating teachers, it was agreed to understand the DIY philosophy as a movement:

- Maker
- Self-run
- Not school-centred
- Not regulated by the institutions
- Anarchic
- It goes beyond the simple fact of sharing hobbies.
- It comes from youth culture
- Based on the interests of the learners
- With the desire to share

Reaching this agreement, in the second block, an approach was made to some of the main pedagogic principles of the project.

1.5. University (The Czech Republic)

Employees of four departments of the Pedagogical faculty UK in Prague (**PedF**) engaged to the preparations of DIYLab activities that are supposed to be realized as a part of the WP03 during the year 2015: IT & Technical Education Department (KITTV), Chemistry & Chemistry Didactics Department (KCHDCH, Fine Art Education Department (KVV) and Biology & Environmental Studies Department (KBIES). **PedF** focuses in its educational activities primarily on undergraduate training of teachers in various subjects for elementary and secondary schools. These departments do not provide only the didactic component but also the subject-specialisation component of teacher training of ICT, chemistry, arts and biology.

The basis for thoughts how to draft DIYLab activities on **PedF** were six key requirements defined in WP01. At first sight, it seemed that the requirements were clear to all regardless the subject focus (biology, arts, ICT, chemistry, etc.). A group discussion showed the need for united agreement of how we will understand and fulfil these requirements within the DIYLab on PedF. By the analysis of specific examples of activities from a variety of fields we came to a conclusion that it is necessary at first to elaborate some of the mentioned requirements more precisely and then establish which of them will be key (main), which complementary and what will be their filling in activities within the DIYLab. Because it can't be managed that every activity designed for the DIYLab would fully fulfil all the six requirements.

Following requirements were established as the key ones. In some cases were more specified possible ways of their filling.

- (1) **Inquiry-based**: it doesn't need to be always strictly an exploratory approach, problem-focused activity of students can be accepted. A degree of fulfilling this requirement is set individually depending on a specific activity.
- (2) **Overlapping into practice**: the activities stress the use of acquired knowledge or developing abilities outside the school or their usefulness in practice or in common life. Therefore, the activity

shouldn't end in itself and be used just for the school purposes, but it should be purposeful for any situations in common life of the students outside the classroom.

- (3) **Requiring self-regulated learning:** student/group/team work independently, they decide on the procedure and pace on their own. They decide on the processing method and they are also responsible for the quality of their outcome and the timeliness of submission. The degree of fulfilling this requirement depends on how much the students work individually, whether they work also outside the classroom and what the role of the teacher is. In the DIYLab activity is the teacher a leader, so can function as a consultant, motivator, contract authority or as a manager of the activity. The DIYLab counts with a high portion of work of the students outside the classroom, or outside the university.
- (4) **Using freely available HW and SW:** maximum effort to meet this requirement. HW or SW shouldn't be a barrier for a realization of the activity. The students will fulfil the activities not only within their courses at the faculty, but especially outside them, so their work shouldn't depend on commercial or licenced SW and HW that they could normally use at the faculty.
- (5) **Requiring cooperation:** the cooperation during the activity usually appears between the students in couples or in small groups. Some activities may require cooperation among the teachers. The cooperation among the students at the faculty may be exercised on three levels:
 - a. within one course
 - b. among courses within one field
 - c. among fields (departments).
- (6) **Supporting the development of digital literacy of students:** the development of digital literacy or the effort for its development is provided by using digital technologies in dealing with the activity. It can be done directly, where the technologies are implemented to the process of dealing with the activity as a necessary, or indirectly, where the students don't need to use the technologies for the activity itself, but they use it for creating an outcome for the DIY Hub (documenting the activity, digitalizing the outcome etc.).

The complementary requirements, those that don't need to be absorbed within each activity, are considered:

- **Including topics from out-of-school activities** and hobbies of students to the teaching. This is not about whatever topics, but the topics that are closely related to the curriculum or to the students' study.
- **Support of cross-curricular relationships** (interdisciplinary overlap). None of the courses of a university study programme is taught in isolation. Nevertheless, from the reasons of organisational, temporal and content demands it is often not possible to realize this requirement fully on PedF.

2. From the vision to the classroom – What DIYLab means in our school?

This chapter collects teacher, student and school related practical things, which are written to the local plans. Generally speaking, we can explicitly read from the all local reports that teachers' voice and concern is related to learning, motivation and goals. New ways of teaching and learning are not that easy to integrate to often very rigid structures of the school life. Especially in university context the classroom and the school should be seen as metaphor to formal education and its boundaries.

2.1. Spain

DIYLab in the 5th grade of the *primary* education

General comments related to both primary and secondary schools.

The roles of the teacher and the student must change. For the participants teachers should:

- Motivate
- Generate new mechanisms to fostering authentic learning
- Have the ability to find answers and teach students to look for them.
- Be formulators of questions and teach students to formulate them.
- Be facilitators of learning situations.
- Be drivers of processes
- Be mentors / guides
- Be role models
- Be managers of students concerns
- Take into account the outside of school contexts - Be generators and facilitators of inquiry-based processes.

It became clear the importance of taking into account aspects such as: self-knowledge, the self-regulated learning, self-confidence, recognition, learning community, motivation and the relationship between inside and outside school.

Regarding the relationships between the different actors involved in the project, attention should be paid to:

- Families – School. It seems essential to achieve a fluid communication between these two groups to foster a sense of mutual trust so that the project becomes successful for everyone.
- Teacher – Student. In the formation process it is agreed that teachers must define and demarcate what should be learnt, and create and design a framework, an environment and dynamics of work. They also should accompany, advice and redirect the learning process when necessary. They are the ones who should provide the tools for evaluating the process, the progress and the results. All that with an open-minded attitude and the disposition to admit and learn from the errors.

Certain degrees of **uncertainty**, that as a controlled and shared feeling can become productive, are accepted. As it is the possibility to **choose** – to take decisions, as an attitude while ensuring the achievement of the minimum required knowledge, but also facilitating students' choice.

In connection with **assessment** the group proposes to pay attention to “what they have learned” instead of “what they should learn,” and distinguish between **perception** (“I think that...”) and **transformation** (“in what they have changed”).

Finally, everybody agrees on the need to find already existing moments and spaces in the in the school in which the student may have a high degree of autonomy. Connecting DIYLab with prevalent aspects of the school culture seems a promising way of guaranteeing its sustainability.

Implementation plans of the DIYLab in Spain are the interdisciplinary projects both in primary and secondary education. According to local report the five basis aspects for the realization are:

1. There must be a basic **focus**.
2. It involves **co-operation**.
3. **Technologies** play an important role, although they do need not be the center.
4. It involves creative decisions, get out of the norm. Adapting, **transforming, experimenting**.
5. It involves feeling as an **author**.

DIYLab will be implemented in the context of two transversal and interdisciplinary projects: “*Tivo Creativo*” (January-March 2015) and “*We geographers*” (April- June 2015).

General Aims

- Experimenting DIY philosophy within the established projects, identifying what have been the key elements in facilitating its development.
- Designing, planning and developing the projects and assess if they have been consistent with the DIY philosophy and if learning has been significant for the students.

Digital skills

- Select, use and program digital devices and their functions in accordance with the tasks to be performed.
- Use the basic functions of editing applications, numerical data processing and multimedia presentations.
- Use software for drawing and editing still images, sound and moving image.
- Search, compare and select digital information considering various sources and digital environments.
- Constructing new personal knowledge through information processing strategies with the support of digital technology.
- Organize and use their personal digital learning environments.
- Conduct virtual interpersonal communications and digital publications.
- Perform group activities using virtual tools and environments for collaborative learning.

The evaluation will be based on rubrics in order to:

- Assess the work process
- Evaluate the final product
- Self-assess the working groups

- Co-evaluate among students

DIYLab in the third year of secondary education

The DIYLab will be implemented within the “*Smart Cities*” (1/2015 - 3/2015) interdisciplinary project which involves languages, natural and social sciences and technology. This project addresses the challenges faced by 21st century cities through classroom activities that pose real or similar situations to the ones found in a modern city.

Aims:

- Work with students the curriculum content of the subjects involved with an interdisciplinary approach to give them unity and coherence.
- Make a motivating proposal for students.
- Help students to develop the basic skills necessary for the formation of autonomous citizens capable of addressing the challenges of contemporary society.
- Help to discover the advantages of self-learning through activities based on DIY philosophy.
- Understand and learn how to use software and hardware associated with the so-called Internet of things (IoT) and its applications in Smart Cities.

Methodology

The activities will be based on DIY philosophy. The student learns while making things. The teacher proposes problematic situations that students must solve through research and experimentation. The teacher accompanies the students’ process advising them and proposing new challenges to help them to improve their learning, showing them, for instance, how breaking a complex task into simpler tasks help to find the solution to the original problem. Students work with cooperative groups to achieve their goals.

Digital skills

- Select, configure and program digital devices according to the tasks to be performed.
- Use text editing applications, multimedia presentations and numeric data processing for the production of digital documents.
- Use basic applications for editing image, sound and moving images in order to produce digital documents.
- Construct new knowledge through personal strategies of information processing with the support of digital applications.
- Participate in virtual interpersonal communication environments and publications to share information.
- Conduct group activities using virtual tools and collaborative learning environments.
- Perform actions of citizenship and personal development, using digital resources of contemporary society.

2.2. The Czech Republic

The internal project scheme facilitates to involve all pupils of *lower secondary school* (aged in 11-15), i.e. about 80 pupils, and all pupils of *primary education*, i.e. about 250 pupils in a specific way.

The School Educational Program enables in subject Fine Art, Labor Activities,

Informatics to make a choice of topics by a teacher and pupils, by all means subject fields follow out. For example observation of natural forms linked to drawing, painting or frottage enables to produce aids for younger pupils to learn Science. In most cases it will contribute to content enrichment by new form of work.

A schedule of each activity can take on school year at most (the 2nd term of 2014/15 and 1st term of 2015/16), although the activities will be supposed to take a few weeks up to one term from the organisational point of view in a frame of a school year and efforts to approach to activities like to projects.

Activities themselves can differ from a didactic and organisation point of view, for example in criterions of quality assurance, time length. A special attention will be given to monitoring and assessment of improvement in digital literacy according to following four principles:

- Choice of a tool
 - Choice of tools for a assignment performance (Question: Why did you choose just this digital tool/device?)
- Suitable tool
 - Pupil can operate a tool, s/he masters a competence to use it (Question: Will be the digital tool/instrument really the most suitable for the activity?)
- functions and limits tools
 - Pupil looks for another appropriate tools for particular phases of the activity (Questions: Could you apply co-operation with othe schoolmates? If the tool is available, what are its functions and limits?)
- I'm learning a new tool
 - Pupil can choose a new tool (Question: Is it for him/her and for the activity appropriate? How can you discover if the tool is appropriate? How can you learn to master working with it?)

Example (described from a pupil's point of view): "***I am designing a picture quiz***"

I can use standard tools which I master to work with them: text-processing, digital camera – the outcome will be a text document. Or I can search for a new tool, in such a case for a special SW for designing quizzes (for example Smart Notebook etc.)

An evaluation of improvement of digital literacy competence pursues a following process:

- Did a pupil need a new tool for the activity?
- Did s/he look for a new tool independently?
- Did s/he find for an appropriate purpose a tool which meets DIYLab requirements and criterions?
- Did a pupil master the tool?
- Did the tool serve its purpose and role, was it really available?
- Did the whole process have a collaborative quality?

2.3. Finland

Theoretical and methodological framework of the DIYLab was well accepted but from this point forward, teachers' way of thinking was surprisingly straightforward towards the implementation. The challenge was, and will be, how to maintain innovative approach in a pressure of school routines and boundaries of the curriculum.

However, teachers creatively convert the theory into practice via goals and questions to students, like:

- "Where am I good at?"
- "What I already know well?"

According to the teachers', the motto of the project "Do it yourself" should be extended to: **"Help me to do it myself!"**

One challenge in teacher training school is that the teaching what combines subjects, requires cooperation between the teacher of the didactics, who usually observes and guides only one subject and its lessons. However, the new curriculum 2016 emphasizes transdisciplinary knowledge and this may renovate also practices of the teacher training. In this sense DIYLab is in line with the future.

Several comments from the meetings express concern how to handle and arrange the situation in a class size group:

It's a challenge to get rid of a conservative teaching culture. Digital surroundings gives freedom to teachers and learners (although digital tools are equipment. - Not a method) so that teachers can devote more time to the weaker students of the group.

In primary school it is not easy to guide pupils to do things by themselves. There is all the time an effort to promote team work.

In secondary school, a school day is made up from school subjects and lessons, different teachers in each. DIYLab teachers put a lot of effort to combine lessons and subjects and this naturally generated co-operation between teachers.

Teachers thought, that it is important to involve parents to the project, but so far the ideas and plans are related only to informing.

Both teachers and principals of the schools consider that the best way to plan DIYLab actions is to start with pupils, classes, timeframes, subjects and other concrete things. Starting point of the university experts were more from theory and methods to practicalities. Differences on approaches did not mean conflict with pedagogical or philosophical approach of DIYLab, more like that teachers wanted to ensure that plans are feasible and DIYLab actions are sustainable. We believe that the teachers have a clear vision about DIYLab pedagogy and ideology.

Arising from that starting point, principals face the challenge, how to encourage the teachers to think innovatively and even break boundaries if needed. Another big challenge is make the new actions possible, regarding timetables, rooms and other resources.

Primary school DIYLab activities. (Timeframe: March - May 2015):

- Theme 1: **"Force" –Thematic school subject integration**
(Crafts, Physics and chemistry, Mother tongue and literature, Music, Finnish as a Second

Language, English)

Class: 5A, 5B

Teachers: *Terho Granlund, Matti Mikkonen, Hanna-Maija Heikkinen, Helena Nissilä*

Secondary School DIYLab activities. (Timeframe April-May 2015):

- Theme 2: "**Europe yesterday and today**" (Geography, History)
Class: 8C
Teachers: *Juha Wedman, Matti Ojakoski*
- Theme 3: "**Traffic -Behavior, road safety, environmentalism**"
Class: 8B, 8C
Teachers: *Hanna Tuhkanen, Terhi Ylöniemi, Hellevi Kupila, Riikka Kiiveri-Raappana*
- Theme 4: "**North-America and immigration throughout history**"
Class: 7B
Teachers: *Katrimaija Lehtinen-Itälä, Virpi Sivonen-Sankala*
- Theme 5: "**Light as wave motion**" (Physics)
Class: 7B
Teacher: *Eero Ijäs*

2.4. University (Spain)

This was one of the most debated points of the formation. Initial questions arose about the characteristics of the DIY philosophy, important for the implementation of the project and a core of doubts were also identified: *how to articulate an innovation generated openly and take it to a controlled institution*. In this setting the following questions were approached:

a) Initial questions:

- What does the DIY concept in the university mean for us?
- How do we move something developed in the sphere of youth culture to the University?
- How is the DIY philosophy in the University embodied?
- What pedagogic implications can it have?
- What can we do with the current structure of the university?

b) Important features of the DIY philosophy for its passing to the institutions and pedagogic application:

- **Creativity:** What do we understand by creativity? Transformation, appropriation, authorship, etc.
- **Collaboration:** *DIY together.*
- **Self-regulation:** it seems to be the less worked feature in the university, since the university system does not usually consider it. It is linked to problems related to the compartmentalisation of the syllabus and evaluation/self-evaluation.
- **Technology:** intensive use of technology, which must not only consider digital technologies, but also analogical, artefactual and symbolic ones.
- **Explain and share:** interest in explaining to others what I know and sharing it.

These features are already worked on in some university classrooms, although generally separately, something that generated new questions:

- What is really done so that we can say we are developing a project based on the DIY philosophy?
- How can all the characteristics enounced in educational projects be fitted into an institution?
- How can we promote a genuinely DIY philosophy into our courses?
- What is distinctive about the DIY philosophy that can help us promote both the students' and our own learning?

All the above led us to formulate the contradiction mentioned above in the following terms:

c) The core of the doubts

If we try to introduce a learning philosophy that comes from a spontaneous and self-run movement into an institution that does not usually favor self-regulation, will the institution *swallow up* the DIY philosophy and turn it into an *as if*, into a sham, or will the DIY philosophy be able to transform the university?

Thanks to the debate, we could see that the participants had the sufficient tools, arguments and experiences to take on and attempt to confront this contradiction:

- Through the creation of new frameworks of action: learning environments and projects.
- Guaranteeing that the teacher also participates in the project. Something that deactivates the role of *I command and you do*.
- Boosting the capacity of the student to choose what, why and how they want to work.
- Guaranteeing not to work with school-centred formats.
- Questioning finalism.
- Recognising the need for a process of preparation of the students, before starting the projects, understanding that one reaches DIY, does not come from it, nor is it imposed.

Implementing the DIY philosophy in the university serves as a trigger to: help find spaces, advance in ideas we already have, and even reach and do things that we did not know or expect (Atkinson, 2011). But it is also necessary to be aware that to develop a project with DIY characteristics it is necessary to follow a process and that perhaps not all students can achieve it.

The tension between suggestion and interest

We know that in general teaching goes top down. It is assumed that teachers have to propose subjects with disciplinary marks and pre-established concepts that the students have to learn. However, would it be possible to find a point of contact between that which has to be learnt, how it must be learnt, and the interest of the students?

This reflection, posed by one of those attending the formation, was specified in the following question:

Is it possible to start from the interest of the students when undertaking a project in the classroom?

Which generated a debate about the importance of:

- Teachers thinking of themselves as creators of circumstances.
- Boosting the trust between student and teacher to back the project: trust – motivation – involvement – choice – motivation.

I believe the teacher develops a type of multi-coaching, because as with some students the subject-interest connection can be quite immediate (as regards the contents), in others the interests must be looked for or awoken in other dimensions of the person.

- Connecting the inside and outside of the university.

Our challenge is to connect their world/life outside the university with that inside. The outside one is more important, more meaningful, has more relevance and, in short, is the one that matters. If we could ensure that every subject was linked to their daily experience it would be a success. In other words, that each subject gives an answer to each of their concerns... • Favouring interrelations between:

- Limits / freedom / uncertainty

I think the trick is to leave a margin where [the students] can include their own interests on the condition they want to. What we need to ask as teachers is how much margin we are prepared to give.

- Having / wanting, understanding by having what I already know; and by wanting what makes it possible for me to learn what I don't know.

One of the challenges of university teaching is to generate more possibilities for learning about what is unknown (Atkinson, 2011).

In short, the DIY philosophy in university learning means:

- Sharing.
- Forming part of a horizontal learning community,
- Questioning the idea of *expert* and tending towards *doing it for oneself* (with others).
- Critical capacity: questioning the syllabi, including my questions in them, etc.
- Authorising oneself within the discourse: from considering oneself not being an expert, from the need to learn.
- Deconstructing the power that decides what has to be studied.

Implementation plans of the DIYLab in the university

The analytical and collective reflective path taken has enabled us to outline the pedagogic and technological specifications for the implementation of the project in the university.

Guidelines have also been specified so that the teachers and students can follow and evaluate digital competence during the implementation process.

It is important to take into account the prescriptive and segmented character in subjects (basic, obligatory and optional of between 3 and 6 credits) of the formative syllabi. In the University of Barcelona the Teaching Plans are prepared several months before starting classes and must be approved at Departments and Faculty levels.

This situation makes it practically impossible to propose transversal and interdisciplinary projects that bring the students closer to real problems in their fields of study, and which can connect and broaden their interests better. This has meant that only in the Social Education degree where there are three

teachers who share in different courses, has it been possible to propose a transversal strategy. Specifically, the DIYLab will be implemented in the following subjects (table 2):

SUBJECT/S	DEGREE	TEACHERS	STUDENTS
Environments, processes and technology for learning	Pedagogy	3	70
Communication in Education	Pedagogy	2	50
Teaching and learning in the digital society	Pedagogy	2	50
Digital and visual culture in socio-formative processes	Pedagogy	3	30
Contemporary Visualities	Fine Art	2	50
Psychology of art and gender studies	Fine Art	1	30
Musical Dynamism	Primary Education	1	15
External practices I Didactic foundations Uses, possibilities and limits of technologies in social education	Social Education	3	70

Scenarios of implementation of the DIYLab in the University of Barcelona.

Despite this syllabus availability all these subjects share a conception of teaching and learning based on:

- Self-regulated learning.
- Autonomous learning.
- Collaborative learning.
- Meta-reflection.
- Transference.
- Evaluation of the learning.
- The use of all learning tools and resources (digital or not) available and relevant in each case.

In all the subjects the students do research-based projects in groups that articulate their goals and contents. The DIYLab will incorporate the process of production, reflection and transference linked to these projects.

Base for the implementation of the DIYLab

The scenarios of implementation of the DIYLab are adapted to the framework of the subjects but have five base points as regards what the DIY philosophy involves in education:

1. The idea of a focus of interest.
2. Collaboration.
3. The fundamental role of technologies, although they do not have to be the main focus.
4. Creative decisions, breaking the mould. Adapting, transforming, experimenting.
5. Feeling like an author.

In all the cases:

- The students will be introduced to the DIY philosophy and the DIYLab project.
- The importance of sharing their own learning processes will be valued.
- It will be suggested that they share a multimedia production individually or in group.
- That this production reflects what they have done, how they have done it and what they themselves have learnt.

The strategy to use will be:

- There will be an introduction to the project at the beginning of the subject.
- It will be pointed out that they are collaborating on a European project of innovation.
- They will be given recognition for their collaboration.
- The importance of visually documenting their processes will be emphasised.
- It will be proposed that they link it to one of the research-based projects done in the different subjects.
- The importance of feedback and accompaniment by the teacher will be stressed.
- It will be clarified that the intellectual property belongs to the authors and an ethical agreement will be established.
- The criteria of evaluation will be shared.

So that the productions of the students to be included in the DIYLabHub must comply with the following minimum conditions:

- Last for a maximum of five minutes.
- Their content has to be comprehensible for a person not connected with the project.
- Have a visual component.
- Move between the descriptive and the reflective.
- Have a story board as a base.
- The title and author or authors are specified.
- Have a summary.
- Be subtitled in English.

“University project on Social Education” (Transversal strategy)

“External practices I” (3rd course)	“Uses, possibilities and limits of technologies in social education” (1st course)	“Didactic Foundations” (2nd course)	ALL
From their practices emerge “histories”. Choice of cases	Visualisation and publication of the case.	Work on the case	Presentation of the cases prepared, reflection: possibilities limits, proposals for improvement.
Joint reflection. Preparation of scripts.	Between experiencing and recounting: reflection about the languages, possible tools for the production of the cases.		
Compilation of visual material for the contextualisation of cases. Images of daily life.	Visualisation of examples. Presentation of tools.	Elaboration of the story board or graphic script. Production and edition of the material.	
ALL: compilation of the process	Elaboration of video-personal diaries. Recording of some sessions. Photographic registry. Virtual space to share cases, comments, doubts and reflections.		

Articulation of the work in the three subjects of Social Education degree.

The diffusion of this stage of the project

As we have progressed, the fact that the formation is done as an activity of professional development of the Institute of Professional Development for Education of the University of Barcelona enabled the attendance of any university teacher interested in the question. So a teacher from the University of Cuenca Ecuador, who is working on a doctorate, also thought about a scenario of implementing the DIYLab for pre-professional practice in the teacher training course for maths and physics at his University. This teaching and learning perspective can contribute, on the one hand, to the learners increasing their knowledge, getting up to date, and undertaking proposals about their needs as a teacher; and on the other hand, to collect information from the schools that enables the degrees to develop research and feedback their activity for purposes of accreditation.

2.5. University (The Czech Republic)

The DIYLab activities are going to be dealt with the students on **PedF** within compulsory or optional courses provided by the departments. The activities are going to be a part of these courses; students can work on them not only at the faculty, but also outside. Students are supposed to work on the activities mainly outside the classroom. The outcomes will be parts of assessed tasks, in most cases necessary for successful completion of the course. Some activities may be solved also within various compulsory or optional excursions organized by the departments.

DIYLab activities are going to be dealt with within one-semester courses; it means they shouldn't exceed one semester. In the form of a week or two-week excursions the time allocation may be much smaller.

Solving each activity will always require a cooperation of students (at least a team of two) whereas the distribution of roles and responsibilities will be let primarily to the students themselves.

The DIYLab activities will be parts of students' assessment. Therefore, it is necessary to deal with it, by whom and how the work will be evaluated. No general framework for students' works assessment can be established; it will depend always on a single activity. The assessment can come from the teacher, or in case of an interdisciplinary cooperation from more teachers; in some cases the assessment can come from the side of the students themselves.

A great attention will be paid to a contribution rate of the activity to improve digital literacy of students. We will use several methods including a questionnaire for monitoring and exploring the level of digital literacy achieved by the students.

3. The tools, devices and applications etc.

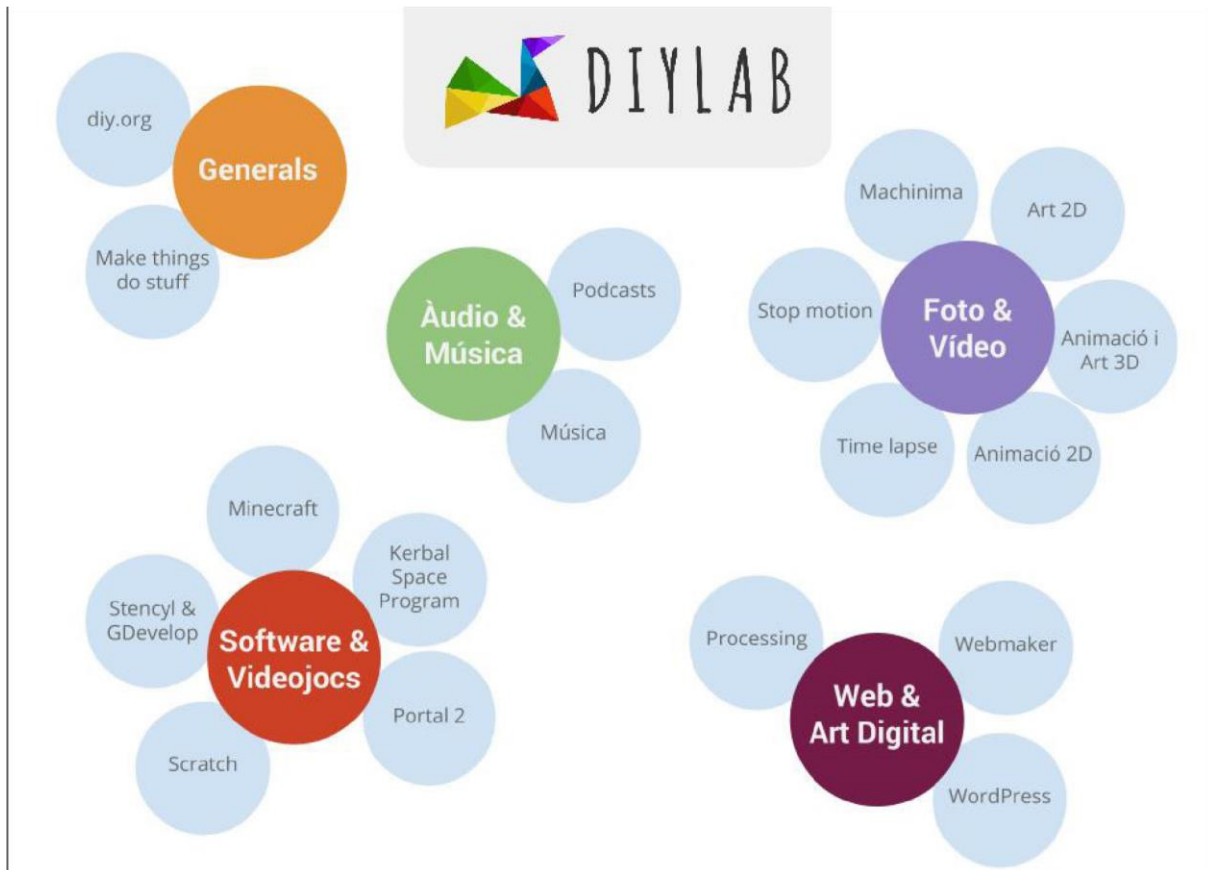
In some cases it is very difficult to list just tools or application, because the pedagogical use may vary in a huge scale. In most cases the teachers have already thought the scenario of usage and that naturally lead teachers to think possible challenges to the learning situation. However, many of the digital tools are open in nature and the final use and the context will be decided by the student.

3.1. Spain

The current policy of the school is to use Open Source resources. Specifically, the school is committed to working with all *Google apps* and services offered, as it covers their needs: a collaborative tool, with automatic updating and free. In general, teachers do not deeply know any particular application but, as revealed in WP1, all of them try to use the ones needed to undertake their daily work. The general feeling, given the vastness of the current possibilities of digital tools and resources, is of the disorientation.

In this discovering context a general vision of the existing resources (see image 1) and a document that detailed how each of them could help create DIYLab projects was offered. For example: a) photography and video resources (Stop Motion, Time Lapse, Machinima, Animació 2D, Art 2D, Animació and Art 3D); b) audio and music resources (production of podcasts, musical production); c) software and video games (Minecraft, Kerbal Space Program, Portal 2, Stencyl and GDevelop, Scratch); d) web production and digital art (Processing, Webmaker, WordPress).

The group decided to take an in-depth look at three of the tools proposed: *Stopmotion*, *Webmaker* and *Wordpress*. In point 4 are specified the digital applications that are intended to be used in the implementation phase of DIYLab.



Summarising map of some possibilities of tools and resources.

Implementation plans for *primary* school projects highlight following tools and resources (Spain)

- Laptops
- Tablets: applications such as video, audio, image, QR
- PDI
- (Common) drive to work cooperatively
- Padlet as a portfolio or PPT to make presentations
- Word as word processing
- Google, as Internet search

Implementation plans for *secondary* school projects highlight following tools and resources (Spain)

- Internet search engines.
- Google Apps (Sites, Drive, Gmail) as collaborative learning tools.
- Video Editing Tools.
- Code Academy: <http://www.codecademy.com> (platform for independent learning of computer programming).
- Raspberry Pi: <http://www.raspberrypi.org/> (mini-computer specially adapted for applications of Internet of things).
- Sensors and actuators.

- Sentilo: <http://www.sentilo.io> (platform for monitoring sensors and actuators used in Barcelona)

3.2. The Czech Republic

The school ZŠ Korunovační has following facilities and equipment:

- HW: network of 25x PCs, 5x IWB, 2x visualisers, 3x digital cameras, 2x tablets
- SW: standard SW applications (MS Office, Photoshop elements, Irfan View, Zoner Calisto, Smart Notebook etc.)

Other free available SW which we would like to use newly in the DIYLab and to test its functionality and efficiency at the school:

- Slideroll Gallery AV 0.92b2 – Publishing of videos and photos on the Internet by flash animation
- UberIcon 1.0.3 – Animation of icons by various graphics effects
- JavaScript Animator Express 1.10 – Creation of simple animations for web based on GIF or JPG pictures
- Sqirlz Morph 2.1 – Smooth animated transitions between two or more pictures or photos
- Wink 2.0 #1000 – Creation of simple guides (tutorials) and presentations
- UnFREEz 2.1 - Easy creation of animated GIF files
- Qedoc Quiz Maker 2.0.3 – Creation of professional quizzes for knowledge tests Foto2Avi 4.2 – Creation of videos in formats AVI, MPEG or FLV based on own pictures and digital photos
- SViGio 1.289 – Creation of flow diagrams, graphs and other vector graphics in SVG format
- CU3OX – Creation of flash 3D animations not only for web
- Math3D 1.0 – Application for comfortable visualisation and interactive manipulation with 3D mathematical objects
- Falco GIF Animator 3.5 – Easy creation of animated GIF files
- Powerbullet Presenter 1.44

Particular attributes of individual SW which can be used will be specified for each DIYLab activity.

Mutual collaboration will proceed under support of publishing system Webgarden, principally in support of pupils and teachers across school subjects and within of certain activities. This system is used in ZŠ Korunovační in a free available version for publishing information for parents.

3.3. Finland

Both schools have quite good ICT-infrastructure and it will be used widely in activities.

Teachers have also made plans to get the work process and product documented by videos and photos, bearing in mind that the practices will be shared through DIYLab hub.

Primary School ICT-infrastructure, which is available for the activities

- Computer class rooms (PC for every pupil.)

- iPad tablets for one class (Bookable for lesson use. Specific Apps can be bought if needed. Several already available, like iStopMotion. on ten tablets)
- School web portal for information
- WiFi-network available
- Google Apps For Education

Secondary school ICT-infrastructure, which is available for the activities:

- Computer class rooms
- 32 iPad tablets (Bookable for lesson use. Specific Apps can be bought if needed.)
- School web portal for information
- WiFi-network available
- Google Apps For Education

Primary school project “Force” contains mechanical and technical materials and digital actions and there is a good possibility to develop and observe DIY-approach, what combines both worlds.

3.4. University (Spain)

Technologies, and not only digital technologies, have a leading role in the DIY philosophy. Nevertheless, the fact that the project is linked to the development of the technology and the digital competency has involved the need to explore its immense possibilities.

Taking into account the current massive development of digital technologies and the multiplicity of possibilities, applications and resources available, the generalised feelings among the teachers are:

- Disorientation
- The need to be up to date but without stress.
- Group work as a strategy to get further.
- The combination of different resources in order to be able to achieve the objectives.

Although a major task of exploration has been done by the participants, and starting off from freedom as a characteristic of the DIY philosophy, the idea is that the students can also decide on the tools they wish to use, according to what they need to explain.

In the formation we offered a general vision of the existing resources and a document that detailed how each of them could help create DIY projects. For example:

- a) photography and video resources (Stop Motion, Time Lapse, Machinima, Animació 2D, Art 2D, Animació and Art 3D)
- b) audio and music resources (production of podcasts, musical production)
- c) software and video games (Minecraft, Kerbal Space Program, Portal 2, Stencyl and GDevelop, Scratch)
- d) web production and digital art (Processing, Webmaker, WordPress).

3.5. University (The Czech Republic)

Within the DIYLab mostly standard and generally available SW and HW will be used. The HW equipment will be the commonly used one or there should be an adequate alternative (e.g. camera and tablet with camera). Specific cases count with special equipment (e.g. use of digital microscope); nevertheless, it can be assumed that this equipment is available in other universities or workplaces. Within SW it counts with Freeware or Shareware licences, or trial versions – it means a SW with a zero cost.

Even though, KITTV has computer classrooms with professional SW equipment for various ICT use, the stress will be paid on finding adequate alternative SW satisfying necessary needs of the students.

Within HW it is expected to use other devices – not only the typical ones (scanner, data projector etc.) if the department in the project owns at least one piece of this equipment: digital camcorder, digital camera, (stereo) microphone, dictaphone, tablets (iOS, Android), digital microscope, BAT detector.

As a support of a collaborative approach to learning and the students' cooperation itself can serve a Moodle that has been used on PedF recently as a support of full-time and distant form of study.

Within the DIYLab on PedF it is being considered that each activity will be recorded for documenting its process. These records, except publishing on the DIYLab Hub, can be used for the overall assessment of the DIYLab on PedF.

Characteristics of outcomes (closely related to digital tools)

The students' activity will lead to a creation of teaching / learning materials that will be published as a digital object on the DIYLab Hub, so that everybody interested in the particular issue have a free access to them. These outcomes may have a diverse form. Even though, the final restrictions will come from the side of the DIYLab Hub and its technological capabilities, we count with the following possible outcomes (those are just an inspirational examples).

Digital competency of the student are noticed in evaluation. Also the quality of the student's digital output is counted, which is important because requirement level of the digital tools varies.

- video record (e.g. video tutorial)
- set of photographs / graphics (e.g. art gallery)
- audio record (e.g. podcast)
- study or methodological text, manual
- lesson plan
- outcome of the SW (e.g. models, objects for IWB, created programs, meta files of applications)
- webpages, presentations (PPT, Prezi etc.)
- web applications
- an access to an experiment in a distant laboratory (e.g. stream from a camera, data from a GPS)
- database
- on-line course
- project documentation of a technological solution of a problem (e.g. a draft of an experiment for a distant laboratory)

4. Relation between DIYLab and curriculum – How the actions we have planned, supports the goals of the curriculum

The directive role and specificity of the curriculum varies in project countries, but it seems that the curriculum is very natural support to teachers. In some cases, even preliminary visioning was unintentionally directed by the curriculum. We can say that planning of the DIYLab was a bit contradictory task for the teachers, but the honest goal of the teachers seems to be to implement the idea of the DIYLab in sustainable and practicable way, with in the frames of the local curriculum.

4.1. Spain

In order to determine the specifications for the implementation of DIYLab in the classrooms, the first step was to locate possible scenarios. The goal is to take advantage of the flexibility allowed by the current curriculum and locate existing moments and situations. To encourage reflection the following questions were raised:

- How to visualize this implementation?
- What conditions are needed to be able to promote this philosophy?
- The type of curriculum we have now is the more convenient?
- With the school organization we have now, what can we do?
- What would we do with other conditions?
- What else do we need?

The goal is to be able to respond to the following aspects:

- WHERE: at what times and in which contexts of the syllabus would we implement the DIYLab?
- WHERE: what timing do we forecast: continuous hours, fractioned time, specific moments, etc.?
- HOW: ideas about how the project can be implemented.
- WHO: who should be involved: one teacher per classroom, several, external agents...
- WHAT: what we need to be able to work. What tools and resources.
- EVALUATION: how we envisage it.
- DIFFICULTIES AND ADVANTAGES: of implementing the project in the university.

From these premisses it was possible to make a first draft of the scenarios.

The teachers have thought both ideas of the DIYLab and the framework of the curriculum, but adjusting to the school subjects and school schedules requires flexibility. Activities of the planned school projects is thought as follows.

Related to Social Sciences

The learning experiences will be based on the idea that a city is not more than a community in which its members must establish relationships based on respect, harmony, tolerance and all those values we declare as basic and invulnerable.

Related to Natural Sciences

The activities will be based on the premise that cities have to take into account criteria for health (e.g. have facilities that enable the sport at various levels), the environment, energy and mobility.

Related to Technology

Students will learn the programming language Python that, on the one hand, it is easy to learn and, on the other, has infinite possibilities of application. To learn the basic syntax of language the platform Code Academy (<http://www.codecademy.com>) will be used. It allows self-learning based on an interactive and auto-corrective course where the teacher can follow the evolution of the learning process.

Related to Foreign Language

From the Department of Foreign Languages, and considering that the resulting products will be shared in DIYLabHub where the lingua franca is English, it has been proposed that part of the final product is a report (presented orally or in writing in English) where students explain the objectives and content of their projects, make a reflection on the process and evaluate their own learning.

Related to Languages and Literature

The development of the communicative competence will be fundamental. In addition, teachers and students will take advantage of the fact that literature has masterpieces of cities as protagonists, what is a magnificent way of exploring them.

Evaluation

The evaluation will be performed through rubrics. The evaluation process consists of three phases: peer evaluation, self-assessment and assessment by teachers.

Final products

Students will prepare a final report of the project and will make a public presentation to the families and guests where they will show their findings, display the artefacts built and explain their learning processes. The use of English as the language of communication will be encouraged.

4.2. The Czech Republic

The planning of DIYLab has taken into consideration the curriculum practically in all stages, in a ways that the teachers have planned the action bearing in mind the present school frame work, like subjects and target groups. The approach is, that the accordance with the curriculum will be checked in activity design and its

For teachers, there is already a draft of the structure for DIYLab activity description ("Guideline for Authors"), which has been prepared in order to ensure uniformity and implementation of all required organisational demands. One of the main points is related to accordance and connections with the curriculum.

- I. Name of the activity (Czech, English)**
- II. Motivation for pupils** (key question which will motivate pupils to participate in the activity)
- III. Number of pupils in the activity**
- IV. Connection with the activity**
- V. Character and features of the activity**
- VI. Accordance with DIY principles** (interdisciplinary relations, inquiry based learning, sharing and collaboration, etc.)
- VII. Accordance and connection with the curriculum**
- VIII. Practicle utilization of outcomes** (where, in which subject and in which class)
- IX. Activity description**
- X. Technologies** (tools, previous and expected dskills, choice of a new tool)
- XI. Time-schedule**
- XII. Course** (What process of activity is expected?)

4.3. Finland

Because of the sensible and practical approach by the teachers, plans for the DIYLab actions are within the frames of the current curriculum. The curriculum in Finland is relatively free, concerning e.g. methods, so it is quite easy to blend DIYLab ideology into work, even though the curriculum dictates the topics and the core contents.

One big incentive to DIYLab work is that Finland is right now in a process to reform the national Curriculum. The new curriculum in 2016 opens the possibility to explore new ways to teach and learn. Related to that big change and DIYLab, teachers have had several discussions what should be taught and how. If one reflects the philosophy of the DIYLab into seven dimensions of a broad based competence, it is easy to see that the tone of the curriculum and DIYLab are in balance.

1. Thinking and learning to learn
2. Cultural competence, interaction and expression
3. Looking after oneself, managing daily activities
4. Multiliteracy
5. ICT competence
6. Competence required for working life and entrepreneurship
7. Participation, empowerment and responsibility

The new coming curriculum gives a good direction to the DIYLab activities but it has to meet also the requirements of the current curriculum. Many of the content related things are binding and even legal protection of the students requires attention and all actions have to happen in these frames.

4.4. University (Spain)

Throughout the formation the DIYLab was related to the syllabi of the different subjects, suggesting possible scenarios and proposals for implementation. The doubts that arose were:

- How can the project be fitted into the current Teaching Plans?
- What should the results be?
- What processes/knowledge will be shared through the DIYLabHub?

- Is it necessary to clarify the context?
- How and what should be evaluated?
- How can the inside and outside of the classroom be related?
- How can a group idea be constructed?

The goal is to be able to respond to the following aspects:

- WHERE: at what times and in which contexts of the syllabus would we implement the DIYLab?
- WHERE: what timing do we forecast: continuous hours, fractioned time, specific moments, etc.?
- HOW: ideas about how the project can be implemented.
- WHO: who should be involved: one teacher per classroom, several, external agents...
- WHAT: what we need to be able to work. What tools and resources.
- EVALUATION: how we envisage it.
- DIFFICULTIES AND ADVANTAGES: of implementing the project in the university.

4.5. University (The Czech Republic)

Relation to syllabus is handled in a way of “the guidelines for the activity design”. These guidelines are mainly didactical but they also point out formal things what teachers and authors have to take account. To sum up one can say that the structures of the syllabus are rigid and slow to change but teachers' methods and innovative thinking may give enough space to apply DIYLab ideas to university studies.

Instructions for an activity design and its structure (Guideline for authors)

I. Name of the activity (Czech, English)

II. Introduction

Introducing the activity to students, gaining their interest in the issue. In this part of a description should be mentioned how to gain students' attention, how to raise their interest in solving the problem and realize the activity. Students should know what the problem looks like and why they are solving it. It is important to clearly set the task and formulate the main question of the activity.

III. Target group

A successful solving the task in time often assumes certain knowledge, experience and skill from diverse fields. The activity may not be suitable for everyone. It is necessary to mention the target group that the activity is suitable for (age, level of study, field of study, etc.).

IV. Task

A description of the activity contains a formulation of a task including an explanation of the aim. The task says what exact results the students should come to when solving it. If the students perform different roles within the activity, it is necessary to characterize these roles, describe the focus of each role, the responsibility of the actors and the way the results of their work will be linked, shared, submitted and evaluated. In case of full responsibility of the students while establishing the roles, it needs to be specified how the work of each student will be evaluated.

V. Process

The process describes main phases of solving the task. It may include a detailed schedule of work. A time allocation for the activity needs to be set.

VI. Outcome

In this part of the activity description are defined the outcomes, formal requirements of each outcome, their parameters, type and form in which they will be published on the DIYLab Hub. It can include criteria for an acceptance of outcomes as a solution of the activity.

VII. Evaluation

Here should be criteria for the evaluation of students' participation on the work and a quality of its outcomes. The student should understand the way of evaluation of the outcomes and procedures.

VIII. Conclusion

Here it is necessary to mention how the activity will be assessed, what to say to the students at the end of the activity, how to close it and include its results to the context of studied issues.

IX. Credits

How is the work of the students going to be marked?

X. Specification of the activity focus according to the DIYLab requirements

Definition by range: 0 – none, 5 – maximum:

Cooperation	Research focus	Cross-curricular relationship	Support of digital literacy	Relationship with the curriculum	Self-regulating the activity
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The references what were mentioned in local reports:

Spain:

- Atkinson, Dennis (2011). *Art, Equity and Learning. Pedagogies Against the State.* Sense. Rotterdam.
- Guzzetti, B. J., Elliott, K. & Welsch, D. (2010). *DIY Media in the Classroom: New Literacies Across Content Areas.* New York: Teachers' College Press.
- Kafai, Y. & Peppler, K. (2011). Youth, Technology, and DIY: Developing Participatory Competencies in Creative Media Production. *Review of Research in Education*, 35, 89–119.
- Kamenetz, A. (2010). *DIY U: edupunks, edupreneurs, and the coming transformation of higher education.* White River Junction, Vt.: Chelsea Green Pub.
- Knobel, M. & Lankshear, C. (eds.). (2010). *DIY Media: Creating, Sharing and Learning with New Technologies.* New York: Peter Lang Publishing.
- McKay, G. (1998). DIY culture: notes towards an intro. In G. McKay (ed.), *DIY Culture - Party and Protest in Nineties Britain* (1-53). London: Verso.
- Spencer, A. (2005). *DIY: The Rise of Lo-Fi Culture.* Marion Boyars Publishers.

Finland:

- Links and tips for project based learning and evaluation
(<http://www.avoinvirta.fi/?p=61622>)
- Process evaluation as a tool for a teacher, a pupil and peers. (Ministry of Education, 2008)
- YouTube-video: Piloting culture. Sitra, the Finnish Innovation Fund, 2012
- ICT and pedagogical use. SlideShare. Matleena Laakso, 2014
- Article about creativity and learning in school, Helsingin Sanomat 9/2014
- Innovative and developing school by means digital technology. Video. Liisa Ilomäki
(<http://www.ede.fi/moodle/mod/page/view.php?id=3612>)
- ICT and new 2016 curriculum. Video. Jukka Tulivuori, Ministry of Education, 2014.
(<http://www.ede.fi/moodle/mod/page/view.php?id=3407>)
- Set of pedagogical models and sense of community in online learning. Video. Virpi Pietikäinen, 2014 (<http://www.ede.fi/moodle/mod/page/view.php?id=3284>)
- Discovery learning. Hakkarainen (1998); Hakkarainen, Lonka, Lipponen, (1999;2004)
- Problem Based Learning. Poikela, Poikela (2005)
- Future Learning Environments. Kirsti Lonka (10/2014)