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Innovating Professional Development in Compulsory Education

*Examples and cases of
emerging practices for
teacher professional
development*

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Foreword

Teacher Continuous Professional Development (CPD) is known as one of the key determinants for improving the quality and relevance of education and learning. There are, however, quite a number of barriers and limitations to effective professional development and learning among teaching professionals.

This Technical Report provides first analysis of 30 examples of innovative and emergent practices of teacher professional development that have evolved as a “workaround” to overcome the known barriers and limitations that teachers face when aiming to improve and innovate their practices. It provides descriptive narratives of examples and a number of in-depth case studies along with details of the methodology applied. This Technical Report will be accompanied by a second report called *“Innovating Professional Development in Compulsory Education - An analysis of practices aimed at improving teacher professional development”*.

Education systems attach increasing importance to the quality and professionalism of their teachers. They recognise that teachers are learners too, at all stages of their careers. Investing in relevant, effective and accessible professional development is therefore an element of making careers in teaching more attractive and sustainable – which is a current focus area of EU-level exchanges on school policy. Traditional formats, such as courses and seminars, often organised away from school, are increasingly complemented with other forms of delivery. The examples in this report show how collaborative and school-based formats, often supported by new technologies, offer great potential to take the professional development of teachers to another level and help create direct impact on student learning. This study was undertaken on behalf of the European Commission’s Directorate-General for Education, Youth, Sport and Culture.

The JRC will shortly release a similar report on innovating CPD in Higher Education, with an analysis of cases of innovative practices for the continuous professional development of academics. Both studies bring together evidence that can support education policymakers at all levels to re-think the continuous professional development of educators. The evidence is not only focussed on digital learning opportunities, it embraces non-digital professional learning as well. Unsurprisingly however, analogue and digital activities are increasing becoming blended.

Both studies are part of the JRC research on “Learning and Skills for the Digital Era”. Since 2005, more than 20 major studies have been undertaken on these issues resulting in more than 120 different publications. Recent work focuses on the development of digital competence frameworks for citizens ([DigComp](#)), educators ([DigCompEdu](#)), educational organisations ([DigCompOrg](#)) and consumers ([DigCompConsumers](#)). A framework for opening up higher education institutions ([OpenEdu](#)) was also published in 2016, along with a competence framework for entrepreneurship ([EntreComp](#)). Some of these frameworks are accompanied by self-reflection instruments, such as [SELFIE](#), focussed on digital capacity building of schools.

Additional research has been undertaken on Learning Analytics, MOOCs ([MOOCKnowledge](#), [MOOCs4inclusion](#)), Computational thinking ([Computhink](#)) and policies for the integration and innovative use of digital technologies in education ([DigEduPol](#)). In 2017, a report on the potential of [blockchain in education](#) was released and more recently, in November 2018, a report on the impact of [Artificial Intelligence on learning, teaching and education](#).

More information on all our studies can be found on the JRC Science hub: <https://ec.europa.eu/jrc/en/research-topic/learning-and-skills>.

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Abstract

Meeting the professional development needs of tomorrow's teachers is a challenge that education authorities face in Europe and elsewhere. This report focuses on innovative and emergent practices of teacher professional development and professional learning among teaching professionals who work in compulsory education.

We set to look out for ways that have emerged to overcome the known barriers and limitations that teachers say hinder them today from participating in professional development activities. Our study gathers 30 examples that well illustrate new emergent features at a general level. The study is descriptive and it is based on desk research and a number of interviews.

This report forms the first part of the study called *Innovating Professional Development in Compulsory Education*. It comprises the main data and documentation gathered for the study. The main results and analysis are reported elsewhere in a JRC Science for Policy report called "*Innovating Professional Development in Compulsory Education - An analysis of practices aimed at improving teacher professional development*" (Vuorikari, 2019).

After the Executive Summary, this report starts with an introduction (Section 2). Following that, a methodological note describes the steps taken for the whole study (Section 3). The main part, Section 4, describes the examples and groups them according to their *focus of innovation*. For that purpose, seven labels were created which are not categorical: School as a learning organisation; Empowering learners through competence-oriented approach; Innovating online delivery; Re-inventing blended learning; Engaging in first-hand experiences; Innovating degree programmes; and Innovating partnerships and new actors. A short concluding note is given in Section 5. Finally, the report also includes a number of in-depth case studies (Annex 2).

1 Executive summary

This report comprises the first part of the study called *Innovating Professional Development in Compulsory Education*. It covers the methodology, describes the data used for the study and outlines the first preliminary analysis. The main analysis will be reported in a JRC Science for Policy report called "*Innovating Professional Development in Compulsory Education-An analysis of practices aimed at improving teacher professional development*" (Vuorikari, 2019).

The starting point for our study on emerging and innovative models of teacher professional development in compulsory education was to ask: *What kind of practices are emerging to overcome the known barriers that hinder teachers from participating in professional development activities and that help them to meet today's needs?*

By means of qualitative methods, 30 examples of practices used for teacher professional development and professional learning in compulsory education were collected and documented keeping the above-mentioned research question in mind. The desk research and accompanying interviews were conducted between summer 2017 and December 2018 covering European countries and beyond. The examples were analysed for their key features using a recent literature to underpin our analysis. Additionally, a number of case studies were conducted to get more in-depth understanding of the model, but also of the local context in which it had evolved. The first part of the work resulted in grouping the 30 examples in seven areas based on their focus of innovation (Figure 1).

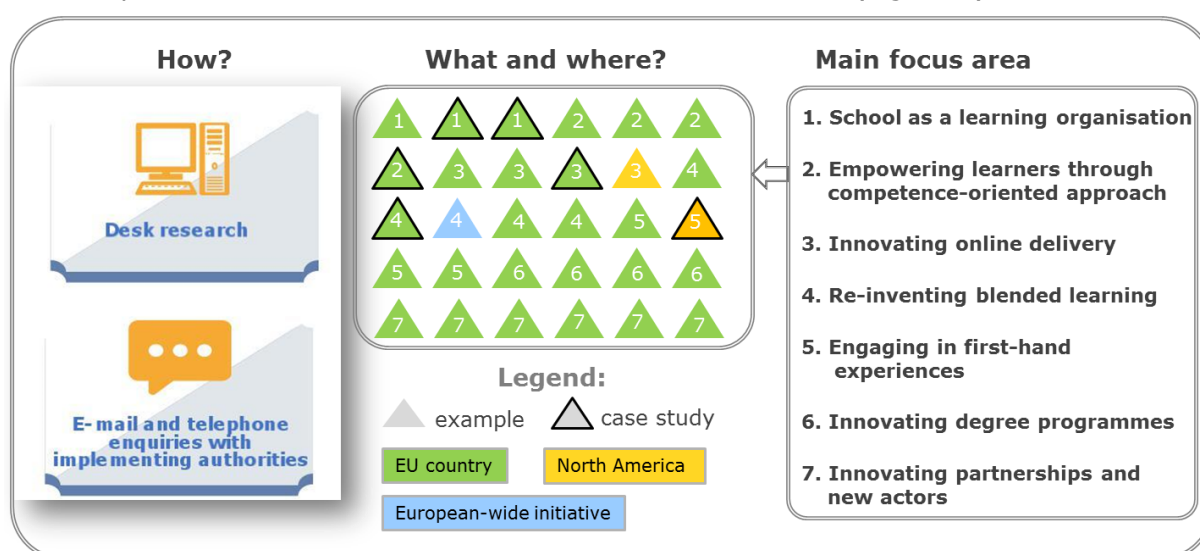


Figure 1. The main elements and a brief description of the data gathered for the study

Firstly, looking at the inventory of the examples of practices used for teacher professional development and professional learning in compulsory education, as an overall trend, we see that about half of the examples are provided as a free course by public authorities, whereas about a third of the providers are considered 3rd party providers. Within the latter, there is an interesting mix of actors from not-for-profit associations to philanthropy, corporate responsibility programmes and small entrepreneurs in the field of education, but also volunteering individuals (see Table 1 for details).

Secondly, about half of the activities are organised as a course or a workshop, whereas the rest represents other types of activities which are less-structured in terms of time and place. Some of them are also more informal in their nature such as participation in teacher networks or in-school teacher collaboration (i.e. professional learning). As a last general trend, we report on the mode of delivery (online, blended, onsite in school, out of school). Interestingly, about 2/3 of the examples mix more than one mode of delivery and about a half of the examples use digital technologies in addition to other modes of delivery.

Table 1. The inventory collected for the study: 30 examples listed with the name and country; type of delivery; type of practice; main provider(s) and how the provision is delivered.

count	Name of the example	Delivery	Type of practice	Provider	How the provision is delivered
School as a learning organisation					
1	Matematiklyftet (SE): Content modules for collegial learning and peer tutoring	onsite in school, online	School-based collaborative PD; Mentoring and/or peer observation;	public authorities (Skolverket): school	free courses by public authorities
2	LeerKRACHT (NL): Creating continuous improvement culture in schools	onsite in school, out of school	School-based collaborative PD; Mentoring and/or peer observation; observation visit to business premises	3rd party: non-profit associations (LeerKRACHT foundation)	course by 3rd parties - cost associated
3	Prof'Essor (BE): a method for fostering in-school teacher collaboration	onsite in school	School-based collaborative PD; Mentoring and/or peer observation	Catholic school network (SeGEC)	free courses by school network authorities (with initial support of McKinsey)
Empower learners through competence-oriented approach					
4	Young Coaches for the Internet 2.0 (CY): empowering students to educate others	onsite in school, out of school	Course/workshops	non formal education and training institutions (Cyprus Pedagogical Institute)	free courses by public authorities
5	Oxfam intercultural mentoring programme (IT): tools for	out of school	Course/workshops;	3rd party: non-profit associations	course by 3rd parties teachers

	teachers to support migrant integration at school		individual research	(Oxfam)	apply for the funding of the costs
6	PopUp School (FI): a digital platform for creating communal learning events	onsite in school, out of school	Course/workshops	3rd party: non-profit associations (Development Centre Opinkirjo), school community and parents	no direct cost
7	Innokas Network (FI): Maker-space activities for cross-discipline learning	onsite in school, online	School-based collaborative PD; Participation in a network of teachers; Course/workshops	Formal education institution (Faculty of Educational Sciences, University of Helsinki), public authorities	no cost, free courses by public authorities and 3rd party
Innovating online delivery					
8	Improving the Quality of the In-Service Teacher Training System (HR): courses delivered online on topics of teachers' needs	online	Course/workshops; In-service training courses	public authorities (Edu.&Teacher Training Agency)	free courses by public authorities
9	MENTOR (PT): online in-service course with the focus on NEETs	online	Course/workshops; In-service training courses	formal education institution (University of Minho)	free courses by public authorities
10	Aprende INTEF (ES): Digital micro-learning opportunities to overcome time barriers	online	Course/workshops; In-service training courses	public authorities (Ministry of Education)	free courses by public authorities

11	Teaching Channel (US): professional videos for peer-observation in the classroom	online	Observation of others through video	3rd party: commercial institution (Teaching Channel)	no direct costs for some of the content
Re-inventing blended learning					
12	E-competent teacher (SL): Blended online delivery with practical hands-on session	online, onsite in school	Course/workshops; In-service training courses	non formal education and training institutions (Methodological and Pedagogical Center)	free courses by public authorities
13	Mediacoach (BE): a programme to foster Media multipliers in educational organisations	online, out of school, onsite in school	Course/workshops	3rd party: non formal education and training institutions (Mediawijs.be)	course by 3rd parties - cost associated
14	eTwinning (EU): mixing classroom practices and digital components to acquire cross-curricular and multilingual competences	online, onsite in school, out of school	Participation in a network of teachers; School-based collaborative PD; Course/workshops	public authorities, school	no direct cost
15	Education Plaza (IS): connecting teachers in a sparsely populated country	online, onsite in school, out of school	Participation in a network of teachers; informal dialogue; Course/workshops; In-service training courses	public authorities (MoE), Formal education (University of Iceland) & 3rd party	free courses by public authorities, some pay associated

16	iKlasé (LT): Informal teacher network providing professional learning opportunities	online, onsite in school, out of school	Participation in a network of teachers; informal dialogue; Observation visits to other schools; Other	3rd party (individuals)	no direct costs
Engaging learners in first-hand experiences					
17	Best Practices Benchmarking course (ET-FI): Excursion to visit schools and observe practices	onsite in school, out of school	Course/workshops; Observation visits to schools; job-shadow	3rd party: commercial (Euneos Corporation)	course by 3rd parties teachers apply for the funding of the costs
18	Shadow a Student (US): a day-long challenge for school leaders	onsite in school	Observation visits to schools; job-shadow	3rd party: non-profit associations (School Retool), school	no direct cost
19	Teacher career services (SE): Career building stipend for Swedish teachers	onsite in school	Other; Mentoring and/or peer observation and coaching, as part of a formal school arrangement; Individual or collaborative research	public authorities (Skolverket), school	by public authorities
20	Pedagogical hackathons (FR): A course for fostering transversal competences	out of school	Course/workshops; Collaborative PD	non formal education and training institutions (Réseau Canopé)	free courses by public authorities
21	Escape rooms (FR): gamifying teacher professional development	out of school/onsite in school	Course/workshops; Collaborative PD	non formal education and training institutions	free courses by public authorities

				(Réseau Canopé)	
Innovating degree programmes					
22	Digi-teacher (FI): A post-graduate degree programme on digital education	online, onsite in school, out of school	Qualification programme	3rd party: formal education institution (University of Eastern Finland)	course by 3rd parties teachers apply for the funding of the costs
23	New Education Laboratory (ES): Degree programme challenging conventional courses	online, onsite in school, out of school	Qualification programme	Formal education institution (University Carlos III of Madrid), 3rd party (non-profit associations)	course by 3rd parties teachers apply for the funding of the costs
24	Teach Live (CZ): Degree programme for future teachers	online, onsite in school, out of school	Qualification programme	3rd party: non-profit associations (Depositum Bonum Foundation)	course by 3rd parties teachers apply for the funding of the costs
25	Practical Entrepreneurship (DK): Supporting VET teachers to support entrepreneurial education	online, onsite in school, out of school	Qualification programme	Formal education institution (many universities), 3rd party (non-profit associations)	course by 3rd parties teachers apply for the funding of the costs
Innovating partnerships and new actors					
26	EnglishOne (SK): Boosting English teaching through digital content	out of school, onsite in school	Course/workshop; mentoring; In-service training courses; other	public authorities (Ministry of Education), non formal education	free courses by public authorities

				and training institutions (Methodological and Pedagogical Center)	
27	Golinelli Foundation (IT): Accredited STEAM courses by a philanthropist	out of school, online	Course/workshops; In-service training courses	3rd party: non-profit associations (Fondazione Golinelli)	course by 3rd parties teachers apply for the funding of the costs
28	FYXXILAB (BE): Educational Makerspace for students and teachers	out of school, onsite in school	Course/workshops	3rd party: non-profit associations (eduCentrum vzw)	course by 3rd parties teachers apply for the funding of the costs
29	Lighthouse network (FI): peer to peer learning opportunities between schools	online, onsite in school, out of school	Mentoring and/or peer observation; Observation visits to other schools; Course/workshops; Other	public authorities (local municipality), school	do direct costs
30	Staff exchange (FI): Teacher exchange for phenomena-based learning	onsite in school	Observation visits to schools; School-based collaborative PD	university: Formal education institution (University of Jyväskylä), school: employer	no direct costs

Source: own elaboration.

In the following, we shortly introduce the 7 labels to describe the focus of innovation of the practices in order to better group them for further analysis. Throughout the text, we refer to examples by their numbers, e.g. [ex.1](#). This corresponds to numbering used in Table 1 which also indicates a number of other details (e.g. ex.1 corresponds to no: 1 Matematiklyftet, SE). Additionally, a one-page-long descriptive narrative of each example is available in Section 4, also using the same corresponding numbering. Throughout the text, we use hyperlinks to link the abbreviation to the narrative. Where relevant, we also link to case studies that are reported in [Annex 2](#) for more in-depth information about the models and the context in which they have evolved.

1.1 School as a learning organisation

When improving the experiences and outcomes of all actors of an educational system, the focus shifts from the individual to a school as a learning organisation. “[learning organisations] encourage and enable teachers and school leaders to improve both their pedagogical and their organisational practices concurrently through local collaborative research, networking and continued professional development.” (European Commission, 2018, p. 7)

Out of the examples, three models focus on improving both pedagogical and organisational practices concurrently, namely “Boost for Mathematics” from Sweden ([ex.1](#)), LeerKRACHT from the Netherlands ([ex.2](#)) and Prof’Eссор from the French-speaking community of Belgium ([ex.3](#)). The most prominent observation with all these three examples is the shift of professional learning activities from an individual teacher to targeting multiple actors within the organisation. Especially LeerKRACHT and Prof’Eссор focus on teachers and the school leadership team (see more about these two models [in the case study](#) in Annex 2). On the other hand, “Boost for Mathematics” focuses on subject-teachers within the school. Consequently, the impact area of these examples targets organisational innovation within the school, not only a single process (e.g. teaching practice) or a service delivered (e.g. digitally improved school-home communication platform).

Another feature, which emerges strongly too, is that in these models, professional development activities increasingly take place onsite in the school. Instead of teachers leaving the school to attend a professional development activity in a training facility with teachers from other schools, the training now takes place onsite in school with colleagues with whom the teacher works daily. As the notion of teacher co-operation and collaboration in a job-embedded context has gained more proves for its benefits (e.g. TALIS studies), it makes sense that learning opportunities are created for teachers to learn how to collaborate with their own colleagues in an authentic setting. Also the model of Mediacoach ([ex. 13](#), see also Annex 2 for [the case study](#)) focuses on collaborating with the all the staff members from the same institution.

Last, in all these examples, teachers form small groups and are set to work together using a certain method for a period of time with reflective cycles and external mentoring help. Importantly, all these models are supported by experts, either external ones or from in-house.

1.2 Empowering learners through competence-oriented approach

The Future of Education and Skills 2030 by OECD talks about learner agency in the following way: “Future-ready students need to exercise agency, in their own education and throughout life. Agency implies a sense of responsibility to participate in the world and, in so doing, to influence people, events and circumstances for the better. Agency requires the ability to frame a guiding purpose and identify actions to achieve a goal.” (OECD, 2018, p.4)

The challenge for teachers to teach transversal themes, or receive training on teaching them, is that they are best learned through “doing” rather than learning the theoretical knowledge about the topic. This might also be one reason for which organising teacher

professional development in areas such as transversal themes (e.g. problem solving, learning-to-learn) and approaches to developing cross-occupational competencies for future life, lack behind (40% teachers say to have need for professional development in these areas, OECD, 2014). Under this label, we focus on the following four practices: Young Coaches for Internet from Cyprus ([ex.4](#)), Oxfam Italy to set up a peer-mentoring programme for students ([ex.5](#)), the Finnish example of platform to co-create learning events with parents and the wider community ([ex.6 PoPU School](#)) and the Innokas network for educational maker spaces to learn 21st century skills ([ex.7](#), see also Annex 2 for [the case study](#)).

First of all, the common theme in these examples is that during the professional development activity, teachers are taught how to set a conducive environment where students are given opportunities to understand what it means to identify, plan and execute actions in a safe environment, in other words, to experiment with taking agency and influence other people, and to change the circumstances for the better.

Moreover, models such as those exemplified here help to move teachers towards competence-oriented approaches in education. Especially with the models of “Young Coaches for Internet” ([ex.4](#)) and Oxfam Italy ([ex.5](#)), both of which are organised as courses, during the structured activities teachers are concretely taught how to co-create a favourable environment for students to practice their key competences, their soft skills and further honing their transversal skills such as taking initiative and using creativity. In the other two examples ([ex.6-7](#)), which are more informal and/or less structured in their nature, the goal of moving towards competence-oriented approach is the same, however, less explicit.

1.3 Innovating online delivery

Digital delivery is still a novelty, however, it is well known for its flexibility in terms of time and place. This is worth keeping in mind because still today, half of the surveyed teachers in TALIS cite conflicts with their work schedule as a barrier to participation in professional development activities. In some European countries, figures are very high, e.g. three out of four teachers in Portugal, 60% in Italy and Spain, and 42% in Flanders (OECD, 2014). In such cases, offering teacher professional learning opportunities online in a paced (fixed starting and ending date) or self-paced mode (any time) can offer ways around the barrier of time conflict. Also, varying the length and depth of the content can offer opportunities for micro-learning. Practices and models that focus on innovating the delivery of professional development activities thanks to digital include ones from Slovenia, Portugal, Spain and the US ([ex.8-11](#)).

First of all, the online delivery format allows for reaching a large number of participants in a short period of time thus alleviating the pressure of physical space needed for training facilities and on the other hand, the need to commute to a training facility. Especially in the case of Croatia ([ex.8](#)) and Portugal ([ex.9](#)), but also in Sweden ([ex.1](#)), Slovenia ([ex.12](#)) and Slovakia ([ex.27](#)), online arrangements have allowed the programme to reach large numbers of teachers in a rather systematic way.

Apart from being effective in reaching large numbers, expanding the offering of professional development to a wider audience thanks to online delivery can be considered innovation. In 2014, the Spanish Ministry of Education moved to experimenting with MOOCs, also known as Massive Open Online Courses ([ex.10](#), see also the case study in [Annex 2](#)). The new aspect was that instead of offering online courses only for in-service teachers of Spanish stated-funded schools, these MOOCs were made open to anyone to participate, no matter if participants were in Spain or abroad. Another innovation was that the courses had no limitation for participants (hence Massive), like usually is the case of teacher CPD courses, so the offer was made available to a larger number of learners at once. Innovation in online delivery can also be in the area of certification; in the case of Spanish MOOC, for the participants who complete all course requirements the

Ministry issued an Open Badge, which is an informal but verifiable digital recognition of skills and achievements, in this case of those acquired through the MOOC.

1.4 Re-inventing blended learning

A well-established concept of blended learning combines two different modes of delivery: online learning with traditional classroom methods that require the physical presence of both the teacher and the learner (i.e. face to face learning). Whereas this type of blended learning is already established in online training in general, and to a certain extent also in teacher professional development, an emerging feature is introducing to an otherwise traditional online course a period of practical hands-on experience where teachers experiment “onsite in school” with the newly acquired knowledge and skills ([ex.12](#) from Slovenia and [ex.13](#) of Mediacoach, see also [the case study](#) in Annex 2). Under this label, we also look at professional learning offerings with a less structured and network-based models ([ex.14](#) eTwinning, [ex.15](#) Education Plaza, [ex.16](#) iKlase), as they also create similar opportunities of experimenting with new practices in the classroom and reflecting upon them, although in a less structured manner.

In the two first models ([ex.13](#) and [ex.14](#)), which both are structured courses, the courses first introduce a piece of theoretical knowledge, or a new teaching model/practice through an online lecture, after which a period of implementation and experimentation in the classroom took place. Following that, teachers came back to a reflective session (either online or face-to-face) to share experiences with peers and trainers. Such authenticity of tasks not only makes the course content more varied by considering both subject knowledge and subject-specific pedagogy, but also touches upon another barrier, the transfer of knowledge from professional development courses to classroom practices, which previous studies have shown to be problematic.

Secondly, it could be considered that classroom experimentation units, when combined with a follow-up session (e.g. opportunities for structured self-reflection; exchange of experiences in a peer-learning context) do not only provide the much needed way for teachers to solicit feedback from peers and experts - an opportunity that they seldom have - but also have a possibility to engage the participant in the analysis of and reflection around the underpinning pedagogical rationale and their own experience. According to literature (Teacher Development Trust, 2015), this kind of active learning has potential to engage teachers directly at the same time embedding the professional development activity deeply in their own context.

1.5 Engaging in first-hand experiences

Professional learning processes that are situated in the context of real-world can be a power tool for teacher professionalism. A common theme across professional development activities with a real-world context is that they require an active participation and/or a certain level of engagement from the participants, thus moving away from traditional models like those of lectures based courses where there is little room for active participation.

Under this label, we focus on two separate themes; those that offer an authentic school/classroom setting for professional development going from a more structured course, such as a week-long excursion in Finnish and Estonian schools ([ex.17](#)) to an informal exercise of shadowing a student ([ex.18](#), see also the [mini-case study](#) in Annex 2), and to eventually exploring the example from Sweden which institutionalises teacher’s career development through a stipend ([ex.19](#)). The other theme explores professional learning activities that engage the participant directly in the same style of learning as the student would experience, in other words, trying out activities first-hand. These examples additionally create participation and engagement through playful means, also known as gamification ([ex.20](#) of Pedagogical Hackathons, [ex.21](#) of Escape rooms).

Professional development models such as the ones above can potentially engage the participants in the process of learning in a new way by making it more emotional and/or

social. For example, “Shadow a student” ([ex.18](#), see also the [mini-case study](#) in Annex 2) is actually a “challenge” for the school leader to follow a student for an entire school day. This role reversal offers the school leader a fundamentally new way to see their school through the eyes of the student. The programme is based on design-thinking and the idea that each observation of a school head can lead to a “hack”, an action that implements a quick change in practices.

Another model, that of a Pedagogical hackathon ([ex. 20](#)), is also a tool for educators to experience the new method of learning first-hand. Importantly, the model is not only “learning by doing”, but it also combines reflective steps throughout the process so that learning of such skills can be made explicit. The idea is, of course, that once teachers have experienced a Pedagogical hackathon themselves, they are better equipped to bringing them, or aspects of them, also to practices in schools. Interestingly, in France, there is a very high number of Hackathons, also in the field of education.

1.6 Innovating degree programmes

In terms of innovation in degree programmes, we have included four examples which all could be considered as for professional development purposes, however, some of them also offer elements for making, or even changing, the career path. The Digi-teacher programme from Finland ([ex.22](#)) offers a rather classical post-graduate degree programme for those who already have a master’s degree in education to conduct in-depth studies in the area of digital education. The course content, however, is nicely structured around teachers’ and educational institutions’ needs in what comes to supporting digitalisation of education. [Ex.25](#) targets teachers in Vocational education and focuses on the spirit of entrepreneurship, also a transversal theme of which teachers have expressed a high/moderate need for professional development. Both of the degree courses are delivered by universities and result in certification.

On the other hand, examples [23](#) from Spain and [24](#) from Czech Republic both are Master’s level programmes, but they offer somewhat alternative educational activities for those already in teaching or willing to get into it. Both are pay programmes where stipends are offered by pedagogical interest groups who wish to have more say and influence on the vision of how future teachers are educated. Regarding the organisation of programmes, both examples rely heavily on syllabus which has an ample scope for classroom practices and observations, scaffolds trainees through the course with peer-mentoring and tutoring, and both programmes combine online modules allowing for more flexibility of how the instruction is organised. It is also interesting that in the first place, both of these programmes were set up as unaccredited degrees, possibly creating a jolt in the otherwise traditional world of teaching that sometimes faces difficulties of renewing itself from the inside.

1.7 Innovating partnerships and new actors

Partnering up with social partners and industry has a long history in education, however, its forms differ greatly from a country to another. Within the examples, a number of innovative partnerships and actors are present who alone or through partnering up with a more conventional player (co)produce and/or deliver the content of the teacher professional development activities.

Some of partnerships are more conventional such as British Council in Slovakia partnering up with the Ministry of Education in a project to create digital resources and educational aids, but also to link local native speakers with schools ([ex. 26](#)). New players also get involved, such as Golinelli Foundation in Italy which is driven by philanthropic activities ([ex.27](#)). Through its newly expanded “Educare a educare” programme, Italian teachers can engage in STEM related professional development activities which are also accredited by the Ministry of Education. On the other hand, FYXXILAB in Belgium ([ex.28](#)) gives an example of setting up a business-education collaboration which is used for providing tools for the first educational makerspace in Flanders, Belgium. Last, our

examples under this label also illustrate how local stakeholders in education can be better leveraged for the purpose of teacher professional development. Two examples from Finland include the Majakka (Lighthouse) network (ex. [29](#)) and the Staff “swap” which represents rather “out of the box thinking” (ex. [30](#)).

Even if currently no data exist in Europe to know whether there is an increase or decrease in the involvement of philanthropy or corporate social responsibility programmes in education, in a number of our examples such partnerships were taken advantage of for the purpose of teacher professional development activities. Behind the examples of LeerKRACHT ([ex.2](#)) and Prof’Eссор ([ex.3](#)), there is a model developed by McKinsey & Company, which was partly initiated through their CSR programmes. The Czech Depositum Bonum Foundation ([ex.24](#)), on the other hand, is part of the CSR programmes of the bank Česká spořitelna and has newly established itself in the field of education in the Czech Republic to spread new educational cultures. IT and software industry has also historically ran many CSR programmes. iKlase ([ex.16](#)) illustrates the training & sponsorship programme by Apple, other popular ones being by Intel¹ and Microsoft². Other examples of social partners include the Free Educational Institution ([ex.23](#)), Danish Foundation for Entrepreneurship & VELUX Foundation ([ex.25](#)), a Finnish non-profit Development Centre Opinkirjo ([ex.6](#)), School Retool in the US ([ex.18](#)). On the other hand, especially [ex.17](#) and teacher workshops in [ex.16](#) represent a rather new type of micro-entrepreneurial activities in education generating value, either social or monetary one.

¹ https://www.intel.co.uk/content/www/uk/en/education/intel-education.html?_ga=2.195098347.657240948.1540397714-349574308.1540397267

² <https://education.microsoft.com/>

2 Introduction

The aim of this study is to better support teachers, school leaders and education policy-makers for excellent teaching and learning in the European Union. This report constitutes the first part of the study called *Innovating Professional Development in Compulsory Education* covering the methodology, and describing and documenting the data used for the study. The main analysis and key outcomes are reported elsewhere in a JRC Science for Policy report (Vuorikari, 2019). The study was conducted by the Joint Research Centre (B4) on behalf of the European Commission's Directorate-General for Education, Youth, Sport and Culture.

The starting point for the study was to look for innovative and emergent practices of teacher professional development (PD) and other forms of teacher professional learning that overcome a number of known barriers that hinder teachers from participating in professional development activities, and that help them to meet today's needs. The TALIS study finds that across all the participating countries and economies, teachers most often cite the following barriers for participation in professional development: conflicts with their work schedule (51% of teachers); a lack of incentives (48%); lack of support from employer; and on average, 44% of teachers consider professional development activities to be too expensive (OECD, 2014). The same study also identified that teachers have high/moderate need for professional development in the following areas: 57% lack professional development for "ICT skills for teaching"; 48% for "teaching for diversity"; 41% for "student counselling and behavioural issues"; and 40% "teaching transversal, soft and future skills".

Based on the selection criteria, which are outlined in Section 3, we looked for pertinent practices of teacher professional development and other forms of teacher professional learning over the summer 2017 to summer 2018. 30 examples were collected of various professional development activities ranging from more classical in-service and Continuous Professional Development courses by public authorities to less structured ways to conduct professional learning activities and acquire professional learning in a job-embedded context (e.g. in-school teacher collaboration; mentoring; or coaching). The aim was to gauge the richness of emergent models in this area, but also to take a deeper look into them in order to better understand the components that they were composed of.

This technical report documents the data gathered for the study. As a first step, Table 1 lists all the examples identifying the following attributes: (1) the name of the example and the country of origin; (2) how the delivery is conducted (online; onsite in school, out of school); (3) the type of activity using an enriched TALIS vocabulary (courses/workshops, conferences or seminars, observation visits to other schools, qualification programme, participation in a network of teachers, individual or collaborative research, mentoring and/or peer observation and coaching, and school based collaborative professional development); (4) training provider, e.g. national/regional educational authorities, non-profits, corporate providers or even individuals and new educational entrepreneurs in the field, and (5) how the provision is done (e.g. delivered free of charge).

As a second step, we were curious to look at the key features of these emergent models. For this purpose, we used the recent research literature on effective teacher professional development where Darling-Hammond et al. (2017) outline seven key elements of effective professional development models. They are the following: Is the professional development content focused (discipline specific)?; Does it support collaboration in job-embedded context?; Does it use models and modelling of effective practice?; Does it provide coaching and expert support?; Does it offer opportunities for feedback and reflection?; Is it of sustained duration?; and Does it incorporate active learning (adult learning theory)? In Table 2, we have analysed the 30 examples according to these seven elements.

As a third step, we created narrative descriptions of all examples. They were guided by Table 1 and 2, and the data extraction template that helped us gather information in a systematic manner (Annex 1). Moreover, a number of in-depth case studies were conducted in order to get better insight into some of the details, but more importantly, to the context where these innovative models have evolved ([Annex 2](#)). These components together form the main data for our inquiry which is documented in this Technical Report.

As a first analysis to better understand the richness of the practices and models behind them, we started by grouping the examples by their *main focus of innovation*. For that purpose, seven labels were created which are not hierarchical or categorical as many of the examples represent more than one of the aspects and therefore they could exist under more than one label. The labels are the following: School as a learning organisation; Empowering learners through competence-oriented approach; Innovating online delivery; Re-inventing blended learning; Engaging in first-hand experiences; Innovating degree programmes; and Innovating partnerships and new actors. Figure 2 below shows the grouping of 30 examples with the labels. It also shows the examples that were extended into in-depth case studies that are documented in [Annex 2](#).

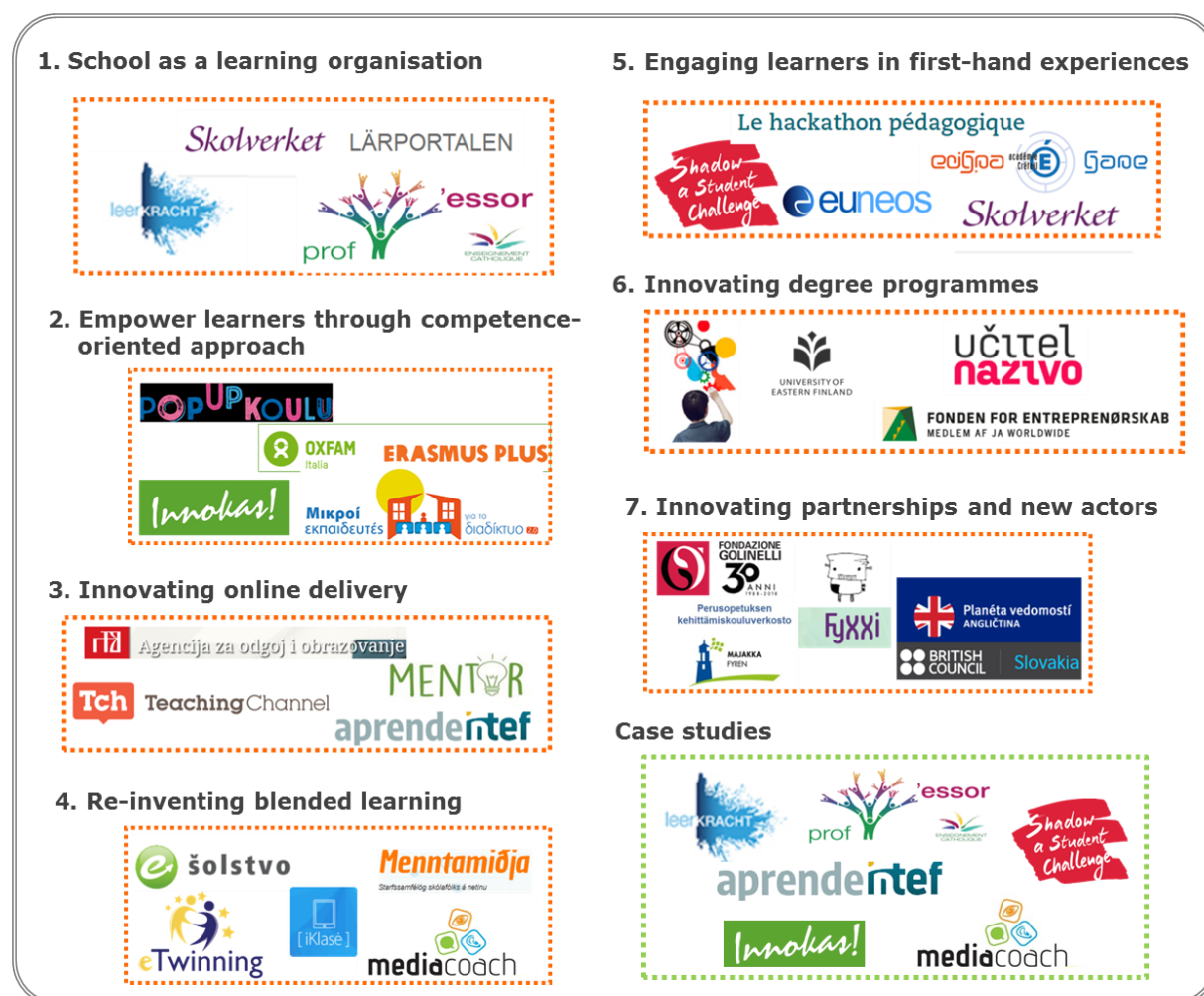


Figure 2. 30 examples with in-depth case studies collected for the study. See Table 1 for more details.

In the following of this report, Section 3 outlines a methodological note describing the steps taken for the whole study. The main part, Section 4, includes descriptive narratives of the examples. In Section 5, a short concluding note is given. Finally, the report also includes a number of in-depth case studies (Annex 2). The more in-depth outcomes of the study will be reported elsewhere in a JRC Science for Policy report called "Innovating Professional Development in Compulsory Education - An analysis of practices aimed at improving teacher professional development" (Vuorikari, 2019).

3 Methodological note for the study

In order to set the protocol and define the parameters for the study called “Leveraging innovation in teacher continuous professional development in compulsory education”, we first formulate the more precise research question and the working definitions for terms such as “professional learning”, “professional development”, “continuous professional development” and “innovative”.

Following that, we define the main three phases of research to be conducted for this study. Finally, we will define in details how to systematically approach the issue in a form of a literature note by defining the selection criteria of the study and the key aspects for the relevant review procedure.

3.1 Defining the research question and terms used

The primary research question for this study is the following: *What kinds of examples of teacher professional learning can be found in the EU and beyond that overcome the known obstacles and barriers for teachers’ participation in professional development and how do they respond to teachers’ needs?*

Following the definition by Darling-Hammond et al. (2017), effective professional development is defined as structured professional learning that results in changes to teacher knowledge and practices, and improvements in student learning outcomes. *Professional learning* is conceptualised as a product of both externally provided and job-embedded activities that increase teachers’ knowledge and help them change their instructional practice in ways that support student learning.

This new definition nicely builds on the often used definition by the TALIS study (OECD, 2014) that defines professional development “as activities that develop an individual's skills, knowledge, expertise and other characteristics as a teacher”, but it goes further by defining also the purpose of professional development which should not only result in higher degree of teachers’ own professionalism, but also benefit learners in terms of better learning outcomes.

The overall parameters of the study are the following:

- Population: teachers in compulsory education (ISCED 1-3)
- Main context: teachers working in compulsory education in EU28
- Focus: emerging and innovative forms of professional development as considered in their own local and cultural context
- Outcome: define characteristics and create a typology for emerging forms of teacher PD
- Speciality: our intention is to find pertinent evidence to define the “new frontier” of “innovative forms” of teacher PD

Main elements of the study:

1. Literature note to set the boundaries for this research;
2. An inventory of examples aiming at covering all EU Member States;
3. A set of in-depth case studies and final outcomes.

Methodology: The above outlined elements are combined to generate a comprehensive picture of the situation in Europe on which sound policy recommendations can be based.

Most of teacher professional development activities are considered to be *non-formal education* following the classification used in the Adult Education Survey by Eurostat. On the other hand, *formal education* activities are those that are designed to lead to achievements included in the National Framework of Qualifications and could be described using ISCED levels from 1 to 8. Examples include study programmes that lead to a qualification.

Moreover, regarding the known obstacles and barriers of teacher participation in professional development activities, the TALIS study finds that across all the participating countries and economies, teachers most often cite the following barriers: conflicts with their work schedule (51% of teachers); a lack of incentives (48%); lack of support from employer; and on average, 44% of teachers consider professional development activities to be too expensive (OECD, 2014). Regarding the needs for professional development, the most cited ones in the EU countries fall under “ICT skills for teaching” and “Teaching for diversity”, e.g. approaches to individualised learning; with special needs; teaching in a multicultural/multilingual setting (European Commission/EACEA/Eurydice, 2015).

3.2 Developing the protocol

The method of this study, the setting of its scope and the selection of examples are loosely inspired by “Rapid Evidence Assessment”, the steps taken to collect and assess the evidence for the purpose of this study are outlined below.



Figure 3. Steps taken to collect and assess evidence for the study.

Inclusion and exclusion of criteria for the study

1. For the literature review

Inclusion

- Date: published in the period between 2013 and July 2017.
- Language: English
- Type of studies: international surveys (e.g. TALIS) on teacher participation in PD, the types of PD training, the topics and duration, the known bottlenecks. Policy-related reports produced by international organisations such as the EC (e.g. Eurydice) or OECD on the topic.
- Additional search: National/grey literature, in addition to a broad but shallow search of academic sources, with the aim of identifying potential examples
- Context: Compulsory education in EU28 and OECD countries

Exclusion

- Studies focusing on PD in tertiary education

2. For the examples of professional development

Inclusion

- What: Types and forms of professional development considered emerging/innovative according to the above-set definition. Example can include all types of PD activities that are used in TALIS (TT2G21), however, the aim is to enlarge this typology to be more relevant in the future
 - Courses/workshops (e.g. on subject matter or methods and/or other education-related topics)
 - Education conferences or seminars (where teachers and/or researchers present their research results and discuss educational issues)
 - Observation visits to other schools
 - Observation visits to business premises, public organisations, non-governmental organisations
 - In-service training courses in business premises, public organisations, non-governmental organisations
 - Qualification programme (e.g. a degree programme)
 - Participation in a network of teachers formed specifically for the professional development of teachers
 - Individual or collaborative research on a topic of interest to you professionally
 - Mentoring and/or peer observation and coaching, as part of a formal school arrangement
- By whom: a wide range of training providers (see Annex 1, list of Adult Education Survey 2017)
- Date: preferably recent practices with a timespan between 2013 and 2017 allowed, however, in certain cases, it can be justified to go further back especially to find examples that have been evaluated to be effective and impactful
- Context: Training focusing on teaching staff working in compulsory education in EU28 and OECD countries
- Languages: EU languages and other if deemed relevant

Exclusion

- In general, we do not focus on conventional PD practices.
- To exemplify this, we use what a recent webinar by The Learning Policy Institute³ defined as "sit and get; drive-by; one size fits all; disconnected from teachers' classroom and students".
 - Buczynski & Hansen (2010, p.1) describe ineffective professional development programmes as "too conventionally taught, too top-down, and too isolated from school and classroom realities to have much impact on practice".
 - However, we acknowledge that innovation may lie in combining conventional content/format/provider in a new way, therefore our study will keep a keen eye on local/cultural/social criteria that is used for excluding an example.

Determining the search criteria and identification of examples

1. Literature review

- Searching: consulting a limited number of publication databases by international organisations (e.g. TALIS library; JRC) including unpublished work by the JRC
- Agreements: consulting a number of (grey) literature and reports through recommendations from the stakeholders

2. Examples of professional development

- An active outward look is cast to find pertinent examples on the topic which was loosely described as finding "teacher professional development with a wow-factor". Various criteria was defined, each of which alone would be sufficient for inclusion for the study:

³ How Investing in Teacher and Leader Professional Development Can Support Student Success
<https://learningpolicyinstitute.org/event/webinar-how-investing-teacher-and-leader-professional-development-can-support-student-success>

- Topic, e.g. teachers learning coding, teaching in multicultural classroom, learning about conflict resolution;
 - Way of delivery, e.g. combination of known formats of delivery (e.g. mooc + f2f workshop + project work over a period of time); school based training; job-embedded practice; blending online and offline
 - Provider, e.g. organised by education authorities, non-profits, NGOs, a pop-up school by parents, etc.;
 - Formal, informal or non-formal type of PD
- The process to be followed can be described in three following steps.
 - Searching: A wide reaching keyword searches on the Internet (using different search terms such as “teacher professional development”; “in-service training”; “types”; “forms”; “new”; “novel”)
 - Agreements: search for examples through the use of personal and professional networks (through email, social media) and through recommendations by the stakeholders; search through Erasmus+ project database⁴ using the keyword “professional development” and “in-service training” for first 1000 hits.
 - The third step, if deemed useful, extends the search for examples through more established European Commission working group under ET2020. Other means could also be envisaged.

Development of the template for examples and case studies

The data extraction template should:

- focus on the underlying innovative aspects of teacher professional development (PD) and bring about the aspects that allow for understanding the context where they were designed and why they are designed. It is important to try to focus on understanding the dynamics of each system, the policy landscape and how resources were mobilised towards the desired goals.
- emphasise the local context and culture, pointing out how those at the local context constructed their own goals and strategies for the PD, rather than rely upon already known methods and conventional offer of teacher PD. Where possible, the focus is to describe aspects of teacher PD that impact teacher professionalism, support changes in teacher practices and/or students’ learning outcomes.

Based on the above steps, a template was designed (see Annex 1). Using an early draft as a prototype, one example was described to test the usability and pertinence of the information. A sub-set of the questions in the template are used for describing the inventory of examples. For the case studies, all the questions of the data extraction template will be used, in addition to more depth interviews where needed.

Selection of case studies

The examples will lead to a selection of 5-8 case studies. In each of the cases identified, the aim is to describe key aspects, e.g. the topics covered and how it addressed the local needs; the intensity of the training; how the known barriers of participation are overcome; whether teachers’ participation is recognised formally or non-formally, are there any incentives at school level or system level (e.g. sufficient time for PD, planning hours in school); what are expected learning outcomes or other benefits that the participant gains; whether there are any available evaluations of efficacy or effectiveness of such offers; and what are the expected drivers of teachers to participate in such professional development. The cases will use a variety of data sources such as key steering documents and evaluations, training materials and schedules, expert interviews with educational authorities and training providers, and with several teachers participating in the programme.

⁴ <http://ec.europa.eu/programmes/erasmus-plus/>

4 Inventory of evidence: 30 examples

This section presents the inventory of 30 examples of emergent practices of teacher professional development (PD) and other forms of teacher professional learning that were chosen based on the selection criteria and described with the help of the steps presented above.

4.1 Emerging trends

In the following, we first describe some general trends that arise among the examples.

As can be seen in Table 1, about half of the examples are provided as a **free course by public authorities**, whereas about a third of the providers are considered as a 3rd party provider. Within the latter, there is an interesting mix of actors emerging from not-for-profit associations to philanthropy, corporate responsibility programmes and small entrepreneurs in the field of education, but also volunteering individuals. Secondly, regarding the **type of activity**, about the half of the practices are organised as a course or a workshop and there are 4 qualification programmes, whereas the rest represents other types of activities which are less-structured in terms of time and place. Some of them are also more informal in their nature such as participation in teacher networks or in-school teacher collaboration, these could be called professional learning activities.

As a last general trend, it is interesting to look at **the mode of delivery**. For this, we use the following terms: "online" to denote the delivery of activities through digital technologies and "out of school" to indicate a physical location where face-to-face interactions take place, such as a training facility. The term "blended" was used when online and face-to-face delivery was mixed, and "onsite in school" was used to indicate that the activities take place in school, either during the instruction or outside of it usually indicating teacher collaboration for professional learning activities. As a general trend, we see that about 2/3 of the examples mix more than one mode of delivery and that about half of them use digital technologies with other modes of delivery.

4.2 Emerging key features

Moving forward to look at the key elements of the models of teacher professional development and other forms of teacher professional learning within our examples, we first briefly outline the seven elements that Darling-Hammond et al. (2017, page v of the summary) found the effective teacher professional development is often composed of. They are the following:

1. **Content focus:** Professional development that focuses on teaching strategies associated with specific curriculum content supports teacher learning within teachers' classroom contexts. This element includes an intentional focus on discipline-specific curriculum development and pedagogies in areas such as mathematics, science, or literacy.
2. **Incorporating active learning:** Active learning engages teachers directly in designing and trying out teaching strategies, providing them an opportunity to engage in the same style of learning they are designing for their students. Such professional development uses authentic artefacts, interactive activities, and other strategies to provide deeply embedded, highly contextualized professional learning. This approach moves away from traditional learning models and environments that are lecture based and have no direct connection to teachers' classrooms and students.
3. **Supporting collaboration:** High-quality professional development creates space for teachers to share ideas and collaborate in their learning, often in job-embedded contexts. By working collaboratively, teachers can create communities that positively change the culture and instruction of their entire grade level, department, school and/or district.

4. **Providing coaching and expert support:** Coaching and expert support involve the sharing of expertise about content and evidence-based practices, focused directly on teachers' individual needs.
5. **Offering feedback and reflection:** High-quality professional learning frequently provides built-in time for teachers to think about, receive input on, and make changes to their practice by facilitating reflection and soliciting feedback. Feedback and reflection both help teachers to thoughtfully move toward the expert visions of practice.
6. **Sustained duration:** Effective professional development provides teachers with adequate time to learn, practice, implement, and reflect upon new strategies that facilitate changes in their practice.
7. **Modelling effective practice:** Curricular models and modelling of instruction provide teachers with a clear vision of what best practices look like. Teachers may view models that include lesson plans, unit plans, sample student work, observations of peer teachers, and video or written cases of teaching.

Table 2 presents the analysis of our examples based on these 7 elements. Below, we briefly outline some of the general trends arising from our data. First of all, all the examples **incorporate active learning** for participants. Therefore, they could be seen moving away from the more traditional lecture based models to ones that utilise adult learning theories, bases of which being the active involvement of the participants in the process. This means, for example, that practices directly engage participants in activities that are often directly connected to teachers' classrooms. They are highly contextualised and use authentic artefacts, often providing teachers also opportunities to engage in the same style of learning that they would design for their students (e.g. experiencing first-hand). Secondly, a great number of examples also take advantage of **modelling effective practices**, for example, by including samples of practices that have been proven to work, and use videos and written cases of teaching. Many also tap on observation of peers, either in the same school, elsewhere, or even through video recordings. Darling-Hammond et al.(2017) show that modelling how effective instruction looks like can provide teachers with a clear vision of what best practices are, and thus giving them some concrete examples on which to anchor their own learning and professional growth.

We highlight two other trends that emerge from the models too, namely that of the **model explicitly supporting job-embedded collaboration** with colleagues and the model **providing coaching and expert support** for participating teachers. In about 2/3 of the examples, we can see features of both in varying intensities. Whereas the concept of teacher collaboration is already rather well known (e.g. TALIS by OECD, 2014), the recent research also points out that this alone does not make professional development effective and successful (Teacher Development Trust, 2015). When applied correctly, Darling-Hammond et al.(2017) show that by working collaboratively, teachers can create a culture of positive change in their instruction. In many of the examples, some type of collaboration was requested or expected, e.g. collaborating with colleagues who participate in the same training. However, interestingly, in 4 models ([ex.1](#), [ex.2](#), [ex.3](#), [ex.13](#)), the collaboration was truly directed to take place with the colleagues of the same school. This trend will be discussed at a later point when introducing the focus on professional development models that emphasise *the school as a learning organisation*.

Regarding the **trend of coaching and expert support to teachers**, the focus is on evidence-based practices that directly fit the teachers' individual needs. About a third of the examples have involved some provision either for an in-school pedagogical coach or someone from outside appointed for this task. The rest rely on some kind of less structured expert help or support, for example, through peers in an online community.

Table 2. The analysis of key features of the 30 examples. The key components stem from the study by Darling-Hammond et al.(2017) outlining effective teacher professional development.

Name of the example	1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning (adult learning theory)?
1. Matematiklyftet (SE): Content modules for collegial learning and peer tutoring	Yes, mathematics	Yes	Yes (self-study units)	Yes	Yes	A semester	Yes
2. LeerKRACHT (NL): Creating continuous improvement culture in schools	No	Yes	Yes, through collegial sharing	Yes	Yes	8-12 weeks of initial training - 2 years	Yes
3. Prof'Essor (BE): a method for fostering in-school teacher collaboration	No	Yes	Yes, through collegial sharing	Yes	Yes	8-12 weeks of initial training after which embedded in organisation	Yes
4. Young Coaches for the Internet 2.0 (CY): empowering students to educate others	Yes, ICT	No	Yes	Yes	Yes	Yes, a year	Yes
5. Oxfam intercultural mentoring programme (IT): tools for teachers to support migrant integration at school	Yes, multicultural education	No	Yes	No	Yes	5 days course	Yes
6. PopUp School (FI): a digital platform for creating communal learning events	Depends	Yes	No	No	No	No	Yes
7. Innokas Network (FI): Maker-space activities for cross-discipline learning	Yes, STEAM	Yes	Yes	Yes	Less	Depends	Yes
8. Improving the Quality of the In-Service Teacher	Yes, various subject areas	Some	Yes	No	No	4-6 weeks	Yes

Training System (HR): courses delivered online on topics of teachers' needs							
9. MENTOR (PT): online in-service course with the focus on NEETs	Yes	Yes (Moolde)	Yes	Yes (Moolde)	Yes	Courses with a fixed period	Yes
10. Aprende INTEF (ES): Digital micro-learning opportunities to overcome time barriers	Yes, mostly ICT	Yes (online)	Yes	Yes	Some, less in focus	Courses with a fixed period	Yes
11. Teaching Channel (US): professional videos for peer-observation in the classroom	Yes, various subject areas	Possibly	Yes	Yes, though community	Yes, though community	Depends of the individual's choice	Yes
12. E-competent teacher (SL): Blended online delivery with practical hands-on session	Yes, various subject areas	Yes	Yes	Some	Some	Courses with a fixed period	Yes
13. Mediacoach (BE): a programme to foster Media multipliers in educational organisations	Yes	Yes	Yes	Yes	Yes	A year	Yes
14. eTwinning (EU): mixing classroom practices and digital components to help acquire cross-curricular and multilingual competences	Yes, various subject areas but also across	Yes	Yes	Some, through Ambassadors	Some	Possibly, especially projects	Yes
15. Education Plaza (IS): connecting teachers in a sparsely populated country	Yes, various subject areas	Yes	Yes	No	Yes (informally)	Many courses and formats provided	Yes
16. iKlasé (LT): Informal teacher network providing professional learning opportunities	Possibly	Yes	Yes	Yes, but informal	Yes, but informal	Possible, depends of the individual	Yes
17. Best Practices Benchmarking course (ET-FI): Excursion to visit schools and observe practices	No	Possibly	Yes	Yes	Yes	Courses with a fixed period	Yes

18. Shadow a Student (US): a day-long challenge for school leaders	No	No	Yes, observation	Yes, through a community	Yes	No	Yes
19. Teacher career services (SE): Career building stipend for Swedish teachers	Yes	Yes	Most likely	No	No	Yes, 1 year	Yes
20. Pedagogical hackathons (FR): A course for fostering transversal competences	Yes, transversal themes	Yes	Yes	Yes	Yes	No	Yes
21. Escape rooms (FR): gamifying teacher professional development	Varies	Yes	Yes	Yes	No	Courses with a fixed period	Yes
22. Digi-teacher (FI): A post-graduate degree programme on digital education	Yes, pedagogy, digitalisation	Yes	Yes	Yes, through peers	Yes	Study programme, 2 years.	Yes
23. New Education Laboratory (ES): Degree programme challenging conventional courses	Yes, pedagogy, digitalisation	Yes	Yes	Yes	Yes	Study programme	Yes
24. Teach Live (CZ): Degree programme for future teachers	Yes, pedagogy, digitalisation	Yes	Yes	Yes	Yes	Study programme, min 1 year	Yes
25. Practical Entrepreneurship (DK): Supporting VET teachers to support entrepreneurial education	Yes	No	Yes	No	Yes	Yes, a semester. Periods of training and practice	Yes
26. EnglishOne (SK): Boosting English teaching through digital content	Yes	Yes	Yes	Yes	No	No	Yes
27. Golinelli Foundation (IT): Accredited STEAM courses by a philanthropist	Yes	No	Yes	No	No	Courses with a fixed period	Yes
28. FYXXILAB (BE): Educational Makerspace for students and teachers	Yes	No	Yes	Yes	Yes	Courses with a fixed period	Yes

29. Lighthouse network (FI): peer to peer learning opportunities between schools	Focus on specific themes	Yes	Yes	Depends on the selection	Depends on the selection	Depends on school's choice	Yes
30. Staff exchange (FI): Teacher exchange for phenomena-based learning	Yes, transversal themes	Yes	Yes	No	No	Possible, depends on the school's choice	Yes

4.3 Descriptive narratives of examples

In the following, we present a short, one page-long descriptive narrative for each of the example. The above mentioned key elements, together with the information that was gathered using the data extraction template (see Annex 1) guided their writing. To facilitate the reading, the examples are grouped under labels that best describe their focus of innovation. The first preliminary results were reported in Vuorikari & Kampylis (2018), after which a round a revisions of the labels and the grouping was done. The following reports the current state-of-the-art.

Focus on the school as a learning organisation

1. Matematiklyftet (SE): Content modules for collegial learning & peer tutoring

As part of the Swedish National Schools Development programme, between 2012-2016, the National Agency for Education initiated a programme called Matematiklyftet, the Boost for Mathematics⁵. The aim is to support math teachers' in-service training and competence building. The content of the professional development programme is delivered through a digital portal called Lärportalen⁶, but the implementation takes place in schools involving a team of math teachers and a tutor. The programme can be considered a major success on a large scale: almost 35000 math teachers took part (76% of all math teachers) from more than 4000 schools. Matematiklyftet had a budget of 650 million SEK (63 million EUR). The National Agency conducted the program during four years in cooperation with National Centre for Mathematics Education (NCM) at Gothenburg University.

The model of the professional development programme is based on collegial peer learning among teachers. In Sweden, school manager is responsible for organising in-service training. Using this model, a team of subject teachers (e.g. math) is grouped together within a school (or from different schools) for a length that stretches over 16 weeks. The National Agency for Education recommends that schools include a provision for time allocation and allocate a tutor for the group (initially financial help was available) in order to run weekly meetings by teachers and the tutor.

The whole programme is composed of "modules" which are delivered as web-based digital resources. The modules are self-standing and self-paced units, it is estimated that one module takes about 30 hours to go through. For example, the whole offering of "the Boost for Mathematics" is composed of 36 modules aimed at different levels and with different focus. Each module includes four steps: (A) individual reading and watching films (45-60minutes), (B) meeting with colleagues and the tutor (90-120 minutes), (C) a classroom activity, and (4) meeting again to discuss the experienced consequences (45-60 minutes).

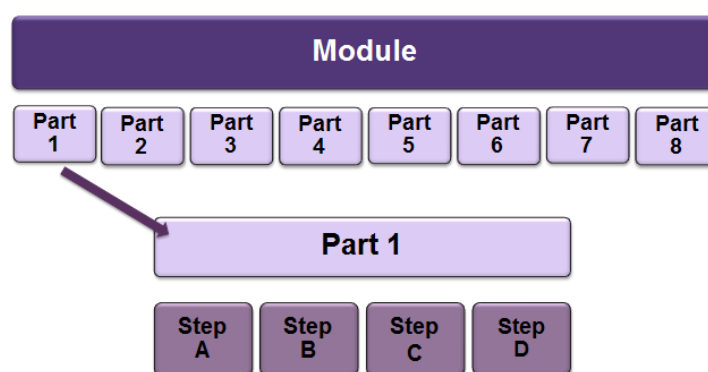


Figure 4. Each "Module" has eight "Parts", and each "Part" is divided into four "Steps" A-D.

This training model mixes individual and collegial learning. Each module includes a step where a meeting with colleagues and the tutor is organised to discuss the self-studied material and to prepare a classroom activity together (steps A and B). Then, each participating teacher runs the designed classroom activity individually in their classroom (C). Following that, a reflective group discussion session is organised to examine their own teaching and that of others, to highlight difficulties, and to exchange methodological and didactic practice (D). A tutor is supporting these activities. The model has strong base in research on school improvement and

⁵ <https://larportalen.skolverket.se/#/moduler/1-matematik/alla/alla>

⁶ <https://larportalen.skolverket.se>

professional development, e.g. a peer-tutoring approach such as Japanese “Lesson Study” (without its peer-observation part), and the model of SINUS for teaching math (Ostermeier et al., 2010). Jahnke (2016) also reports that the original training model is based in previous research e.g. by Clark and Hollingsworth (2002) and Hattie (2008). The content of the training modules is closely related to different mathematical areas in the national syllabus. It is developed in a peer-reviewed process by teacher educators from all universities in Sweden and after being launched, the content has been revised by collecting data from school visits.

Several studies exist on the “the Boost for Mathematics”-initiative (e.g. Österholm et al., 2016; Ramboll, 2016) highlighting that the collegial part of the programme is important. External evaluations demonstrated, for example, that the participating teachers felt that the training helped to develop and implement new teaching methods in their practice and gave them a better readiness in terms of new “tools” to teach. The programme also boosted teachers’ self-esteem and helped to become more reflective in their role as a teacher. In order to sustain the desired practices, however, the support of school head and the school management team becomes important. The model will also be evaluated in terms of delivering better students’ learning outcomes in Math⁷, results are foreseen in fall 2018 (estimation) by a research institute under the Swedish Ministry of Employment⁸.

The initial model, which was tested in “the Boost for Mathematics” programme, is replicated to other subject areas. Similar professional development modules are available to boost the quality of teaching in writing and reading comprehension (“the Boost for Reading” - Läslyftet) and Special Education & pedagogies. In the area of the Digitalisation of education⁹, since spring 2017, modules are offered for school heads (Leading Digitalisation) and for teachers (Teaching and Learning with Digital Tools) in support of the Swedish government initiative for elementary school, upper secondary and adult education for skills development. The big difference is that the latter programme does not have funding for tutors.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes (self-study units)	Yes	Yes	A semester	Yes

2. LeerKRACHT (NL): Creating continuous improvement culture in schools (see also the [in-depth case study](#))

LeerKRACHT¹⁰ is a Dutch foundation who runs a coaching programme for schools with an aim to gain more effective learning and a more enjoyable working environment on a long run. The focus is on changing the school culture which is seen as a lever for the above-mentioned goal. The piloting of the programme started in 2012 with 15 schools and by the end of summer 2018, it has attracted more than 750 schools (out of approx. 7000 total). The programme is designed to make teachers work together in a “continuous improvement culture¹¹”, modelling the same way as corporate

⁷ <http://pedagog.stockholm.se/matematik/matematiklyftet-har-hojt-resultaten/> and https://issuu.com/pedagogstockholm/docs/l_ra_2_2017/31

⁸ <http://www.ifau.se/en/Research/Current-research/Education-policy/does-the-boost-for-mathematics-boost-mathematics-results/>

⁹ <https://www.skolverket.se/skolutveckling/resurser-for-larande/itiskolan/styrdokument> and <http://www.regeringen.se/pressmeddelanden/2017/03/starkt-digital-kompetens-i-laroplaner-och-kursplaner/>

¹⁰ <https://stichting-leerkracht.nl/>

¹¹ Each day, together, a bit better - ‘elke dag samen een beetje beter’.

companies do, for example, as part of Agile software development culture¹². Schools participating range from primary to secondary, also VET, and the programme is also being extended into Initial Teacher Education¹³.

The method is based on cycles of 8 weeks and at the core of it, there are four tools: the whiteboard, educational visits, educational sharing, and students' voice to give feedback. (1) The whiteboard session is a short, weekly staff session where ideas are translated into goals and action plans for the whole team to achieve. Whiteboards form a central point of the training and its advancement. (2) Within-school classroom visits are organised in order to observe colleagues in action and to enhance knowledge sharing among colleagues. (3) Bi-monthly reflection sessions, on the other hand, are there for joint lesson planning, to collaborate on possible solutions to issues, etc. (4) Students' voice, which is the latest addition to the set of tools, offers a structured possibility to get the learners' view integrated as a possible source of inspiration for the improvement. The method emphasises creating a weekly rhythm to use the tools. This allows for a cycle of doing, experiencing and improving.

Schools sign-up voluntary to the programme upon the decision of the school head who has an important role throughout the programme in supporting the change management process. In terms of the time allocation, teachers are scheduled time for implementing the 4 above-described tools, e.g. each teacher some 2 hours a week. In-school coaches have a central role to play and their involvement requires more hours. The cost of participation depends on the type of the school (e.g. primary school € 7,950/first year¹⁴).

At preparation phase, a "start team" is trained by an expert coach from the LeerKRACHT Foundation. The team includes 2-3 in-school coaches and a small management team. In a 3-day training, they get acquainted with the method and are trained to use the tools. After the "start team" is ready, the school starts its first 8-week initiation cycle. Small groups of teachers are formed, from about 8 to 10 participants (not subject specific). With the help of the in-school coach, each teacher team starts using the 4 tools in a weekly routine. The method additionally includes an online platform where survey type of tools are made available (e.g. to track progress step-by-step; to evaluate the mood). At the end of each 8-week cycles, internal stock-taking and reflection takes place so that teams can make new adjustments in short cycles.

The in-school coach has an important role in supporting the group of teachers in order to ensure that things remain dynamic and that teachers experience what cooperation means to them. The expert coach from the Foundation remains involved, although their role is mostly to be engaged in supporting and coaching the management team and in-school coaches. The approach is a 2-year intensive transformation programme after which a continuous support programme is available¹⁵.

An important role to support the change management process is placed on regional "pizza sessions" where teachers from different schools who implement the programme are invited to an informal get-together and sharing. This between-schools peer-support is important - also as a way to go through emotional dips which evidently are faced during the change of school culture.

An interesting additional part of the programme includes visits to Dutch companies that use similar "continuous improvement" culture, e.g. daily stand-up meetings to improve quality. For example, TataSteel, Philips, ING, TomTom, or even the grocery chain Albert Heijn, offer observation visits to their premises. The visits offer teachers, school leaders and education administrators an opportunity to see

¹² <https://www.versionone.com/agile-101/>

¹³ <https://stichting-leerkracht.nl/how-a-simple-idea-is-transforming-dutch-education/>; Short video in English: <https://www.youtube.com/watch?v=sbIkyH0HiX4>

¹⁴ <https://stichting-leerkracht.nl/aanpak/>

¹⁵ <https://stichting-leerkracht.nl/inspiratieprogramma/>

similarities between the goals of creating a culture of improvement in companies to that of shaping learning in schools. Every year around 1 000 teachers, school leaders and education administrators visit 15 major companies. Such close co-operation is made possible thanks to the fact that the programme was initially started by McKinsey & Company Netherlands as part of their pro bono actions for education and part of their corporate responsibility programme.

In the Netherlands, the law regulates that schools are checked (by the Education Inspectorate) for basic quality and, from August 2017 onwards, also for improvement culture which, for example, could be achieved through the LeerKRACHT coaching programme.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	Yes	Yes, through collegial sharing	Yes	Yes	1-2 years	Yes

3. Prof'Essor (BE): A method for fostering in-school teacher collaboration (see also the [in-depth case study](#))

Prof'Essor is a method and set of tools that aims to enhance teachers' classroom practices through a culture of continuous improvement among teachers. It is based on the same set of tools than LeerKRACHT in the Netherlands (example 2), but implemented by a different education stakeholder in a different country, namely in the French-speaking community of Belgium.

To facilitate and increase in-school teacher collaboration, the programme Prof'Essor was launched in 2014 by the Secretary General of Catholic education (la Fédération de l'Enseignement fondamental catholique¹⁶, henceforth referred as SeGEC) within its network of 750 Catholic schools. After an initial pilot with 8 schools in spring 2014, by the end of June 2018, approximately 3000 teachers & pedagogical professionals from 110 schools are participating in this professional learning model.

Similarly to LeerKRACHT, the method is based on cycles of 8 weeks, but it only involves three main tools: the whiteboard, educational visits and educational sharing. (1) The whiteboard session is a short, weekly staff session where all pedagogical preoccupations and wishes are translated into goals and action plans. These are marked on a physical white board which forms a central point of the training and its advancement. Secondly, (2) there are in-school classroom visits to observe colleagues in action, e.g. while they implement a specific teaching method, how they deal with a child in need of special education, and so on. Last, (3) there are the bi-monthly reflection sessions concerning the planning of lessons or parts of them, to collaborate on possible solutions, to share constructive feedback and to go over issues that were hard to deal with in order to reflect, find new ways to deal and adopt new practices. At the end of the 8-week period, there is a reflective session before the cycle re-starts again.

Individual schools, who are part of the SeGEC school network, voluntarily sign up with no cost for the Prof'Essor programme which starts with a 2-day immersion course to familiarise with the method and to learn about the tools. The training is organised by SeGEC and teachers can use their CDP days for it (3 days allocated for PD/year). Each school will involve a school leadership team and will appoint its own in-school pedagogical coach along with a group of teachers (8-12, not subject matter related)

¹⁶ <http://enseignement.catholique.be/segec/index.php?id=2239>

who are at the first wave to start the programme. After the immersion course, the programme is run onsite in school for a period of 8 weeks during which the in-school pedagogical coach works with the group of teachers to support them in using the new techniques and tools. With iterative small steps of improvement, and with the help of the pedagogical coach, the staff will eventually achieve a change in practices. In this process, each school, and especially its management team, receives help from a pedagogical coach by SeGEC.

For the school leadership team, the aim is to focus the director's time on improving teachers' instructional competences. Support tools are also available through the coach by SeGEC and through on-going evaluation of the process, both by teachers and the school management team themselves, in an anonymous way using web-based surveys. The programme also encourages exchanges between the participating schools, for example, by having get-together meetings around a dinner.

Currently, SeGEC has 4 teams comprising of 43 pedagogical coaches available to train and support schools with the method of Prof'Essor. They are spread around the different provinces of the region (e.g. Liege, Namur, Bruxelles). On average, each pedagogical coach has 1-2 waves of trainings (8 weeks) at the time, which could comprise of 2 schools, depending on their size.

In 2014, SeGEC organised the initial pilot with the help of McKinsey Belgium to test and adapt the method which was already then in use in the Netherlands (see LeerKRACHT, example 2). The aim was to appropriate the model to their own use and to train the SeGEC pedagogical coaches. In terms of the implementation and the transferability of the overall method, SeGEC was quick in gaining independence with the method and its tools. Additionally, McKinsey Belgium, who initiated their education track in 2007, has supported 2 other school networks implementing the method in other municipalities; the Province of Hainaut (program Collabor'Action) and within a public school network in Wallonie-Bruxelles Enseignement (program PratiCole).

Before starting the pilot in 2014, SeGEC did not have similar professional learning programmes for teachers in place. Thanks to pilot schools' positive response to the models, and the policy push called "Excellence in Education Programme"¹⁷, which demands for teacher collaborative practices in schools, SeGEC is committed to continuing the programme.

An external evaluation of the implementation in schools was conducted after 3 years of implementation. Along the way, SeGEC has seen that some changes to the tools and processes were needed in order to adapt them in their context. For example, one period of 8 weeks is rarely sufficient to sustain the new practices in schools, but more follow-up and support is needed through SeGEC pedagogical coaches and also through between-schools exchanges.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	Yes	Yes, through collegial sharing	Yes	Yes	8-12 weeks, later with SeGEC's support	Yes

¹⁷ <http://www.pactedexcellence.be/>

Empowering learners through competence-oriented approach

4. Young Coaches for the Internet 2.0 (CY): Empowering students to educate others

The teacher CPD programme programme called Young Coaches for the Internet 2.0¹⁸ provides teachers with the competences and activities to coach their students to train others, including fellow students, adults and even teachers of their own school, on the creative and safe use of the Internet. The CPD programme is planned and organised by the Educational Technology Department¹⁹ of the Cyprus Pedagogical Institute, which is under the Ministry of Education. Similar activities were started already in 2013 as part of the Safer Internet programme called "Young Coaches for the Internet"²⁰.

Teachers can apply for the professional development which lasts the whole school year. Annually, 15 schools can participate in the programme that includes teacher workshops on how to coach students, and how to teach students to coach and teach others. It also includes workshops on specific topics related to Safer Internet. Importantly, the programme also includes following up of the implantation plan that teachers create themselves for their activities. At the end of the school year, a follow-up seminar is organised for the participating teachers.

In each participating school, some 20 young coaches participate in the programme. The activities take place during school hours (e.g. 1h/week as part of "interest group time"), but often after-school hours are used. With the guidance of their teacher and the support of specialists, the young coaches develop an action plan for their school, and over the school year, design and implement actions. The role of the participating teacher is to coach the youth to develop and implement an action plan in their school which often include training their classmates and friends, as well as parents and teachers on chosen topics. The actions can be broadened to the community where the school is located, for example to train internet-illiterate pensionaries.

The programme offers two possibilities for teacher professional development: on the one hand, the teachers who participate in "Young Coaches for the Internet 2.0" as a CPD activity will be able to acquire competences to teach various transversal competences to their students and to organise activities where students have a chance to put them in practice.

On the other hand, as a secondary effect, teachers of the participating schools also have a possibility to get training from the young coaches. As an example, the young coaches have created training material on the use of educational resource portal for digital material. But other topics, which are not directly related to teachers' profession, are also popular; such as the use of online shopping platforms²¹, internet banking, and popular communication tools. In general, the feedback has been very positive and encouraging, and the participation rate is high. In other words, the CPD programme offers a possibility to create novel in-school professional development opportunities at the same time giving students new roles by empowering their knowledge and experience which, in often cases, are acquired from a context other than formal education. Additionally, the programme also encourages students' activities within school and across age-groups, also extending them outside of school to reach out to the local community.

¹⁸ <https://youngcoaches.pi.ac.cy/>

¹⁹ http://www.pi.ac.cy/pi/index.php?option=com_content&view=article&id=58&Itemid=270&lang=en

²⁰ https://www.betterinternetforkids.eu/en_US/web/cyprus/profile

and <https://youngcoaches.pi.ac.cy/what-is-young-coaches>

²¹ <http://anyflip.com/bookcase/gooo>, lessons in Greek, see Amazon 1 and 2

In order to scale-up good practices established through the CPD programme, the model of students becoming young trainers for adults on the use of internet is taken further in an Erasmus+ funded project called EDUWEB²². The project combats digital exclusion by supporting and helping children educate digitally illiterate adults in safe and creative use of the internet. The training materials²³, which are based on the DigComp framework²⁴, include booklets for Teacher training²⁵ and Student training²⁶ in English.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes, ICT	No	Yes	Yes	Yes	Yes, a year	Yes

5. Oxfam intercultural mentoring programme (IT): Tools for teachers to support migrant integration at school

In order to improve the learning abilities of students with a migrant background and empower them, Oxfam Italy²⁷ offers a 5-day professional development course for teachers and educators. At the core of the model, the idea is to create a group of mentor students in schools. Through a peer-to-peer approach, mentors guide and support other students, especially those with a migrant background, during their integration phase at school and throughout the whole school year, especially if they face difficulties at school or are at risk of exclusion. Often mentors are students who found themselves in a similar situation earlier, thus further empowering them with a new skill set for the future.

The professional development programme promotes a model that fosters young people's sense of initiative and leadership, and builds their civic competence as well as active citizenship, thus emphasizing a competence-oriented approach to education. The aim is to further develop students' confidence and motivate them to be involved in applying their competences in the future.

The course provides teachers with an adaptable and flexible model based on which they can identify, train, supervise, support and evaluate the mentor students. The method has been piloted within in five countries (Italy, Poland, Spain, Turkey and the United Kingdom)²⁸ thanks to a European Comenius project in 2015. Oxfam Italy offers the course 3-4 times a year for which teachers can apply for an Erasmus+ grant.

The training gives teachers and educators opportunities to reinforce their intercultural competences. Through the use of inclusive and participatory approaches in multicultural educational contexts, the course introduces concrete tools to identify and measure educational needs in a multicultural context. The "Intercultural Mentoring Program" training also focuses on developing teaching methodologies and an action-research approach to promote integration at a whole school level, the aim being that each participant will leave the course with a professional development

²² <http://ec.europa.eu/programmes/erasmus-plus/projects/eplu-project-details/#project/e780baef-621d-46b4-bf4c-edd41931c00c>

²³ <http://eduweb-project.eu/index.php/en/eduweb-en/documents-en>

²⁴ <https://ec.europa.eu/jrc/digcomp>

²⁵ http://eduweb-project.eu/images/otherdocuments/teachers_training_booklet.pdf

²⁶ http://eduweb-project.eu/images/otherdocuments/students_training_booklet.pdf

²⁷ <http://edu.oxfam.it/erasmusplus/portfolio-view/intercultural-mentoring/>

²⁸ Video: <https://youtu.be/3-gFbnLjdZI>

plan incorporating clear objectives for an inclusive teaching method where diversity is seen less as a challenge and more as an opportunity.

The course methodology itself is based on an action-research and peer educational approach and includes practical workshops, moments of reflection and time for individual-collective investigation and collaboration. The Intercultural Mentoring Program model has been designed by Oxfam Italia thanks to long experiences on the educational field within Italian secondary schools²⁹.

The support material, which is self-teaching materials, includes training courses for teachers from the perspective of key competences. The support material includes a Didactic Kit which guides how to implement a model of intervention in secondary schools system that can help to resolve certain situations. The Guideline Handbook³⁰, on the other hand, supports the future implementation of training courses – by other education organisations and secondary schools taking advantage of the “train the trainer-model”.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes, multicultural education	No	Yes	No	Yes	No	Yes

6. PopUp School (FI): Digital platform for creating communal learning events

“PopUp School³¹” is a free-of-charge web-based platform that can be used to organise educational “one off” events (i.e. pop-up events). The platform fosters a method of schools as an open learning community. In general, all pop-up participants are committed to creating learning spaces where exchange can take place, thus blurring the boundary between teacher, student, parent, locals, etc. In spring 2018, the platform has nearly 80 000 users. During the first 10 months of 2017, more than hundred PopUp School events had been organised across the country in Finland.

“PopUp School” can be used by any entity who wishes to organise an onsite learning day or event, for example a day full of (extra-)curricular activities in a school or a teacher professional development event. The platform helps to create the event, invite people, sign them up to different sub-events or workshops, and also helps to promote the event through social media. The platform offers detailed instructions for organising events.

In Finland, the platform is also used to organise teacher professional development events and activities, many of which seem to promote a new method of “pop-up training” through involving participants in organising the event (e.g. “un-conference”). For example, the city of Tuusula, Finland, organised a pop-up CPD event for its 400 teachers who, by using a participatory method, were able to propose the topics and the trainers for the annual in-service training day³². Many of the teacher professional development and learning events organised through the

²⁹ <http://ec.europa.eu/programmes/erasmus-plus/projects/eplu-project-details/#project/3190a144-875b-4206-b7a9-886f768ca471> and <http://interculturalmentoring.eu/en/>

³⁰ http://interculturalmentoring.eu/images/Toolkits/GUIDELINES_TO_IMPLEMENTING_THE_MENTORING_MODEL.pdf

³¹ <https://www.popupkoulu.fi/about>

³² Article from the Finnish teacher union’s magazine only available in Finnish: <http://www.opettaja.fi/cs/opettaja/jutut&juttuID=1408918031497> and <https://www.popupkoulu.fi/festivals/95>

PopUp School include fresh and contemporary topics such as new practices around the curriculum reform, leadership, collegial peer-learning, etc³³.

Most of the “PopUp School” events are co-organised by school, students and/or parents either as formal or non-formal learning activities. In these events, learning activities are either part of a regular school day or as a special day during a weekend. The Finnish national core curriculum requires pupils’ participation in planning “multidisciplinary learning modules” at least once a year, so the PopUp School platform offers a tool to facilitate such planning and organisation. Multidisciplinary modules are defined as a theme, project or course that combines the content of different subjects and deals with the selected theme from the perspective of several subjects. Through organising such events as part of the school activities, teachers involve learners and other stakeholders in active planning, thus helping learners to take action and eventually gain agency over their own learning.

The platform is provided by a Finnish non-profit association called “Development Centre Opinkirjo”, a service and content provider promoting the well-being of children and youth already since 1947. It was first offered in nation-wide use in 2015, before which, for a few years, it was offered regionally in Helsinki as one of the services by the city. The platform monitors the numbers of the participation and its geographical spread, but currently no other research is on the way. User feedback is taken seriously and the tool has been modified in various iterations. There has been some interest from abroad on the tool and its philosophy, some collaboration is forming up with Scotland including piloting the tool there.

For the moment, the term “pop-up school” has many meanings which are not necessarily related to the name of this digital platform. A quick search for “pop up schools” on the internet reveals various meanings, e.g. that the school is set up after a catastrophe or a fire³⁴, charter schools in developing countries following scripted lessons delivering low-cost education³⁵, a mobile classroom that serves children most in need and visits various parts of town³⁶, citizen events for non-formal learning³⁷, etc.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Possibly	Yes	No	No	No	No	Yes

7. Innokas Network (FI): Maker-space activities for cross-discipline learning (see also the [in-depth case study](#))

The Innokas Network is a Finnish school network with the approach related to “maker culture”. The underlying idea is to support learning and teaching of 21st century competences. The Network currently includes more than 500 Finnish schools from 190 towns and municipalities around the country. Its goal is to make creative and innovative use of the available technology around us, the challenge is aimed at primary school students, teachers, parents, and administrative and industry stakeholders, who also participate in the Network.

³³ <https://www.popupkoulu.fi?q=veso#festivals>

³⁴ <https://www.hertford.ox.ac.uk/news/pop-up-school>

³⁵ <https://www.wired.com/2013/11/schoolinabox/>

³⁶ <https://www.umflint.edu/popupschool>

³⁷ https://www.washingtonpost.com/news/answer-sheet/wp/2015/06/16/radical-pop-up-schools-a-new-way-to-reach-educationally-disadvantaged-communities/?utm_term=.96ab2bd45f24

Since 2015, the Innokas Network is coordinated by the University of Helsinki, although already since early 2000, different actors have carried out its activities first starting at the local level in the municipality of Espoo. The main driver for the Network is the integration of programming (coding) into the Finnish curriculum from 2016 onwards. Another driver is the availability of robotic technology which offers a practical hands-on tool to learn the principles of programming.

The Network aims to enable and support teaching and learning through competence-oriented approaches and in a practice oriented way. Today's children live in the middle of a digitalization and automatisisation processes that touch many aspects of their lives. Teaching students to observe and to make sense of the technology around them is important. In simple robotics and programming activities, students can learn to use critical and creative thinking, and engage in problem solving. This can provide students with transferable competences that help them become a maker and innovator, not only a consumer of surrounding technologies and services.

Schools sign-up for the Network using a very simple online procedure and at no cost. What is important is that each participating school nominates 1-3 liaison teachers who take responsibility for coordinating cross-curricular activities, e.g. in science, math, hand craft, arts, through cross-grade and whole school approaches. Importantly, while carrying out the activities, both students and teachers are encouraged to assume new roles, freeing them from the constraints of their traditional relationship. For example, a teacher does not need to be a robotics or programming expert to start such activities, their task is to think how they can explore the area together with their students. As the new Finnish curriculum also encourages teacher collaboration across subjects and team-teaching, the Network's activities are also well placed to promote in school teacher collaboration.

The Network provides teacher training events, either directly or through partnership trainings, but it also provides more focused "made to measure" professional development to schools³⁸. Importantly, to be close to schools, 36 coaches throughout Finland support and give hands-on coaching for schools. These coaches are paid through a national project funding for their role, which usually includes one day a week work for the Network. The Network also provides digital learning resources for inspiration; the topics range from everyday automation of lifts and traffic lights to creating smart clothes and electronic textiles, but also using sensors and Micro:bit technology, to mention but a few. For example, with 10 Lego EV3 robots a school could start a group on programming working pairwise (hardware is usually provided by the municipality).

From 2012, the Network also organises a national robotics tournament where students can compete in five events, which all have different focus, e.g. robo sumo-wrestling, free style and robotic dance/theatre special called "Dancing with robots". This variety for expression proved to be successful in engaging a wide audience in coding activities including also girls. In 2018, the national Broadcasting Company (YLE) televised the Robotics tournament in a 9-week long television series³⁹ with 23 mixed teams participating from all parts of Finland.

All the activities of the Network and schools are driven by the model of Innovative School which is co-created by the participating schools and the Department of Teacher Education at the University of Helsinki. This research based model focuses on the development of students transversal competence (e.g. to think critically and creatively, to make use of a wide range of tools creatively, to engage and interact in heterogeneous groups, to act autonomously and to take responsibility). In this model, students take an active part in the planning and implementing school activities (e.g. students become tutors). Other important parts of the model include;

³⁸ <https://www.innokas.fi/en/training/>

³⁹ <https://globalinnokas.com/2018/05/23/innokas-networks-robotics-tournament/>

teacher professionalism, shared leadership and the establishment of collaborative networks and partnerships with the local community and companies (Korhonen et al., 2014). On-going pragmatic and design-based research is taking place between the University of Helsinki and Stanford University.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes, STEM	Yes	Yes	Yes	Less	Depends	Yes

Innovating online delivery for professional development

8. Improving the Quality of the In-Service Teacher Training System (HR): Courses delivered online on topics of teachers' needs

By the end of 2017, approximately 10% of all general education school staff in Croatia has undergone an online in-service training course provided by the Education and Teacher Training Agency (ETTA⁴⁰). Based on a wide stakeholder consultation in 2013, where many teachers expressed their need to refresh and strengthen their knowledge, understanding and application of modern didactic approaches in the teaching and learning process, a number of interdisciplinary topics were defined for courses. The delivery was planned through a MOODLE platform in an easily accessible digital format. These in-service training courses are free-of-charge.

Depending on the course, the workload counts from 8 to 20 hours throughout 4–6 weeks. Courses contain video-clips, e-books, various digital materials and individual tasks. The content of these courses covers various areas demanded by teachers: *Assessment of Learning Outcomes; Individualisation in the Teaching Process; Teaching and Learning Strategies; Challenges of Mentoring Novice Teachers; and Pathway to Professional Development*. Since 2015, two additional courses were added – one related to *transversal knowledge, skills and attitudes* and another one specific for *Religious Education* teachers.

Courses are designed in a way that they encourage cooperation among participants during the course – the idea is also to stimulate further cooperation among participants after the course, which is especially valued by the participants. There are also some examples of further cooperation, for example, of work that participating teachers have presented at national teacher conferences. Mentors are involved to a certain level, especially in the courses that were designed latter. The courses developed at a later stage also require fulfilling tasks with learners in the classroom, whereas such activities are optional for the older courses.

New courses are opened every 2-3 months and the maximum number of participants is admitted based on a cohort system. Annually, approximately 1 500 teachers and non-teaching staff participate in the five e-learning programmes, their feedback is very positive. The participation is recognised by e-certificates in the same way as participation for regular face-to-face courses. The certificate is provided by ETTA, a public institution funded from the state budget that offers teacher professional development free-of-charge to teaching and non-teaching staff of Croatian schools and teachers. Teachers need the certificate for their eventual promotion into higher ranks of teacher-mentors and teacher-advisers.

The training provider, ETTA, estimates that choosing digital delivery using an already available platform has proved to be an enormous success. It has worked around the known bottlenecks of participation, for example increasing access to CPD for teachers living and working in remote areas of Croatia (e.g. islands); for younger teachers with small children; and for those who work in several schools to fill in the full-time employment.

A prior to Croatia's accession to the EU, enhancing in-service teacher training was recognised as a strategic priority for Croatia's national, social and economic development. In the context of Croatia, the initiative can be considered to be large scale due to its sustainability and the fact that running the courses does not incur any additional costs. The provider ETTA considers that these e-learning courses complement the face-to-face in-service training offering, which they also provide, as they directly answer to the most urgent needs identified by Croatian teachers.

⁴⁰ http://www.azoo.hr/index.php?option=com_content&view=article&id=1999&Itemid=343

The development of the five e-learning programmes was part of the project called "Improving the Quality of the In-Service Teacher Training System" that was EU-funded through IPA programme (2012-2014) which was available to Croatia during its pre-accession period. ETta developed the courses in cooperation with experts from CARNet and other professionals in the fields of each topic. CARNet provides its services free-of-charge to public institutions in the education sector, it also provides the Moodle platform. CARNet is a public institution funded from the state budget.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Some	Yes	No	No	No	Yes

9. MENTOR (PT): Online course to coach mentors to work with NEETs

To support teachers acquiring the needed competences to reduce the number of Youth Not in Employment, Education or Training (NEET), the Portuguese Ministry of Education provided 2 courses which were attended by more than 2000 teachers over the school year of 2017-2018.⁴¹ One of the courses was delivered as an online course (MOOC) and it was completed by close to 1600 teachers with average completion rate being at 58%. The other one was delivered on a digital platform (Moodle) and it attracted close to 600 teachers with the completion rate of 98%. The success of both professional development programmes was in their design and content, but also a recent change in the national strategy for education.

In 2017, the Portuguese educational system had set a new strategy to reduce the rates of early school leaving and NEETs. This meant that schools, who had students at risk of leaving without obtaining at least a lower secondary education certificate, were supported in organising small groups of students (<10) to accompany them on a weekly basis by a regular teacher acting as a mentor. Each mentor used 4 out of their 22 work hours to work with these students⁴². The intention was that, thanks to this close monitoring, conditions for improving students' academic achievement could be created.

For teachers to deliver such mentoring sessions, there was a need for specific professional development on mentoring, but also how to improve students' competences in learning to learn and in self-regulated learning. The Ministry of Education, namely its Serviços de Projetos Educativos, contracted an independent research team from at the University of Minho (School of Psychology⁴³) to develop and run MENTOR, the teacher professional development program which was to be delivered free of charge.

The response was two-fold⁴⁴; teachers were offered two different types of online courses, both with complimentary content, but each accommodating to teachers' different needs of participation. On the one hand, there was a 6-week online course (MOOC) where teachers worked autonomously (15h) using a digital platform (edX) provided by the Ministry of Education. The content was designed to help them cope with the mentoring task; it included theoretical sections and purpose-built videos addressing how mentors are expected to set up mentoring sessions. It also

⁴¹ <https://www.publico.pt/2017/03/20/sociedade/noticia/quando-os-professores-sao-tambem-tutores-e-o-objetivo-e-mudar-comportamentos-1765443>

⁴² <https://www.publico.pt/2016/06/17/sociedade/noticia/quatro-horas-de-tutoria-para-alunos-com- dois-ou-mais-chumbos-1735468>

⁴³ https://www.psi.uminho.pt/pt/_layouts/15/uminho.portaisuoel.ui/pages/eventsdetail.aspx?id=50313

⁴⁴ <https://prezi.com/xp5vgji009ss/projeto-mentor-tutorias-autorreguladoras/>

introduced scientific papers, short assignments, and a forum where participants could share experiences and materials.

On the other hand, there was a Moodle course which lasted for eight weeks offering specific pedagogical training on mentoring (25h). It was designed to have weekly assignments which required participants working on their own pace (2h-2,5h) and synchronous (1h) sessions where real time discussions could take place. The content offered a diverse set of materials fit to the diverse educational needs of mentors and mentees (e.g., academic papers focusing on theoretical content, videos of experts discussing the theoretical parts and what do they mean for practice, comics targeting mentees' educational needs, story-books to use in the sessions). The novel part of the content provision was that the organising team, when introducing a new theme, also posted a video where they discussed the theme in a conversational style, going through its main ideas and cornerstones using terms and examples that were familiar to the practitioners - therefore facilitating the interpretation of the theory into practice. These videos were greatly welcomed by the participants.

Apart from the self-paced activities, the synchronous session offered the participant an opportunity to discuss in real time with the trainer and their peers about strategies, tools, and good practices on mentoring, and to complete assignments and receive feedback on their progress. This was possible because each course were kept small, each enrolling only 15 participants from different parts of the country. This created the feeling of an authentic learning community that promoted educational success for all participants. In the end, the participants of these small groups were allowed to continue to use the platform and were encouraged to propose issues or cases from their own classrooms in an anonymous manner. On a monthly basis, the organising team picked up these cases and produced a video where they proposed classroom strategies to deal with issues reported by those giving the mentoring. This helped the participating mentors in their work throughout the school year allowing for sustained participation in professional learning.

The MOOC was repeated 3 times with an average completion rate at 58%. The Moodle course, with a more interactive and evidence-based approach, was repeated 45 times over the school year. As the course content of both courses was different but complementary, there were many teachers who attended both. After completing the course requirements, a certificate could be requested from the School of Psychology at the University of Minho, additionally, for the MOODLE course, 2 in-serve training credits (equivalent to 1 ECTS) could be added with a certificate from the Direção-Geral da Educação (i.e. Ministry of Education office).

The team organising the course, School of Psychology from the University of Minho, conducted research activities on the efficacy and efficiency of this type of online training (two master thesis, one PhD thesis). The course was not provided in the following school year, but the University was able to continue developing the programme and in summer 2018, it was chosen to be a flagship project of Pope Francis' educational team to work with children in South America.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes (Moodle course)	Yes	Yes (Moodle course)	Yes	A course of fixed duration	Yes

10. Aprende INTEF (ES): Digital micro-learning opportunities to overcome time barriers (see also the [in-depth case study](#))

“Aprende INTEF” is an online teacher training initiative run by the Ministry of Education in Spain⁴⁵. It is a digital platform with an aim is to foster teachers continuous professional development and learning. The platform offers non-formal online courses, which are open for anyone to participate, with an aim to transform teacher professional development towards more autonomous and personalised ones, and to make online learning experiences socially connected. The completion of the online course is acknowledged through open badges to showcase the improvement of teachers’ competences and other learning outcomes. These professional learning offerings are complementary to other officially recognised forms of in-service training by the Ministry that result in an official certificate.

The overall training scheme of “Aprende INTEF” is based on a national roadmap to foster teachers’ acquisition and development of digital competence. All the course content is rooted in the Reference Digital Competence Framework for Teachers, published by INTEF and updated in September 2017⁴⁶, which has its origins in the European Digital Competence Framework (DigComp⁴⁷). The content of the courses includes a wide range of educational trends such as Flipped Education, Project Based Learning, Formative Assessment, Nurturing Creativity, Digital Citizenship, Digital Collaboration and Communication, Digital Content Creation, Safety, Problem Solving and so forth.

Variety of different types of online courses are offered, they range from five-week long Massive Online Open Courses (MOOCs) to small Nano Online Open Courses (NOOCs) which are units requiring only 3 hours of instruction time. Such diversity in the length of courses is a result of analysing participants’ online behaviour. The log-file analysis of longer online courses revealed that giving participants smaller “chunks” of content to learn at the time seemed to allow them to overcome the known barriers of time at the same timing increasing flexibility. Other innovatively structured instruction model is called “Self-Paced Online Courses” (SPOOC) which allow participants to advance in their own pace, instead of following the content in fixed times. For those with little time available, there is even a different solution: micro learning opportunities are offered where the estimated workload ranges from 5-7 minutes to 3 “learning hours” (called “Edu-pills”⁴⁸). Thanks to the use of open badges, these micro-learning units can be stacked to comprise the content of a bigger course.

“Aprende INTEF” uses innovative methods such as peer to peer assessment, digital artefacts crafting, aggregated outcomes, teamwork, live events for connected educators and online facilitation by “facilitation teams” including mentors and instructors. The organisers estimate that the fact that every MOOC and NOOC has a live connected online event, which may be viewed online and offline, gives training a humane side that other online trainings lack. The long-term goal of the platform is to generate a sustainable core of professional learning communities that co-build and keep sharing good practices, for that reason, the communities used in online courses remain public even when the training activities are over. The online training actions are funded by the Ministry of Education in Spain and are free for participants. The Ministry of Education invests over 500 000 euros every school year in online training.

Over the school year 2016-2017, INTEF has trained 56 929 people worldwide and has issued over 4 000 open badges. In general, INTEF is rather content with the completion rate and studies show that those who start an INTEF course are more likely to finish it than other MOOC takers in Spain (Castaño Muñoz et al., 2018).

⁴⁵ <https://aprende.intef.es/>

⁴⁶ <http://aprende.intef.es/mccdd>

⁴⁷ <https://ec.europa.eu/jrc/digcomp>

⁴⁸ <https://edupills.intef.es/>

INTEF also runs its own Open Backpack (Insignias INTEF) that is connected to the INTEF digital learning platform to safely store the open badges that teachers have earned. This also makes the Open Badge collections easy to manage and socially sharable.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Possibly	Yes	Yes	Yes	Depends	Yes

11. Teaching Channel (US): Professional videos for classroom peer-observations

Launched in 2011, Teaching Channel is a US-based company running a digital platform that delivers professional development videos for teachers over the Internet and on television. Its overall goal is to change how teachers learn, connect and inspire each other to improve the outcomes for all students. "Video allows one to enter the world of the classroom without having to be in the position of teaching in-the-moment." (Sherin, 2003).

Any teacher can access the library of 1300+ videos free of charge, whereas Teaching Channel Plus, an interactive collaboration platform for professional learning, is a pay service⁴⁹. The videos cover a variety of subjects and classroom topics for teachers at all grade levels from kindergarten through high school. Videos are labelled with metadata facilitating the search for specific content, for example teachers can find videos aligned with Common Core and see which specific standards are aligned with that lesson. Anyone can propose videos of innovative practices and the chosen ones are recorded by the company. Teaching Channel also partners with other companies to deliver videos on new topics, e.g. the Boeing Company developed a curriculum series on engineering. In addition to showcasing effective, replicable and inspiring teaching videos, Teaching Channel also hosts a community for educators to share ideas, best practices and enhance their knowledge, but they can also reach out to other educators to get guidance on teaching methods, strategies, lesson plans and curriculum. There are over 1 million members of the community, made up of teachers, administrators, coaches, and educational support personnel⁵⁰. Some school districts around the US use it to enhance professional development.

The theory behind platform' professional learning model is based on self-reflection, analysis, practice and feedback, at the same time emphasising both watching and analysing one's self and others as part of reflective practice (Sherin&Dryer, 2013). The design of the service itself is based on several strands of educational research, e.g. research on the role of video in teacher education, research on blended video-enhanced professional learning, adult learning theories, online teacher professional development and the production of pedagogical content knowledge⁵¹. As a general research trend, there is a mounting number of evidence on the effective use of video in teacher professional learning. There is also some literature available on how videos such as those offered by Teaching Channel could be used as "thinking prompts" to help asking effective questions about current practices as part of school-based professional development activities (Knight, 2012).

The Bill and Melinda Gates Foundation have provided grants to help fund the educational service, which according to the Foundation's website reach to more than

⁴⁹ <https://www.teachingchannel.org/tchplus>

⁵⁰ <https://www.teachingchannel.org/teachers>

⁵¹ <https://duuciyt57l69v.cloudfront.net/uploads/2018/08/the-research-that-drives-our-work.pdf>

21 million USD⁵² between 2011-2014. Currently, it is a for-profit company in the interest of long-term sustainability. Teaching Channel has won a number of awards and been touted to be one of the five emerging professional development technologies for the Future of Teacher PD (Burns, 2013).

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Possibly	Yes	Yes, through community	Yes, through community	Depends	Yes

52 <https://www.gatesfoundation.org/search#q/k=Teaching%20Channel>

Re-inventing blended learning

12. E-competent teacher (SL): Blended online delivery with practical hands-on session

The "Slovenian Educational Network"⁵³ is based on successful project called the "E-Education" that ran from 2009 to 2013. The programme defined a model for teacher in-service training in 20 different subject areas based on 6 key e-competences that teachers, school leadership and ICT coordinators should have. More than 20.000 teachers (of approximately 25 000 teachers in Slovenia) from virtually all Slovenian schools were involved in courses to gain the basic level of pedagogical digital literacy. This 4-year national project was co-financed by the Slovenian Ministry of Education, Culture, Science and Sport, and the European Social Fund.

The in-service training courses, with 24 hours of workload, applied a blended learning model where 50% of the course was conducted online using a digital learning platform (Moodle) and the rest involved classroom implementations allowing teachers to apply the new knowledge in their own classroom. Some sessions were with fixed timing allowing for synchronous communication among all participants, whereas others required self-paced work either online or in the classroom. The training course usually started with an online session (4 hours) after which participants were provided with 2-3 weeks to work in Moodle and to conduct their classroom implementation. In general, the course content was prepared so that the teachers had to take an active and collaborative role allowing for peer to peer learning to take place. The course ended with another 4-hour synchronous session for feedback and an additional "come and tell us" video conference with the purpose of sharing good practices. At the end of each course, the Moodle area was left open so that teachers were able to go back, review some of the activities and continue collaboration and communication. There is, however, no evaluation to what extent this took place, if at all.

The course assessment was built into the training model; teachers had tools for tracking their own advancement throughout the programme which contributed to an on-going formative assessment. Peer-assessment methods were also used as part of the overall evaluation. The teachers received a CPD certificate and accreditation of 1,5 points for a 24-hour in-service training which they could use for career advancement purposes. The free of charge online courses were delivered as in-service teacher training by the National Education Institute Slovenia on behalf of the Ministry of Education and Sports.

According to the course provider, the combination of online and offline course activities limited teachers weekly workload to about 2 hours per week which was estimated to be one of the success factors. Also the fact that the digital e-competence model with its 6 key competences was adapted to 20 different subject areas contributed to the success of the course. Course provider estimates that this allowed educators to acquire their digital competence in an authentic setting according to the needs of their subject area while working with and learning from their peers. This was also a highly motivational factor for participants; they felt that the training was relevant for their teaching while at the same time this also guaranteed a good transferability into classroom practice.

In 2011, just in the middle of the E-Education project, almost 60% of students in Slovenia had teachers who had participated in a course on pedagogical use of ICT, this is rather high in comparison to an European average of 46%. Additionally, almost 80% of Slovenian students were taught by teachers who learnt about ICT in their free time, as oppose to European average of 68%. The authors of the study speculate that the difference is at least partly thanks to the E-Education project (Kreuh&Brecko, 2014).

⁵³ <http://www.ouslovenia.net/project/slovenian-educational-network-teachers-training/>

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Some	Some	A course	Yes

13. Mediacoach (BE): Programme to foster media multipliers in educational organisations (see also the [in-depth case study](#))

Mediacoach is a year-long course on digital and media literacy for professionals who are interested in integrating media literacy in their own practices and in the practices of their organisation. It is aimed at teachers, youth workers, library staff and others. The aim of bringing such diverse group of professional together in one program is to stimulate collaboration, exchanges and inspiring perspectives. The course was first offered in 2015 by Mediawijs, the Flemish Knowledge Centre for Digital and Media Literacy in Belgium⁵⁴. Each year, around 100 professionals participate in the course for which a certificate is awarded. The number of teachers participating has been increasing steadily over the years. In 2017-2018, about 75% of the participants were teachers, mostly in primary education.

The course is delivered using various methods; it mixes face-to-face sessions with online content and requires an individual hands-on project implemented in one's own organisation. The foundation of the syllabus consists of 9 theoretical modules, which are delivered as an online course. This MOOC is available to all, not only those who participate in the year-long course. The MOOC focuses on digital competence and medial literacy, and provides a theoretical framework on media literacy, at the same time demonstrating a variety of good practices and concrete tools for inspiration. Each module also includes several knowledge questions so that the participants can check their understanding of the content through formative assessment.

The theory, which is delivered through the online course, is further processed and discussed in-depth in face-to-face sessions with a heavy focus on realising specific hands-on activities and practices. 7 monthly face-to-face sessions are conducted over the whole school year taking place in three different cities (Ghent, Leuven, Antwerp), the fact that facilitates access and cuts down the commute for participants. Face-to-face sessions also offer room for practice, exchange and project coaching, as the programme requires each participant to develop an individual project that they conduct within their own organisation throughout the course.

The goal of the individual project is to apply the newly acquired knowledge directly into practice. Therefore, the project should be conducted in the real context of the participant's workplace, for example in a school, and it requires at least an input of 38 hours over the course. The aim of the project is to bring about a tangible result and change within the organisation around the theme of media literacy - during and after the training. Thanks to the help of a personal supervisor, who provides online and offline support where necessary, the participants are coached throughout the process.

Finally, at the end of the course, the participants will present their projects to a jury in order to receive concrete feedback. One criterion for evaluation is that the projects respond to concrete needs of the participant's organisation, as the aim of the

⁵⁴ <https://en.mediawijs.be/mediawijsbe-launches-the-mediacoach-mooc>

training is also that participants will become a point of contact regarding the pedagogical use of media in their own organisation.

Throughout the course, the participants have access to a digital platform⁵⁵. Videos, course materials and other information are made available as additional material for the sessions and to support the ongoing project implementation⁵⁶. Participants can also ask questions and exchange information with each other and their supervisors, but also with media coaches from previous years, as many of them remain active in the community (via a Facebook group). There is also an annual event to bring participants together for further fostering collaboration and knowledge sharing.

The registration fee is 350 euros (VAT included), which is usually paid by the participant's organisation with the funds foreseen for CPD costs. The MOOC, however, is available free of charge. After attending the full training, a (non-formal) certificate is awarded attesting the competences as a media coach. In 2018-2019, in addition to the Mediacoach programme⁵⁷, a specific one is offered for professionals in basic education⁵⁸. The course is an initiative of Mediawijs in collaboration with Culture Connect, LINC vzw and Media Council with the support of the Flemish Government - Department of Education and Evens Foundation.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Yes	Yes	Yes, a school year	Yes

14. eTwinning (EU): Mixing digital and classroom practices to acquire cross-curricular competences

eTwinning is an online platform and a community for teachers in Europe⁵⁹. The platform provides a range of activities including joint pedagogical projects for schools at national and international level, collaborative spaces for activities and sharing practices, and a range of professional learning and development opportunities. In some countries, teachers can earn some sort of CPD recognition or career advancement points for their participation in eTwinning (Vuorikari, 2010).

eTwinning started in 2005 and in August 2018, the number of registered members on the platform reached over 580,000. Participating teachers come from 36 countries, those within the EU and from a number of other ones. eTwinning is designed to be an inclusive network with a relatively low 'participation threshold' as all its support strategies and tools offer an easy way of starting international school cooperation and networking. The eTwinning is one of the main actions of the European Commission.

eTwinning offers non-formal and informal professional development and learning opportunities for teachers: the non-formal ones include online distance courses in addition to on-site professional development workshops which are offered at national and European level. The more informal professional development activities, on the other hand, range from pedagogical project collaboration across-schools to online interest groups on various topics. Especially eTwinning project work takes advantage of mixing hands-on classroom practices and digital components, as teachers

⁵⁵ <http://mediacoach.mediawijs.be>

⁵⁶ <https://mediawijs.be/mediacoachtool>

⁵⁷ <https://mediawijs.be/activiteiten/mediacoach-opleiding-2018-2019-mediawijze-opleiding-wie-jongeren-werkt>

⁵⁸ <https://mediawijs.be/nieuws/mediacoach-professionals-basiseducatie>

⁵⁹ <http://www.eTwinning.net>

implement jointly planned activities in their classrooms, thus experimenting directly with digital tools and pedagogical ideas. Often times, there is more than one eTwinning teacher in a school, so co-planning and team teaching does not only take place online, but also at the school level with close colleagues (Vuorikari, 2013).

A survey conducted in 2016 with a non-representative convenience sample of 5900 eTwinning teachers show that a large majority of the survey participants believe that eTwinning has a significant impact on the development of their competences and teaching practices, the top most impacted areas being their ability to team work, teaching creativity and problem-solving, and decision taking. Interestingly, the surveyed teachers also said that this is the practice they implement the most as a direct result of their involvement in eTwinning (Kearney & Gras-Velázquez, 2018). Even if these findings are interesting and impressive, one has to caution that only a small number of teachers involved in eTwinning engage in across-school collaboration, thus not all teachers who sign-up for eTwinning are automatically reaping the potential benefits that this conducive environment could offer. In any case, as professional development possibilities for teaching transversal competences and skills for future are on high/moderate demand by 40% of teachers in the TALIS study (OECD, 2014), the finding points in the direction that eTwinning is potentially a good fit for demand.

Moreover, 87% of teacher respondents stated that they engage in professional self-reflection about their pedagogical practice, with a similar amount expressing that they use new teaching methods, tools and resources as a direct result of their eTwinning engagement. Very similar results were reported in previous surveys (European Commission, 2013; Kearney & Gras-Velázquez, 2015), indicating that especially those teachers who get involved in the above mentioned cross-school project collaboration are the ones who report the most professional gains. A complimentary way to explain such positive benefits in increased professionalism is through the kinds of relationships that teachers form through participation in a social network for professionals. The benefits that they can derive from this participation are commonly referred to as social capital (Vuorikari et al., 2012).

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes, also cross-discipline	Yes	Yes	Some, e.g. through ambassadors	Some	Yes, especially projects	Yes

15. Education Plaza (IS): Connecting teachers in a sparsely populated country

In 2015, a year-long course on “ICT in education for practicing teachers” was organised to support the professional development of Icelandic teachers. The course followed a hybrid approach combining features of a Massive Open Online Course (MOOC) and a Community of Practice (CoP). The activity was officially recognised as professional development and it was attended by over 300 teachers which in Iceland represents some 7% of all teachers at the primary and lower secondary level (Jakobsdóttir, 2016). The course content was provided the University of Iceland with the funding from the Icelandic Ministry of Education and Culture, and it was provided by Education Plaza⁶⁰. Education Plaza was set up in 2013 to promote and create opportunities for collaborative educational development and to increase collaboration/interaction between Icelandic actors in the educational community.

⁶⁰ <http://menntamidja.is/education-plaza/>

The course used online tools such as webinars, Facebook, blogs and aimed at modelling effective practice. Many of the webinars were conducted by teachers who were participating in the training with the purpose of highlighting the innovative practice already occurring among Icelandic teachers, and to make the existing practices and innovators more accessible to other teachers. Even if sharing lesson plans or digital learning materials is not a common practice among Icelandic teachers, Education Plaza found a way to make space for teachers to talk about and to demonstrate what they do in their classrooms.

The planning of the MOOC had factors that played an important role. For example, the course started with an onsite session that was delivered in various parts of the country, thus reducing the distance to commute but also to allow meeting among teachers of the local area. Such onsite sessions were considered key to the success also because it allowed the organisers to ensure that all participants were aware of what would be expected of them in the online part. It also allowed participants to familiarise with the tools that would be used. Last, the organisers emphasise that such onsite session abled them to understand the community around the course and to identify the thought leaders that would be involved in online sessions.

The course is a good example of various ways in which Educational Plaza (EP) works using a bottom-up approach. One of the goals is to identify and support individuals within the community that others can look to for advice and examples of best practices. Equally important is making the academic community more accessible to practicing teachers and vice versa. Secondly, participants are generally involved in shaping the initiatives through direct input and their interaction during the initiatives which provides strategies and practices that participants can transfer directly into their teaching environment. There is also room for experimentation and innovation so that teachers will be better prepared for increasingly rapid change. Last, since social media is used a fair amount, it allows the participants to learn in their usual context, which facilitates the transfer of what has been learned back to their teaching environment.

Apart from using social media tools to organise open dialogue, e.g. Facebook groups for daily communication outside meetings and courses; "Educational chat" via Twitter every other Sunday (Thayer, 2014), Education Plaza also hosts and develops specific websites to serve as hubs for interest groups. Such hubs are callez *Plazas*, e.g. IT Plaza, Adult Learning Plaza, Education Futures Plaza, Natural Science Plaza, Language Learning Plaza. eTwinning also uses EP for reaching out to teachers and to communicate about its programme and campaigns. Physical knowledge sharing events, such as EduCamps, are organised too.

Importantly, teachers' participation in various professional development activities, such as those outlined above, is now officially recognised as professional development. This indicates towards a systemic level innovation in terms of what types and topics of professional practices are recognised as professional development, but also in terms of the variety of training providers. For example, teachers can now receive recognition for their participation in live online discussions as well as for attending face-to-face events such as the "Educamps". Reportedly, school principals also hold positive views on it. This could be (partly) due to a policy shift toward giving teachers more flexibility in how they wish to pursue their professional development (European Commission, 2018b).

Apart from innovative and flexible types of teacher professional development, the Education Plaza also has a wide set of partnerships involving educators, educational administrators, policy makers, the academic community and other stakeholders, working in communities of practice, both online and in physical spaces. This offers an interesting model of how digital technologies and resources can be used and pooled in a small country with a sparse population to focus on learning opportunities at the national or local level.

The organisers of Education Plaza use data generated from the digital platform, social media and feedback questionnaires to conduct formative evaluations of activities on an ongoing basis, however, no longitudinal study or impact evaluation exist.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	No	Yes	Depends	Yes

16. iKlasė (LT): Informal teacher network providing professional learning

Social media and easily accessible publishing platforms have facilitated the sharing of ideas and practices among likeminded teachers. iKlase.lt is but one example of such web-based communities, which interestingly, also has a very local and physical presence. About 10 years ago, this community started as a blog by a single Lithuanian teacher and has now grown into a bigger community: its FB community, where first posts originate from 2011, has more than 1600 members. The community has mostly a Lithuanian member base, however, since its close proximity with Estonia and Latvia, the group has also attracted teachers from both countries.

Over the last couple of years, this network has taken a different shape through evolution of mutual interests, and some sort of self-organising. Two examples stand out. Recently, the group has organised informal observation visits to interesting and innovative schools. There has even been a cross-the-border visit; a trip by a group of 30 Lithuanian teachers from all-over the country visited a school in Tartu, Estonia. The trip was self-funded by participants (50e for the transportation) and some industry resellers supported them for the accommodation and food. Another new feature has emerged too, namely workshops and seminars (2-4 hours) are offered to schools for teacher professional development purposes. Through the iKlase.lt blog⁶¹, some 20 teachers display their skills and workshops illustrating a micro-entrepreneurial action aimed at creating value for their own community and peers. In a way of becoming entrepreneurial through offering training and professional development workshops and seminars, these teachers now also have a chance to work as occasional trainers. Looking at teachers' career evolution and perspectives for advancement, such activities could be considered as an additional motivator for staying in the profession.

Looking back at the evolution of this teacher community, the background of the teacher who started the blog, on the grand scheme, most likely bears similarities with other informal digital communities where a personal career development path plays a part in the long-term success. At the beginning, even before starting her blog, the teacher attended a seminar by British Council in Lithuania where an expert presented iPod Touch functions for language learning. She was so inspired by the seminar that she started looking for ways to experiment with iPods in her language class. The desire coincided with a larger hardware pilot in Lithuania, which was coordinated by the National ICT Center. She was eventually selected to be part of the pilot and received a set of iPod Touches for the school to use.

In the spirit of sharing and creating value for others, she started the blog voluntarily so that other teachers could learn from her school's experience. Almost a year later, she was invited to attend Apple Professional Learning-programme⁶², an invitation that was triggered by the blog. Through her motivation to share and learn something new, she has also become an eTwinning Ambassador, among some other networks,

⁶¹ <http://www.iklase.lt/>

⁶² <https://www.apple.com/education/apple-professional-learning/>

and conducts training workshops at European level, too. Currently, apart from still working as a teacher, she also runs teacher training gigs for one of the Apple Authorised Distributors in the Baltics and she is also appointed as an “IT in education ambassador” engaging actively in CPD at the national centres funded by educational authorities⁶³ and in activities as eTwinning Ambassador. Throughout the years, both national and international networks therefore have been important outlets for developing personal and professional skills, the fact that offers interesting perspectives and outlooks for future planning of teacher professional development and career planning.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Possibly	Yes	Yes	Yes	Possibly	Yes	Yes

⁶³ <https://www.upc.smm.lt/veikla/about.php> and <https://www.itc.smm.lt/en/centre-of-information-technologies-of-education/>

Engaging learners in first-hand experiences

17. Best Practices Benchmarking course (ET-FI): Excursion to visit schools and observe practices

This 40-hour teacher professional development course takes place in an authentic setting of the EU's top-performing school systems (according to the PISA study): in Finland and Estonia⁶⁴. The programme, called Original Best Practices Benchmarking course, includes school visits with lesson observation; interaction with principals, teachers and students; and offers even opportunities for shadowing teachers' classroom practices. Courses are grounded by lectures and discussion sessions with experts focusing on issues such as lessons learned from the PISA study, and school development and management in both countries. The course is provided by Euneos, a SME in the field of education & training.

The course is organised in both countries, for example 4 days in Finland and 3 days in Estonia. The training model mixes different types of sessions: general introduction on each of the topics is delivered through lectures; classroom observations take place in small groups or individually; whereas sharing of experiences, feedback and reflection is conducted in small groups, in plenary sessions and using social media. The training course also includes pre and post sessions that are organised online. Additionally, each participant is expected to produce a pre-course task and an output afterwards, both of which are also part of the course requirements.

The course cost is 650 euro without room and board. It includes preparation and post course support, tuition and training materials, administration and organisation costs and VAT. Erasmus+ KA1 grant can be applied by the participants' school, it is recommended that a school sends a team, for example, someone from the school management team and a teacher (according to the main trainer, many schools send both a principal and teachers). After the completion of the course, participants get a certification for the course attendance and they can also ask for "Europass Mobility" with content and hours indicated on it. The "benchmarking courses", as they are called, are organised since autumn 2014. Between 2014 and 2017, more than 700 participants have had an opportunity to visit schools, and observe classroom and management practices of peers from schools in these two high-performing PISA countries. A great majority of the participants have given assessments "very good" or "good"; the latest course assessments by previous participants are available online⁶⁵.

The training provider, Euneos, uses a network of experts, teachers and trainers from various European countries for its courses. Euneos OY is a Finnish company, registered in Helsinki in 2005, which originally had Finnish and Dutch founders both education professionals. The cross-border European collaboration between founders started in mid-2000 with the initiation of a school networking project called "Europe meets India"⁶⁶. Euneos itself was founded as a spin-off of Comenius 3 network COMP@CT. Between 2006 and 2017, it has partnered many Comenius 2 and Erasmus+ KA2 projects, the latest projects being about "circular economy" and "digital badges". Since 2017, Euneos no longer participates in Erasmus+ projects.

⁶⁴ <https://www.euneoscourses.eu/?p=147> and <http://www.benchmarkingcourse.eu/>

⁶⁵ https://www.euneoscourses.eu/?page_id=180

⁶⁶ <http://www.eumind.net/index.php/history/>

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	Possible	Yes	Yes	Yes	No	Yes

18. Shadow a Student (US): A day-long challenge for school leaders (see also the [mini case study](#))

Shadow a Student-challenge⁶⁷ is a tool to support school leaders, mostly in compulsory education, in their own professional learning, but also at continuously improving on their school's model. The basic idea is that during one school day, the participating school leader changes the perspective and spends the day following a student around participating in all activities, not only the academic ones, but also sports, lunch and breaks. A free online toolkit supports school leaders in their challenge going through four steps: Preparation, Shadowing, Reflecting and Acting. The challenge is organised annually between the dates of February 19 and March 2. Between 2016 and July 2018, close to 5300 school leaders from more than 60 countries have already taken it up.

Shadow a student-challenge offers school leaders a radically new way to change the perspective of what happens in their school. Shadowing, in general, can lead to powerful and deeper observations and even to insights that can drive change. This is the emphasis of the model behind the programme, which is based on design-thinking and the idea that the observation can lead to a "hack", an action that implements a quick change in practices.

The toolkit, which is freely downloadable on the websites, offers concrete steps to plan the activities around the challenge. The main idea is to turn the rich observations gathered during the day into future opportunities for the purpose of improving the school. This, to start with, requires rigorous planning of goals as well as choosing the student to shadow who would be the best informant concerning the goals set. During the shadowing day, the guide proposes to pay attention to all actions that students take and to observe how students modify the spaces they occupy to facilitate their activities. All interactions and encounters, on the other hand, are telling too, as one can discover unintended uses of objects, processes and products. Observing student's behaviors, preferences and needs can also be revealing about the function of the school and its environment in general.

The model also emphasises the importance of a reflection session in order to focus the future actions to opportunities to improve. It guides the participant to start with "hacks", or "quick wins", at the last step, as they offer a way to rapidly test ideas for immediate feedback. The programme also offers possibilities to connect with peer cohorts at the local area in order for school leaders to better equip students for the future⁶⁸. The programme Shadow a Student is an initiative of School Retool, a professional development fellowship that helps school leaders redesign their school cultures using the small experiments called "hacks" (some examples available on their website⁶⁹). The challenge is supported by the Hewlett Foundation⁷⁰. Academically the programme has a connection with "d.school" of Stanford University, US. One of their Labs works with educators and has a mission to "reinvent professional development for educators". Apart from sharing workable hacks (good

⁶⁷ <http://shadowastudent.org/>

⁶⁸ <http://shadowastudent.org/community>

⁶⁹ <http://schoolretool.org/big-ideas>

⁷⁰ <https://hewlett.org/strategy/deeper-learning/>

practices), there is some emerging academic literature appearing on shadowing students (e.g. Ginsberg, 2015).

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	No	Yes	Possibly	Yes	No	Yes

19. Teacher career services (SE): Career building stipend for Swedish teachers

Teachers career options are usually not discussed about as a very few options exists apart from becoming a school head. Talented teachers are often sought for by industry, for example. In 2013, a governmental regulation was given in Sweden regarding teachers' career services (SFS 2013: 701⁷¹) with a combined purpose to raise the status of the teaching profession and to develop the teaching itself. For that purpose, the state designed a year-long stipend that school leaders could request to make sure that good teachers do not leave the profession while, at the same time, talented students would see the teaching profession more attractive in the future. In Sweden, in general, teachers' CPD is the responsibility of employers, i.e. municipalities and independent schools.

There are two different job descriptions that could be applied for, both with a set of criteria. In general, teachers must have at least four years of teaching experience in the school system and demonstrate a particularly good ability to improve the students' study results. Both positions have a requirement of at least 50 percent teaching (e.g. alone or with colleagues planning and following up the teaching; assess, grade or document students' knowledge development; feedback pupils' development to students or guardians), otherwise, it is up to the principal to design the services to best benefit the school's own needs (some examples outlined here⁷², e.g. responsible for the introductory period for newly employed teachers, coaching other teachers, conducting projects aimed at improving teaching, being a senior lecturer at a secondary school, being responsible for topics and more. Teacher unions are also part of drafting and outlining tasks⁷³.

For example, grants for 2018/2019 were made available by the National Agency in early spring 2018 with a total of SEK 16 million to be used for 180 posts in Sweden (pro rata 8500euros/post)⁷⁴. According to the National Agency for Education, in the budget for 2018, the government has announced annual funding until 2020.

In 2015, a report was published on the programme which outlined that the duties of the teachers who took up the programme were often linked to subjects such as mathematics, Swedish, English, technology and nature-oriented subjects in combination with various development assignments (Skolverket, 2015). The latter often largely determined based on the needs of the school and the teacher's specific skills. The programme has also been criticised in the press and wider society, for example, for widening the wage gap⁷⁵, but also for job description which is not

⁷¹ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/forordning-201370-om-statsbidrag-till_sfs-2013-70

⁷² <https://www.skolverket.se/skolutveckling/leda-och-organisera-skolan/leda-arbetet-i-skola-forskola-och-vuxenutbildning/forstelararens-uppdrag>

⁷³ <https://www.lr.se/yrketsforutsattningar/karriartjanster/fragorochsvaromkarriartjansterforlarare.4.628f11bf13d66b62ff7833.html>

⁷⁴ <https://www.skolverket.se/skolutveckling/statsbidrag/statsbidrag-for-karriartjanster-2018-19>

⁷⁵ <https://www.dagenssamhalle.se/debatt/alliansens-foerslag-staeller-pa-nytt-laerare-utanfoer-30966>

clearly defined (e.g. too many tasks for the compensation) or how the selection of the candidates take place.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Most likely	N/a	N/a	1 year	Yes

20. Pedagogical hackathons (FR): Fostering transversal competences

Hackathons are known as events in which a large number of people engage in collaborative computer programming. The idea is extended in a pedagogical context where a participatory learning event is organised to bring people together to co-design an educational artefact (e.g. activity, digital tool, programme)⁷⁶. The goal of an educational hackathon as a professional learning experience is not only “learning by doing”, but also to combine reflective steps throughout the process so that learning of such competences can be made more explicit.

Pedagogical hackathons have morphed into a tool for teacher professional development and professional learning especially in France thanks to Réseau Canopé, a public institution under the supervision of the French Ministry of Education, who in 2017 published a guide called “Hackathon – Organising educational challenges” (Canopé, 2017). Apart from a step-by-step guide on how to organise an educational hackathon, it outlines some pedagogical foundations for their use in education.

A pedagogical hackathon is an active learning method that re-uses a model developed elsewhere but adapted to an educational context. The goal of the pedagogical hackathon in teacher professional development emphasises its value for teacher professional learning and competence building. The model of Hackathon as a professional tool⁷⁷ by the Academie de Toulouse uses the following constraints: a project approach with real-world relevance (formulating the problem, the creative phase, the production phase), cooperative work in teams, the time constraint (6 hours of consecutive work) and a production of some digital artefact as an outcome. Facilitators and tutors are made available to help teams progress throughout the sessions (e.g. 4-6 facilitators for a group of 24 participants). It is expected that team members would have different competences and backgrounds and that there is some gamification involved.

The act of co-designing an educational artefact, so to speak, remains as a “good excuse” to run a hackathon and to develop new active ways of competence acquisition for collaboration, creativity, collaborative knowledge building and problem solving, but also competences related to creation of new value (e.g. entrepreneurship) and digital technologies with the goal of pedagogical use. The underlying idea being, of course, that once teachers experience Hackathons first hand, they are better equipped to bringing them, or aspects of them, to their practices in school, thus fostering the same competence building in the youth.

In 2018, pedagogical hackathons, courses on them⁷⁸ or even courses to become an organiser of Hackathons⁷⁹, are appearing in continuous professional development catalogues of the French Academies websites who organise teacher in-service

⁷⁶ <https://www.edutopia.org/blog/hackathons-as-a-new-pedagogy-brandon-zoras>

⁷⁷ <https://www.reseau-canope.fr/notice/le-hackathon-pedagogique.html>

⁷⁸ <https://www.reseau-canope.fr/service/concevoir-un-marathon-creatif-de-type-hackathon-pedagogique.html>

⁷⁹ E.g. <https://www.reseau-canope.fr/service/formation-aux-techniques-de-hackathon.html>

training in France. In January 2018, there was even a hackathon to re-think the teaching profession of the tomorrow, attended by the minister himself⁸⁰. Some earlier examples include the "Academie de Creteil", where the Center for Teacher Professional Development, which creates, tests and pilots new professional development models, experimented with "Hackathons" or the "pedagogical marathons". A course around 2015 was aimed to discover new ways in using digital resources in schools. The aim of the activity, also known as a "design challenge", focused on digital resources on digital identity. The aim was to produce a reusable plan to be implemented in a school⁸¹. The participants worked in small groups (e.g. 4 people) and used participatory co-design methods. In this case, the professional development course used blended learning method including a 6-hour face-to-face session combined with 12 hours through a distance learning platform.

Another example of pedagogical hackathons focuses more on pedagogical aspects of the use of new technologies for school collaboration. The French National Support Service of eTwinning co-organised an event with the Université de Poitiers⁸² using hackathon as a method of work. All teams of eTwinning teachers had 6 hours to co-design a final product, which required each team to plan an eTwinning project scenario and a video to promote it, or "sell" it, in order to engage project partners for further collaboration.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	Yes	Yes	Yes	Less	No	Yes

21. Escape rooms (FR): Gamifying teacher professional development

"Escape rooms" are an immersive way to experience problem solving in an authentic context with a limited time to solve a problem. This way of gamification is often used in video games and simulations where an individual has to solve a problem in order to move to the next task in a game. In real life implementations, escape rooms can be physical spaces where, in a playful manner following a background scenario, a group has to collaborate in order to solve a set of problems and thus being able to escape from within a limited time.

This type of gamification effect has also been implemented in teacher professional development and professional learning in order to give participants a first-hand experience about collaborative problem solving, inquiry, group functions and team building, creative use of resources, and time management under pressure - all transversal and life competences for which teachers say they have a high need of professional development (TALIS, 2014). The concept of Escape games in education is based on active learning theory, experiential pedagogy and playful learning. Both physical rooms and online games are being used with subject implementations ranging from STEM topics to history and digital technologies, but also combining them for cross-curricular activities. The model is still very experimental and various ways to implement it as a professional development practice emerge⁸³, below two examples which are illustrative of models, but by no means exhaustive.

⁸⁰ <http://www.education.gouv.fr/cid125502/un-hackathon-pour-reflechir-aux-enjeux-de-la-voie-professionnelle-scolaire.html&xtmc=hackathon&xtnp=1&xtcr=1>

⁸¹ http://dane.ac-creteil.fr/spip.php?page=article&id_article=670

⁸² <http://mrsbienvendu2.blogspot.com.es/2017/05/etwinning-conference-2017-hackathon.html>

⁸³ See a blog post in English at: <http://www.learningscientists.org/blog/2018/7/12-1>

On its online resources portal, the French Ministry of Education offers teachers resources related to Escape games and gamification⁸⁴. One of the models, called ENIGMA, is developed by the Académie de Creteil with the goal of training the participating group of teachers on the pedagogical use of digital technologies⁸⁵. The CPD programme consists of an online game that a group of teachers play in a physical room competing against a limited time to collaboratively solve twelve puzzles and riddles, all designed with a pedagogical goal in mind. Each session has 8-12 participants who, in groups of 3-4, solve the tasks advancing in their own pace in a non-linear way. There are also coaches who help the groups to advance without giving direct answers. This would also be the role of the teacher, were she or he to implement an escape game in their own teaching. Apart from upskilling teachers' digital competence, the goals include using collective intelligence and discovering the diversity of competences that the participants might possess.

The French resources by the Académie de Creteil also include a resource website⁸⁶ that the teachers, who participated in the CPD programme, have developed. All of the resources are available under Creative Commons, thus reusable by others. The site includes an interesting map where participants report "escape room" implementations in schools and adult education⁸⁷, thus enforcing the link between teacher professional development and its implementation in the classroom. Another French resource website for teachers to use Escape rooms and games in an educational context comes by a staff member in the Académie de Rouen who, with the help of volunteering teachers, has collected more than 140 escape games in different subject area for teachers to re-use.

The Teacher Training College of the University of Helsinki, on the other hand, experiments with physical escape room in chemistry⁸⁸. In this example, the puzzles and riddles to solve are related to chemistry, the background story that sets the scene is related to Nobel-prize research on green fluorescent protein⁸⁹. Some of the tasks include participants doing hands-on experiment with low-cost equipment and materials (less than 3e to implement). The example is reported as part of a master thesis research in the University of Helsinki, which also exemplifies that the topic of escape games and gamification in education is getting more focus of research activities (see also⁹⁰). [Example 30](#) also includes an example of escape rooms in Finland.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Depends	Yes	Yes	Yes	No	No	Yes

⁸⁴ <http://eduscol.education.fr/jeu-numerique/article/2238>

⁸⁵ <http://dane.ac-creteil.fr/?article655>

⁸⁶ <http://scape.enepe.fr/>

⁸⁷ <http://scape.enepe.fr/la-carte-aux-tresors.html>

⁸⁸ <http://www.novissima.fi/2018/02/pako-kemian-luokasta-pakohuone-konsepti.html>

⁸⁹ https://en.wikipedia.org/wiki/Martin_Chalfie

⁹⁰ <http://www.adjectif.net/spip/spip.php?article205>

Innovating degree programmes

22. Digi-teacher (FI): Post-graduate degree programme on digital education

A new post-graduate level degree programme targets teachers who already have a master's degree and who wish to specialise in teaching and learning in digital environments, and the planning and the management of digital environments in education. The university level degree programme consists of 60 ECTS and it can be accomplished over a period of 1,5 to 2 years alongside working. The course is offered by three universities in Finland. The first course started in spring 2016 by the University of Helsinki, the other two are offered by Universities in Turku and Eastern Finland in 2017.

The curriculum is composed of theoretical studies with a large emphasis on teachers' own experimentation in classroom and a personal project which needs to implement aspects of the programme's curriculum. The emphasis is both on new forms of teaching and learning but also on aspects of digitalisation in schools and education in general. The following modules are included: the school of the future as a place of work and learn (10 ECTS); Learning and teaching in digital environments (15 ECTS); External expert in educational institutions and professionalism (15 ECTS); Personal project (20 ECTS). The programme follows the goals set for teachers' continuous development in the governmental degree of 1439/2014.

At the beginning of the programme, each participant creates their own personalised study plan with personalised criteria which is used for the purpose of a continuous follow-up. The assessment is based on on-going tasks and demonstrations of competences either through using a portfolio, which the participant collects throughout the programme, but also through participation in activities where peer-assessment takes place. A final interview at the end of the coursework with a panel, which is composed of experts and practitioners, constitutes a mandatory part of the assessment.

In practical terms, the courses are composed of "modules" where some are conducted on-site in face-to-face meetings and others can be attended at the distance using digital means. There are peer activities for reflection and peer support purposes. The prerequisite for courses is a master's degree and previous work experience (e.g. 3 years). The programme can be completed in a course of one year and a half or two years. The programme costs, for example, 3000 euros in the University of Eastern Finland and it can be subsidised through study grants dedicated to adult education. The course syllabus is available only in Finnish⁹¹.

The course is also supported by a national network where the participants from all the Universities can access for more sharing, peer-learning and peer-support. The network is also part of the Government's top priorities and it is used to further develop digital education in Finnish educational institutions. Such collaboration reinforces the link between research, practice and policy-making in the area.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Yes	Yes	Yes	Yes

⁹¹ <http://www.uef.fi/web/erikoistumiskoulutus-digiope/opetussuunnitelmateksti>

23. New Education Laboratory (SP): Degree programme challenging conventional courses

"New Education Laboratory" (Laboratorio de la Nueva Educación) is a Spanish degree programme started in October 2017. The programme is available to teachers, teaching staff in university and trainers in non-formal education⁹². It offers an exploratory master's programme using blended learning models that are not typically used in traditional Spanish teaching diploma for primary school teachers. The programme is based on "learning by doing" and therefore includes a variety of activities (on-site in school, online, school visits, practice periods, personal work accompanied by tutoring). It also takes advantage of digital delivery of the content and other possibilities afforded by new technologies. The content is delivered by the University of Carlos III of Madrid, the Free Educational Institution (La Institución Libre de Enseñanza⁹³) and la Fundación Estudio⁹⁴, a private, secular school spreading the philosophy of the Free Education Institution.

The goal of the programme is to create a new type of teaching professionals that can better address the changing nature of society. The impetus for the "New Education Laboratory" comes from experiencing inertia and rigidity in Spanish Initial Teacher Training programmes (e.g. Enguita, 2016)⁹⁵. In order to create a new vision for the teaching profession and to bring more change in classroom practises, a group of educators and faculty members got together to plan the programme and to create a new type of master's degree.

The programme has roots in progressive education, which has a long history in Spanish education since 1930's (e.g. Francisco Giner de los Ríos⁹⁶). The programme combines such influence with contemporary pedagogical thinking and the support of digital for diversifying education, but also uses various experts and practitioners from the field as lectures. All these requirements meant that even if the master's degree is awarded by the University Carlos III of Madrid, it is an unaccredited degree (in Spanish *título propio universitario* which is not recognised by the Ministry of education as an official teaching degree), however, it holds weight in the work environment (e.g. private schools).

The programme lasts 12 months and at the end, a master's degree is awarded⁹⁷. The master's programme consists of 60 ECTS, it is composed of theoretical studies (48 ECTS) and practical training (+12 ECTS for master level) and delivered in six modules⁹⁸. The master course price starts from 5.500 euros and there are stipends available. Option for specialisation with less credits are offered too (30+6 ECTS and 20+4 ECTS).

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Yes	Yes	Yes	Yes

⁹² http://economia.elpais.com/economia/2017/06/01/actualidad/1496332176_564177.html?rel=mas;

⁹³ https://en.wikipedia.org/wiki/Instituci%C3%B3n_Libre_de_Ense%C3%B1anza

⁹⁴ <https://colegio-estudio.es/>

⁹⁵ See also: https://elpais.com/economia/2016/05/08/actualidad/1462704637_262325.html

⁹⁶ https://en.wikipedia.org/wiki/Francisco_Giner_de_los_R%C3%ADos and <http://master.fundacionginer.org/>

⁹⁷ https://www.uc3m.es/ss/Satellite/Postgrado/es/Detalle/Estudio_C/1371231428835/1371219633369/Master_Especialista_Experto_en_Innovacion_Educativa#programa

⁹⁸ <http://master.fundacionginer.org/modulo.html>

24. Teach Live (CZ): Degree programme for future teachers

"Teach Live"⁹⁹ is a newly established teacher education programme in Czech Republic for future teachers. It is promoted with the tagline "Gain the confidence to teach through extensive placements, vocational training, and sharing experiences within a community of enthusiasts". The programme recently received accreditation by the Ministry of Education. Some parts of the course are also accredited as Further Teacher Education¹⁰⁰. In 2017, the model was first tested with 15 students who graduated from the course. According to the pilot report, the organisers found that creating a learning community in which students actually experience what they are being taught is rudimentary (Nadace Depositum Bonum, 2017). This is also reflected in how the syllabus is organised; it includes 750 hours of instruction comprised of "vocational training" (370h) and 380h of placements in two schools where candidates work alongside selected educators. The list of placement schools includes top innovative schools in the country.

Novel aspects of the curriculum include that each student is paired with another student in order to discover how to teach and how to team-teach¹⁰¹. Each student observes, prepares and continually reflects on their own teaching but also on that of their fellow student. Additionally, students are observed by an experienced accompanying teacher providing possibilities for mentoring type of activities including reflecting with the student after a lesson and helping them to find new solutions for their future lessons. Last, one day seminars each Friday focuses on the experience the students gained at their placements during the week allowing not only for reflection, but also connecting practice with theory. Additional innovation is how the course is offered with variant options; either as a one-year intensive course or stretching it over a period of two years (for those with little time or those who wish to combine work and study).

The course is organised and subsidised by the Depositum Bonum Foundation whose mission is to support education and contribute to raising the Czech Republic's competitiveness¹⁰². Other donors of the programme have aims to spread new educational cultures in Czech Republic. The partners and supporters include one previous Minister of Education. The course is targeted to those who are already teaching or who wish to teach, one requirement is holding at least a bachelor's degree in the subjects that one wants to teach. The fees for the full course per student are between CZK 27,000 and 38,000 (470-900e), depending on the course variant chosen, most of the real costs are subsidised by the sponsors (real cost estimate: CZK 140,000 per student). The degree is delivered by the College of International and Public Relations Prague in combination with a master's degree entitling right to teach¹⁰³.

The Foundation's aim is to train 1000 teachers and to establish a high level of quality for the course by tracking the following indicators: Student improvement; Impact – number of people influenced; Systemic effect¹⁰⁴. The first pilot was assessed by external researchers conducting a qualitative survey focusing on the contribution the Teach Live course made. Interviews were carried out with students, accompanying teachers, lecturers and project team members.

⁹⁹ <https://www.ucitelnazivo.cz/en/>

¹⁰⁰ 'Další vzdělávání pedagogických pracovníků' – DVPP

¹⁰¹ <https://www.ucitelnazivo.cz/en/course>

¹⁰² <http://www.nadacedb.cz/en/about-us/foundation-profile>

¹⁰³ <https://www.ucitelnazivo.cz/files/rozhodnuti-akreditace-program.pdf>

¹⁰⁴ <https://www.ucitelnazivo.cz/en/project-outcomes>

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Yes	Yes	Yes	Yes

25. Practical Entrepreneurship (DK): Supporting VET teachers to support entrepreneurial education

This continuing education programme, called "Fagligt Entreprenørskab¹⁰⁵", is offered for teachers in Vocational Secondary Education in Denmark (Erhvervsuddannelser-EUD). The aim of the training programme is to empower practical aspects of entrepreneurship education in vocational teaching. The coursework leads to 10 ECTS upon completion of the course. The content of the course was designed by the Danish Foundation for Entrepreneurship and first offered in 2016, now, a majority of the Danish University Colleges offer this training. The course focuses on developing teachers' competences to engage VET students in entrepreneurial and innovative learning processes. The focus of the course content is not only on procedural and practical knowledge regarding entrepreneurship, but also on methodological aspects of teaching focusing on the innovation process within the context of entrepreneurship, the latter being the innovative aspect of the content of the professional development. The course includes 3 blocks of 2-3 days of instruction (total eight days). Between the periods of instruction, each participant has to put in practice some of the theory learned, meaning that they have to experiment their newly acquired knowledge in practice with their own VET students. Digital tools are provided to support and get feedback of the effects of one's teaching and instruction practices on students' experience¹⁰⁶. The OctoSkills-app provides the status on the development of confidence in their own entrepreneurial skills, intentions and ambitions.

The content and method of the training has been evaluated thoroughly during the first pilot year following the first cohort of 73 teachers. A follow-up research¹⁰⁷, published in autumn 2017, used both qualitative (Sorensen et al., 2017) and quantitative methods (Moberg, 2017). It indicates that such entrepreneurial approach in teaching is motivating for students in vocational education, especially for those who are academically challenged and have previously experienced some bad school experiences. The follow-up evaluation shows, among other things, that students become more engaged when the teaching moves away from traditional teacher and student roles giving more room for student-directed processes. In entrepreneurship education, the teachers enable students' greater influence not only on content and time consumption, but also on the end product and evaluation form. The report thus suggests that this programme may allow for a more suitable method to retain students in the VET education.

By spring 2016, 92 teachers in vocational education and training from all over Denmark had completed this course offer. New courses were offered in autumn 2017 and spring 2018 at the Metropol University College and VIA University College and has since been spread to now being offered at the majority of the Danish University Colleges. The overall goal is to train 1500 educators by 2020 (of 194 000 teachers in Denmark). The course and the follow-up research were conducted by the Danish

¹⁰⁵ <http://www.ffe-ye.dk/undervisning/efteruddannelser/indsats-for-efteruddannelse/projekt-fagligt-entreprenoerskab-eud>

¹⁰⁶ <http://eng.ffe-ye.dk/education/octoskills>

¹⁰⁷ <http://www.ffe-ye.dk/fonden/nyheder/nyheder/entreprenoerskab-motiverer-fagligt-udfordrede-elever-paa-erhvervsuddannelser>

Foundation for Entrepreneurship¹⁰⁸ with the support from the VELUX Foundation. The Foundation for Entrepreneurship also runs other CPD programmes, e.g. E3U is a certified entrepreneurship education programme for teachers in primary, upper secondary and higher education. The E3U initiative was also evaluated in a recent report which is only available in Danish¹⁰⁹ (118 teachers with different subject knowledge and from all education levels participated from February 2016 to April 2017).

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	No	Yes	No	Yes	A course	Yes

¹⁰⁸ <http://eng.ffe-ye.dk/the-foundation/about-the-foundation>

¹⁰⁹ <http://eng.ffe-ye.dk/publications/publications-2017>

Innovating partnerships and new actors

26. EnglishOne (SK): Boosting teaching English through digital content

EnglishOne, a project to expand digital resources and educational aids to teaching English as a foreign language in Slovakian primary schools, covers virtually all English language teachers in Slovakian primary school. They now have access to a multitude of digital interactive lessons which they find on a digital platform managed by the Ministry of Education¹¹⁰. The project was developed by the Methodological and Pedagogical Center in collaboration with British Council¹¹¹, and it was funded through the European Social Fund.

The project is a national response to the change in legislation in 2011 which made English a compulsory subject starting from the third grade in all primary schools in Slovakia. The change in School Act triggered a lack of English teachers in the country and a dire need for further professional development. The English One-project started in 2014 as part of a national project called New Trends in Education of Primary School English Teachers. The initial project phase lasted one year and was later expanded to English language teachers working in secondary education¹¹².

Apart from digital educational materials and lessons, which were produced by a commercial provider, the project included a 2-day teacher training workshop for English language teachers in primary education. It focused on new trends in teaching and the use of modern didactic tools. Since a short training is usually not enough, some innovative support actions were designed around it. Additionally, pedagogical counselling on the use of the digital resources (e.g. demo lessons) was offered by pedagogical coaches who were located in the same region as the teachers were. To do this, an existing network of trainers by the Methodological and Pedagogical Center was deployed with the funding from the project.

The more innovative aspects of the programme included offering motivational lessons with native English speakers who were already living in the same region as where the school was, this part was facilitated by British Council and financed through small contracts as part of the project. Last, the new digital material was "paired" with the content and teaching guides of the most commonly used English textbooks in Slovakia so that suitable digital material would be readily available to teachers when they needed it. Additionally, within the project, there were funds for teachers to produce proven practices and sample lessons, ready-made lesson plans and case studies in order to model their pedagogical practices and thus further facilitate the uptake of these new tools. Nearly 1000 such peer-produced outputs were produced in the project.

Some internal and external¹¹³ evaluation has taken place showing a very high level of satisfaction by participating teachers. Especially demo lessons by pedagogical coaches and the in-class support by native speakers were very welcomed by the participating schools and pupils who seldom get a chance to speak with native speakers. From the partnership point of view, the collaboration of British Council with Ministry was very forward thinking.

The promotion of the platform and its digital material was also far-reaching and it was started right after the initial project ended. A competition was launched for teacher with the main prize being a week-long stay in the UK. The winner was the teacher whose students had done the most number of homework using the digital material on the platform. Moreover the British Council, Samsung and some local Slovakian companies teamed up to promotional activities which made the programme well

¹¹⁰ Online material: <https://anglictina.iedu.sk/>, demo: <https://anglictina.iedu.sk/obsah/demo-lekcie/zakladne-skoly>

¹¹¹ <https://www.britishcouncil.sk/>

¹¹² <https://www.mpc-englishgo.sk/en/>

¹¹³ <https://www.youtube.com/watch?reload=9&v=xCmwHTRoh9A>

known in the country (e.g. one of the prizes that schools could win was a school concert by a very popular Slovak singer).

The national project trained 3000 teachers from 1351 primary schools. After the first year's success, it was continued. In 2017, digital educational aids were extended to another group of more than 2,000 teachers. Due to the great interest by the English language teachers, the Ministry has decided to continue to work on the project activities in 2018 and is now expanding our digital educational aids to another more than 2,000 teachers. In Slovenia, there are approximately 11000 teachers including primary and lower secondary.

The Methodological and Pedagogical Center, which is directly managed by the Ministry of Education, Research and Sports of the Slovak Republic, coordinates the project. In 2017-2018, due to its great popularity among teachers, it has been continued and is now financed from the state budget.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Some	No	No	Yes

27. Golinelli Foundation (IT): Accredited STEAM courses by a philanthropist

The Golinelli Foundation, based in Bologna, Italy, offers accredited teacher in-service courses in its recently built Art & Science Centre with experimental laboratories for teaching science and technology in emerging fields such as genetic research and biotechnology; Internet of Things, but also in more conventional areas such as pedagogies for teaching mathematics with digital aids, design thinking or entrepreneurship education, to mention a few. Annually, through its "Educare a educare" programme, 3000 Italian teachers engage in professional development activities in the field of scientific and humanistic disciplines¹¹⁴. Courses use blended learning methods where parts of the instruction is given on-site at the premises of the Art & Science Centre whereas other parts might require individual activities, such as experimentation at school with the students using the newly acquired tools and methods, or through activities using a digital platform.

The course catalogue for school year 2018-2019 includes 25 courses in 7 different areas: methodologies and activities in science laboratory; digital didactics and learning environments; computational thinking and creativity; entrepreneurship education; teaching strategies; transversal didactics; and early childhood science education¹¹⁵. The courses' focus is on alternating didactic instances with experimentation in the classroom emphasising a hands-on approach: knowledge and skills gained through direct experiences. Fondazione Golinelli has an extensive network of scientific partnerships and other collaborators¹¹⁶ which are also used for creating and delivering the content of the in-service courses, thus allowing teachers to have first-hand experiences with top experts in the field.

One third of the courses are free, others include a fee starting from 50e. The courses cover 25 hours of instruction corresponding to one in-service training unit. After the completion of the course with its requirements, Italian teachers can gain credits towards their in-service training thanks to an accreditation by the Ministry of

¹¹⁴ <http://www.educareaeducare.it/>

¹¹⁵ <http://www.educareaeducare.it/per-singoli-insegnanti-2/>; the whole catalogue: <http://www.educareaeducare.it/wp-content/uploads/2016/06/FondazioneGolinelli-Insegnanti.pdf>

¹¹⁶ <http://www.fondazionegolinelli.com/people-and-organization/>

Education (MIUR). Therefore, model shows innovation not only by professional development being provided by a non-conventional provider and because of their design focusing on experimentation in the classroom, but also at the systemic level because teachers can gain in-service credits¹¹⁷, a lack of which is one of the main barriers for teachers' participation in professional development.

The Golinelli Foundation was born in Bologna in 1988 and it is "a unique example in Italy of a fully operational private foundation" which is inspired by the model of North-American philanthropic foundations. The foundation fosters the intellectual and ethical growth of young people and society in order to contribute to the sustainable development of the country. The development of new highly innovative forms of training for young people and teachers is one of its three primary objectives. The activities of the Foundation include scientific research, education, monitoring of public understanding of Life Sciences; in particular molecular biology, genetics, biotechnology – in order to promote a positive perception of science, for a higher critical awareness towards scientific development¹¹⁸. The foundation reckons that the continuous and accelerating development of genetic research and biotechnology is bound to deeply influence the shaping of moral, social and political views of the society.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	No	Yes	No	No	No	Yes

28. FYXXILAB (BE): Educational Makerspace for students and teachers

FYXXILAB is the first Educational Makerspace in Flanders, Belgium¹¹⁹. Its main activities focus on topics of Science, Technology, Engineering, Math, but also Arts and Creativity. It opened as a lab-space for educational use in 2014. Student workshops, which are offered during schooldays, align activities with school curriculum in the areas of STEAM and teacher professional development workshops focus on matching proposed teaching activities and lesson plans with curriculum goals. Since its opening, some 15000 children have experimented with its tools and additional 4000 in out of school events such as fairs and camps. Regarding professional learning opportunities for teachers, during four years of its existence, some 3500 teachers have already participated¹²⁰. FYXXILAB is run by a Belgian non-profit organisation called *educentrum.be* and is based in Gent. It is supported through project-based funding from Ministries in Flanders, Belgium and through European projects and through its large partner network of more than 70 industry partners¹²¹.

The space of FYXXILAB is filled with a wide selection of tools for coding, experimenting and creating, all with an educational goal in mind. Makerspaces generally build on education approach such as those introduced by Jean Piaget and developed by Seymour Papert. The primary goal is to have learners create their own knowledge by creating and interacting with physical objects¹²². In FYXXILAB, these goals have been implemented in themes ranging from coding and working with Scratch (graphical

¹¹⁷ In Italy, CPD points can be used for job mobility/transfer if they have taken part in certain types of CPD activity or acquired further qualifications.

¹¹⁸ <https://www.scuoladirobotica.it/en/fondazione-golinelli.html>

¹¹⁹ <https://www.fyxxi.be/>

¹²⁰ Slides: https://www.educaid.be/system/files/2018-03/PPT_Fyxxi_0.pdf

¹²¹ <https://www.fyxxi.be/info/partners>

¹²² <http://www.makerspaceforeducation.com/why-makerspace.html>

coding programme for children) and Arduino, to 3D-printing, modelling and Robotics (LEGO Education WeDo, EV3, Bee-bot, Cubetto), but there are also sciences equipment and sensors and various other things to support unplugged coding and tinkering.

The workshops are planned and instructed by professionals who have background in education. Interestingly, when a class comes for a 3-hour workshop, teachers are encouraged to participate as learners with the rest of the class, which offer a novel way for teachers to learn together with their students, and to observe others teaching and interacting with their students. This method is powerful in demystifying the use of STEAM-tools which some teachers think are difficult to use. The lab is also open during out of school hours when other activities are organised, e.g. STEM-ICT-birthday parties with robots and tools, and camps during holidays.

Teacher professional development activities are popular and a range of learning experiences is offered. "Teacher STEAM-camps" are organised for teachers to spend a whole week in the lab with teacher trainers immersing themselves in learning by doing and tinkering about lesson plans in the area of STEAM. It also offers "pop-up Fyxxilab" to schools, in case when taking time off from school or travelling to the lab becomes cumbersome. The "STEAM-toolboxes" with lesson plans and a start-up-training can be ordered to a school for a month¹²³. The box itself is free and includes different tools and lesson plans geared for kindergarten, primary and secondary levels. However, schools are asked to provide time for teachers to attend an on-site in-school training by FYXXILAB staff which the school pays for from their own dedicated CDP budget. Apart from giving teachers more self-confidence in using the tools, this also allows the school to see which tools work for them and what doesn't, in case they wish to pursue hardware purchases. This way of offering teacher professional development stems from a known method from the open source world where the product itself is free but the services around are charged.

The novel part of sustaining the lab is the collaboration with industry through which a set of authentic tools is made available¹²⁴. It could be estimated that at the moment, the budget of the tools would be around € 400 000 (at the beginning much less), but thanks to various partnerships, about 80% have been received through sponsorships (rough estimate). The lab has, for example, a state-of-the-art digital infrastructure including furniture (e.g. zioxi, Baert), whiteboards and flat screens (e.g. Samsung, Vanerum) and charging cabinets (e.g. LEBA Innovation). The main partners for the tools are LEGO Education, Roland, TTS, Primo, Zulogic to mention a few of the partners with international scale, whereas at national level, there are Trideus, Velleman, Robots4All, among others. It is important to emphasise that it is actually not only a sponsorship, but rather a relationship based on collaboration, as the industry partners receive feedback on the use of their tools in educational setting, they get classroom scenarios and additional educational resources for the use of the tools - something that is well valued in return. The partnerships are forged via visits to fairs, via internet (e.g. blogs, Kickstarter), but sometimes FYXXILAB is also contacted directly. Important project partners are WAAG Amsterdam, IAAC Barcelona, All Digital.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	No	Yes	Yes	Yes	No	Yes

¹²³ <https://www.fyxxi.be/tools/toolbox-huren>

¹²⁴ <https://www.fyxxi.be/info/infrastructuur>

29. Lighthouse network (FI): Peer to peer learning opportunities for schools

The Finnish Lighthouse (Majakka)¹²⁵ network aims at fostering schools' capacity for strategic planning. Within the Lighthouse network, the participating schools organise and offer informal professional development and learning opportunities to each other, thus becoming local CPD providers in a non-formal and in informal way. The focus is placed on effective use of local resources in order to have the responsiveness to local needs. In 2018, the network covers 11% of primary and lower secondary schools across Finland¹²⁶. These schools, based in 5 regional hubs, act as "lighthouses" for other schools in the region facilitating the diffusion of good and/or innovative practices in the core areas of the network.

Various flexible models of professional development provision exist: schools can organise a training event, offer peer observation possibilities for teachers from nearby schools, offer expert help or coaching to other schools, make their own planning material available for reuse, etc. A recent booklet illustrates 40 cases in Finnish¹²⁷. Themes, which are pre-defined by the network, include co-teaching, collegial collaboration and team teaching strategies; pedagogy and teaching methods; and teacher professional knowledge and wellbeing.

The network was set up by the Finnish National Agency for Education in 2014 in order to support schools in planning and implementing various concurrent educational initiatives, among them, the new core curriculum implemented in fall 2016; the plan for "New comprehensive school"¹²⁸; and also a programme that supports municipalities as education providers¹²⁹. Together, these educational policy initiatives offer novel opportunities and support for teachers professional development.

In Finland, municipalities are in the key position to transform policies into practice in schools. With the new educational policies in place, municipalities are also responsible for establishing, for the first time, a professional development plan for each teacher. Currently only 40% of teachers have one. Therefore, with this novel arrangement of the network, schools are not paid for offering or receiving professional development activities, but as schools are owned and managed by municipalities, the provision of professional development opportunities is seen as one of the ways of assuring and sustaining the high quality of education in Finland.

In other words, the Lighthouse network offers a sustained structure for which teachers' needs for professional development and the whole school development (e.g. school as a learning organisation) are drivers for. The new innovative aspect is that the schools within the Lighthouse network become local professional development providers for other schools in the area as this way local resources can best be leveraged. This also allows creating informal links between schools, which is a potential enabler for further cooperation in the future.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Possible	Yes	Yes	Yes	Possible	Possible	Yes

¹²⁵ Majakka/peruskoulutuksen kehittämiskouluverkosto

¹²⁶ 265 out of 2339 schools in Finland

¹²⁷ http://www.oph.fi/download/187576_majakka_taitto_28102017.pdf

¹²⁸ <http://minedu.fi/en/new-comprehensive-education>

¹²⁹ <http://www.oph.fi/kuntakesu>

30. Staff exchange (FI): Teacher swap for phenomena-based learning

A primary school in a small Finnish town exchanged, or swapped, its entire teaching staff with pre-service teachers from a training institute for 3 days¹³⁰. The idea was that when the pre-service teachers get to experiments hands-on in an authentic school environment, the entire teaching force of the school gets to go to in-service training. The arrangement was a brainchild of the town's education manager and the director of the Initial Teacher Training (ITT) institute who were brainstorming together about different ways to re-invent teacher professional development¹³¹. In Finland, the municipality is responsible for teacher CPD, so with the arrangement it was able to organise 70 in-service days in one go, whereas the pre-service teachers got valuable classroom experience.

The scheme consisted of a group of 50 pre-service teachers, who were at different stages of their ITT, taking the total responsibility of planning and implementing 3 days of activities for 400 pupils of the primary school (grades 1 to 6). The student teachers were asked to focus on the new requirements of the curriculum, namely on phenomenon-based learning¹³², active inquiry-based-learning and cross-class teaching mixing age groups of pupils for the whole period 3 days. The student teachers were given one month for all the planning and design work which was supported by their teacher trainers at the ITT. They earned study-points for all their activities.

On the other hand, for 2 out of the 3 days of the exchange, the teachers of the primary school participated in their own separate CPD activities organised by the school head. Additionally, for one day, each teacher had a chance to shadow the student teachers in their teaching implementing new ways to organise instruction such as phenomenon-based learning and inquiry based learning. This was an enriching experience for them, as the topics are a new addition to the national core curriculum and little previous experience exists. As the phenomena-based teaching also included aspects of gamification and role plays, the in-service teachers had a chance to observe their own students taking new roles during the class.

After the swap, the pre-service teachers and their trainees reflected upon the training model in order to take advantage of the learning experience for the future. Additionally, the ITT institute, which is part of the University of Jyväskylä, conducted some research-based activities (Juntunen et al., 2016), however, no publication is available in English. As a result, it was considered that this type of hands-on experimenting is as an effective way to teach pre-service teachers to plan, implement and evaluate phenomena-based learning.

Inspired by the overwhelming positive experience, the model was considered worth pursuing further. The ITT institute has since continued developing the activity of staff exchange of in-service teachers to pre-service teachers creating a more structured strategy around it and extending it to upper secondary schools too. In spring 2016, for example, a 2-day "swap" took place in the upper secondary schools of Keuruu¹³³ where students' task was to build the society from scratch after a catastrophe that had destroyed it entirely. New versions involve more gamification aspects and problem solving skills. One example of such is the use of "escape rooms", one of which is being built on a semi-permanent bases in the Keuruu upper secondary school.

¹³⁰ <http://ylojarvenuutiset.fi/2015/10/07/koulusta-kuoriutui-opettava-kaupunki/>

¹³¹ <https://www.sitra.fi/blogit/opettajat-koulutuksessa-nappikaupasta-rohkeisiin-ratkaisuihin/>

¹³² https://en.wikipedia.org/wiki/Phenomenon-based_learning and https://www.jyu.fi/edupsy/fi/laitokset/okl/opiskelu/luokanopettajakoulutus/luokanopettajakoulutus/Curriculum2014_English.pdf

¹³³ <https://www.opettaja.fi/digilehti/9-2016/8-117> p. 8-9

The “swapping” model was also presented as part of the national activities¹³⁴ aimed at enhancing the Finnish education system by Sitra, the Finnish Innovation Fund. A video¹³⁵ recording of the seminar is available in Finnish with many insights into the benefits of the model, including its cost-efficiency. For example, thanks to the experiment with the model, the municipality, which is responsible for organising teacher in-service training, received approximately 70 in-service days for its staff. The ITT institute and student teachers, on the other hand, felt that they got valuable experience in collaborative work and in implementing the new curriculum in a real context of a school.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Not	Yes	Yes	No	Yes

¹³⁴ <https://www.sitra.fi/tapahtumat/yhteistyolla-uuden-opettajuuden-kimppuun/>

¹³⁵ <https://www.youtube.com/watch?v=ZE6g1GVkbU8>

5 Conclusions

This report constitutes the first part of the study called *Innovating Professional Development in Compulsory Education*. It includes the methodological note outlining the steps taken to gather the evidence of innovative and emerging models for teacher professional development and professional learning in compulsory education.

In this first part of the study, we focused on identifying the main emerging trends and key components of the practices that were gathered for our study. The aim was to gauge the richness of professional development and learning models that are emergent. The main contribution of this first part of the study constitutes of the narrative descriptions of 30 examples. For each example, a number of features were identified (e.g. type, provider and delivery mechanisms that have evolved to better serve the needs of modern-day teachers). Moreover, the examples were also analysed using the literature by Darling-Hammond et al.(2017) which has identified the key components of the effective professional development.

We found that the examples chosen for this study range from more classical in-service and CPD courses by public authorities to less formal and less structured ones in terms of organisation of time and place. Some of the examples are well structured professional development courses and workshop leading to a certification whereas other examples illustrate less structured and more informal ways of acquiring professional learning in a job-embedded context such as in-school teacher collaboration and mentoring or coaching. A variety of non-conventional providers was identified. The study also outlines seven areas on which the innovation in these examples focuses.

The report also includes a number of in-depth case studies. Whereas this report presents the evidence and first early results for discussion, the second part of the study, which will be published in the course of 2019, will outline the main findings, key conclusions and some policy-relevant pointers.

References

- Anette, J. (2016). Analysing the architecture and epistemological foundation of Boost for Mathematics – a PD program conducted by 37,000 mathematics teachers in Sweden (p. 2). Presented at the Conference contribution at Educating the Educators, Freiburg, Germany.
- Blaskó, Z., Costa, P., & Vera-Toscano, E. (2018). *Civic attitudes and behavioural intentions in the 2016 International Civic and Citizenship Education Study (ICCS): New evidence for education and training policies in Europe*. European Commission (JRC Scientific and Policy Reports).
- Blaskó, Z., Pokropek, A., & Sikora, J. (2018). *Science career plans of adolescents: patterns, trends and gender divides*. European Commission (JRC Scientific and Policy Reports). Retrieved from <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/science-career-plans-adolescents-patterns-trends-and-gender-divides>
- Bocconi, S., Kampylis, P., & Punie, Y. (2012). *Innovating Learning: Key elements for developing Creative Classrooms in Europe* (JRC Scientific and Policy Reports). Publications Office of the European Union. Retrieved from <https://europa.eu/!rp36uM>
- Buczynski, S., & Hansen, C. B. (2010). Impact of professional development on teacher practice: Uncovering connections. *Teaching and Teacher Education*, 26(3), 599–607. <https://doi.org/10.1016/j.tate.2009.09.006>
- Burns, M. (2013). The Future of Professional Learning. *Learning & Leading with Technology*, 40(8), 14–18.
- Canopé. (n.d.). *Hackathons: organiser des défis pédagogiques*. Retrieved from <https://www.reseau-canope.fr/notice/hackathons-organiser-des-defis-pedagogiques.html>

- Carpenter, J., & Krutka, D. (2014). Engagement through microblogging: educator professional development via Twitter: *Professional Development in Education*: Vol 41, No 4. *Professional Development in Education*, 41(4), 707–728.
- Castaño-Muñoz, J., Kalz, M., Kreijns, K., & Punie, Y. (2018). Who is taking MOOCs for teachers' professional development on the use of ICT? A cross-sectional study from Spain. *Technology, Pedagogy and Education*, 0(0), 1–18.
<https://doi.org/10.1080/1475939X.2018.1528997>
- Darling-Hammond, L., Hyler, M., & Gardner, M. (2017). *Effective Teacher Professional Development*. Retrieved from <https://learningpolicyinstitute.org/product/effective-teacher-professional-development-report>
- Enguita, M. F. (2016). *La educación española en la encrucijada* (Edición: 1). Madrid: Santillana Educación, S.L.
- European Commission. (2013). *Study of the impact of eTwinning on participating pupils, teachers and schools: final report*. (Website). Directorate-General for Education, Youth, Sport and Culture. European Commission. Retrieved from <https://publications.europa.eu/en/publication-detail/-/publication/ec23d4e3-e305-4d1c-83da-1989d35ec7e0>
- European Commission. (2018). Commission Staff working document accompanying the document Proposal for a Council Recommendation on Key Competences for Lifelong Learning (No. SWD/2018/014 final-2018/08 (NLE).
- European Commission. (2018b). *Boosting teacher quality - pathways to effective policies* (Study). Brussels: DG for Education, Youth, Sport and Culture. Retrieved from <https://publications.europa.eu/en/publication-detail/-/publication/95e81178-896b-11e8-ac6a-01aa75ed71a1/language-en>
- European Commission/EACEA/Eurydice. (2015). *The Teaching Profession in Europe: Practices, Perceptions, and Policies* (Eurydice Report). Luxembourg: Publications Office of the European Union.

- Gamoran Sherin, M. (2003). New perspectives on the role of video in teacher education. In *Using Video in Teacher Education* (Vol. 10, pp. 1–27). Emerald Group Publishing Limited. [https://doi.org/10.1016/S1479-3687\(03\)10001-6](https://doi.org/10.1016/S1479-3687(03)10001-6)
- Ginsberg, M. B. (2015). Shadowing a student shows how to make learning more relevant. *Phi Delta Kappan*, 97(4), 26–30. <https://doi.org/10.1177/0031721715619914>
- Heemskerk, I.M.C.C. & Schenke, W. (2016). Kennisontwikkeling en kennisdeling met leerKRACHT. Ervaringen van vo-docenten met het programma leerKRACHT. . [Knowledge development and knowledge sharing within leerKRACHT. Experiences of teachers in secondary education with the programme leerKRACHT]. Amsterdam: Kohnstamm Institute, University of Amsterdam. Retrieved from <https://www.voion.nl/publicaties/kennisontwikkeling-en-kennisdeling-met-leerkracht>
- Jakobsdóttir, S. (2016). (M) OOCs in Iceland: Language and learning communities.
- Juntunen, M., Kainulainen, J., Silander, T., Rautiainen, M., & Pöntynen, L. (2016). Yhdessä oppien kohti yhteisöllistä opettajuutta. In *ITK 2016*. Retrieved from <http://whm13.louhi.net/~itk/2016/ohjelma/teemaseminaari/351>
- Kearney, C., & Gras-Velázquez, À. (2015). *Impact on teachers' practice, skills, and professional development opportunities, as reported by eTwinners* (p. 60). Brussels: Central Support Service of eTwinning - European Schoolnet.
- Kearney, C., & Gras-Velázquez, À. (2018). *eTwinning's 2017 Full Report: "eTwinning Twelve Years On: Impact on teacher's practice, skills, and professional development opportunities, as reported by eTwinners"* (p. 60). Brussels: Central Support Service of eTwinning - European Schoolnet. Retrieved from https://www.etwinning.net/eun-files/report2017/eTwinning-report-2017_DEF.PDF
- Kelly, N., & Antonio, A. (2016). Teacher peer support in social network sites. *Teaching and Teacher Education*, 56, 138–149.

- Knight, J. (2012). *High-impact instruction: A framework for great teaching*. Corwin Press.
Retrieved from <https://uk.sagepub.com/en-gb/eur/high-impact-instruction/book234377>
- Korhonen, T., & Lavonen, J. (2017). A New Wave of Learning in Finland: Get Started with Innovation! In S. Choo, D. Sawch, A. Villanueva, & R. Vinz (Eds.), *Educating for the 21st Century: Perspectives, Policies and Practices from Around the World* (pp. 447–467). Singapore: Springer Singapore. https://doi.org/10.1007/978-981-10-1673-8_24
- Korhonen, T., Lavonen, J., Kukkonen, M., Sormunen, K., & Juuti, K. (2014). The Innovative School as an Environment for the Design of Educational Innovations. In H. Niemi, J. Multisilta, L. Lipponen, & M. Vivitsou (Eds.), *Finnish Innovations and Technologies in Schools: A Guide towards New Ecosystems of Learning* (pp. 99–113). Rotterdam: SensePublishers. https://doi.org/10.1007/978-94-6209-749-0_9
- Kreuh, N., & Brecko, B. (2014). Development of Teacher E-competence Standard in Slovenia. *ELearning Papers*, (38). Retrieved from http://www.academia.edu/7132911/Development_of_Teacher_E-competence_Standard_in_Slovenia
- Leinonen, T., Purma, J., Pöldoja, H., & Toikkanen, T. (2010). Information architecture and design solutions scaffolding authoring of open educational resources. *IEEE TRANSACTIONS ON LEARNING TECHNOLOGIES*, 3(2), 116–128.
- McKinsey. (2007). *How the world's best performing schools systems come out on top*. <https://www.mckinsey.com/industries/social-sector/our-insights/how-the-worlds-best-performing-school-systems-come-out-on-top>
- McKinsey. (2010). *How the world's most improved school systems keep getting better*. <https://www.mckinsey.com/industries/social-sector/our-insights/how-the-worlds-most-improved-school-systems-keep-getting-better>

- Moberg, K. (2017). *Den kvantitative følgeforskning Projekt Fagligt Entreprenørskab i Erhvervsuddannelserne*. Retrieved from <http://eng.ffe-ye.dk/media/786526/fagligt-entreprenoerskab-i-erhvervsuddannelserne-kvantitativ-forskningsrapport-2017.pdf>
- Nadace Depositum Bonum. (2017). *Teacjer Live 2016-2017*.
- OECD. (2014). *The OECD Teaching and Learning International Survey (TALIS) - 2013 Results*. Paris: OECD Publication. Retrieved from <http://www.oecd.org/education/school/talis-2013-results.htm>
- OECD. (2016). *Netherlands 2016 - Foundations for the Future. Reviews of National Policies for Education*. Paris: OECD Publication. See link for direct deep-linking: https://read.oecd-ilibrary.org/education/netherlands-2016_9789264257658-en#page108
- OECD and Eurostat. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. Retrieved from <http://www.oecd.org/sti/inno/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm>
- Österholm, M., Bergqvist, T., Liljekvist, Y., & van Bommel, J. (2016). *Utvärdering av Matematiklyftets resultat: slutrapport*. Umeå universitet. Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:miun:diva-30177>
- Ostermeier, C., Prenzel, M., & Duit, R. (2010). Improving Science and Mathematics Instruction: The SINUS Project as an Example for Reform as Teacher Professional Development. *International Journal of Science Education*, 32(3), 303–327.
- Ramboll. (2016). *Slututvärdering utvärderingen av matematiklyftet 2013-2016*. Retrieved from <https://via.tt.se/pressmeddelande/larare-nojda-med-matematiklyftet?publisherId=743270&releaseId=1078077>
- Skolverket. (2015). *Vad gör försteläraren?* (text). Retrieved from [/om-oss/publikationer-och-nyhetsbrev/sok-publikationer](http://om-oss/publikationer-och-nyhetsbrev/sok-publikationer)

- Sørensen, D., Day, B., Minds, S., Christensen, S. M., Boniface, J., & Allerland, M. M. (2017). *Fagligt Entreprenørskab i erhvervsuddannelserne* (p. 108). Retrieved from <http://eng.ffe-ye.dk/media/786527/fagligt-entreprenoerskab-i-erhvervsuddannelserne-kvalitativ-forskningsrapport-2017.pdf>
- Teacher Development Trust, T. (2015). *Developing Great Teaching: Lessons from the international reviews into effective professional*. Retrieved from <https://tdtrust.org/about/dgt>
- Thayer, T. (2014). Constructing Optimal Futures for Education - Technology Foresight in Educational Policy and Planning. *Nordic Journal of Digital Literacy*, 9(02), 148–165.
- Toikkanen, T., & Leinonen, T. (2017). The Code ABC MOOC: Experiences from a Coding and Computational Thinking MOOC for Finnish Primary School Teachers. In P. J. Rich & C. B. Hodges (Eds.), *Emerging Research, Practice, and Policy on Computational Thinking* (pp. 239–248). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-52691-1_15
- Visser, R. D., Evering, L. C., & Barrett, D. E. (2014). #TwitterforTeachers: The Implications of Twitter as a Self-Directed Professional Development Tool for K–12 Teachers. *Journal of Research on Technology in Education*, 46(4), 396–413. <https://doi.org/10.1080/15391523.2014.925694>
- Vuorikari, R. (2010). *Teachers' professional development: An overview of current practice*. Brussels: Central Support Service of eTwinning - European Schoolnet. Retrieved from http://www.etwinning.lt/files/metodine_medziaga/etwinning_report_teachers_professional_development_en.pdf
- Vuorikari, R. (2013). *eTwinning School Teams: Case studies on teacher collaboration through eTwinning*. Brussels: Central Support Service of eTwinning - European Schoolnet. Retrieved from http://files.eun.org/etwinning/report2013/eTwinning_report_EN.pdf

- Vuorikari, R. (forthcoming in 2019). *Innovating Professional Development in Compulsory Education- An analysis of practices aimed at improving teacher PD*. European Commission (JRC Scientific and Policy Reports).
- Vuorikari, R., Kampylis, P., Scimeca, S., & Punie, Y. (2015). Scaling Up Teacher Networks Across and Within European Schools: The Case of eTwinning. In C.-K. Looi & L. W. Teh (Eds.), *Scaling Educational Innovations* (pp. 227–254). Singapore: Springer Singapore. https://doi.org/10.1007/978-981-287-537-2_11
- Vuorikari, R. & Kampylis, P. (2018). *Emerging, innovative practices of teacher professional development addressing the changing needs*. Proceedings of ICEM 2018 Annual Conference, September 5-7, 2018 Tallinn, Estonia.

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Annexes

Annex 1. Data extraction template for collecting information

Based on the scoping note in Section 3, a set of relevant pointers were gathered that led the data collection for the study. This template was designed for extracting the data for both examples and case studies. The idea was that the examples will use only a sub-set of the template, just enough information to allow for the identification of the case studies, which will use the full set of the areas in order to yield the relevant information. The bold grey text shows some instructions for how to fill it in and what aspects to pay attention to.

Title and Synopsis

Instructions:

Summary to highlight what, why, when, how and why the example is found to be innovative (its format? its delivery? its content? etc). Why is it innovative within its context, and why do we think it's an innovation worth considering elsewhere/across Europe. Think of "Motivation (what led to the introduction of the initiative?)"

2. Classification	
<i>Type of practice</i>	<p>Use the list from TALIS</p> <ul style="list-style-type: none"> • Observation visits to business premises, public organisations, on-governmental organisations • In-service training courses in business premises, public organisations, non-governmental organisations • Observation visits to other schools • Qualification programmes • Mentoring and/or peer observation and coaching, as part of a formal school arrangement • Participation in a network of teachers formed specifically for the professional development of teachers • Education conferences or seminars • Individual or collaborative research on a topic of interest to you professionally • Course/workshops <p>Modify it, for example, use: networks of teachers, mentoring and peer-learning, school-based collaborative CPD; online courses; school-based PD</p>
<i>Content area</i> (maps with "Is content focused"?)	<p>Use high needs identified in Eurydice report: e.g. teaching cross-curricular skills; teaching in multilingual and multicultural settings; special needs,</p> <p>Also: issues linked with ICT and needs for digital learning, coding / computational thinking, supporting dealing with increased diversity of learners, ESL, work based learning, digital competence, innovative pedagogies, including through EU tools such as eTwinning, School gateway and EPALE</p>
<i>Delivery</i>	<ul style="list-style-type: none"> • Digital only • Blended • Offline • with digital material (free of charge - creative

	commons - paid) • with printed material (free of charge - creative commons - paid)
<i>Type of delivery</i>	e.g. From Eurydice • as free courses by public authorities; • through subsidies for schools; • teachers participate in courses by the 3rd parties and apply for the funding of the costs • own contribution
<i>Provider</i>	e.g. from AES 2017 • Formal education institution; • non formal education and training institutions; • Commercial institutions where ET is not the main activity, e.g. equipment suppliers; • employer; • employer organisations, • chamber of commerce; • Trade unions; • non-profit associations, e.g. cultural society, political party; • individuals (e.g. students giving private lessons; • non-commercial institutions where ET is not the main activity, e.g. library, museum, ministries); • Other;
<i>Name of the provider</i>	National...
<i>Duration and workload</i>	
<i>Nature of CPD</i>	• Formal, • Non-formal, • Informal
<i>Type of course material</i>	
<i>Credits; certification</i>	
<i>Funding</i>	

<i>Policy context and need for the course content</i>	
<i>Numbers of participation</i>	
<i>Origins of the CPD and how it all evolved</i>	
<i>Information about the CPD context in xxx</i> Sources from Eurydice report and from TALIS, figure of participation in days	
<i>Incentive structures in place by employer to facilitate teachers' participation</i> <i>Formal and non-formal support measures by employer to encourage teachers' participation</i>	

Questions for the course provider to better understand why teachers participate in this form of CPD and why this CPD could be considered "innovative"

Instructions:

We look for example that are not "just" innovative because they are doing something new, but also because they help overcome obstacles, help deliver effective and/or efficient CPD (improving student learning)

<i>Innovation aspects: How does this PD support participation and help overcome the known obstacles?</i>	
<i>Does the PD provide any collaborative features for teachers to co-operate?</i> (maps with "Does it support collaboration in job-embedded context")	
<i>Does the PD include time for practice, e.g. be job-embedded through implementing something in classroom teaching?</i> (Maps with the question: "Does it incorporate active learning (adult learning theory)"?)	
<i>Does the PD extended over time, e.g. by providing further updates by email, or through a FB group?</i> (Maps with question: "Is it of sustained duration?")	
<i>Is there any coaching or other type of mentoring for participants? Does it offer opportunities for feedback and reflection?"</i> (Maps with: "Does it provide coaching and expert support?")	
<i>Is there any follow-up or community features such as social network to continue exchanging and staying in contact?</i>	
<i>Does it use models and modelling of effective practice? (e.g. videos or written cases, demonstration lessons, lesson plans, observation of peers, curriculum materials including sample of assessment)</i>	
<i>Is the PD grounded in students' curriculum?</i>	
<i>How is the PD connected to any elements of instruction (e.g., assessments, curriculum)?</i>	
<i>Is the PD aligned with local policies?</i>	
<i>Are there any social aspects, such as increased satisfaction in the work environment, that could play a role to make teachers to participate?</i>	

<i>Any suggestions how or why the course can overcome the known barriers of CPD participation (e.g. flexibility, timetables, lack of support from employers)?</i>	
<i>Anything else you want to add?</i>	
<i>Evaluations</i>	
<i>Are any evaluations of efficacy/effectiveness of course available?</i>	
<i>Evidence of utility</i>	
<i>6. Further info</i>	

Annex 2: Case studies

Five in-depth case studies and one mini-case study were conducted to deepen the knowledge and understanding of the design of the professional development model and to further analyse the cases. The case studies were selected out of the 30 examples for their innovativeness and for illustrating the emerging aspects deemed important for the study (for more details, see the main report by Vuorikari, 2019). All the case study descriptions follow the same model and it consisted of the following:

- Part 1: Introduction to the design of the professional development/professional learning model
- Part 2: Analysis of design elements based on the underlying framework of the effective teacher professional development model (Darling-Hammond et al., 2017) and aspects regarding innovation (see table below for five aspects)
- Part 3: some background to better understand how the model has evolved

Box 1. Five aspects of innovation in education

Five aspects of innovation in education

This study is inspired by the five trajectories of innovation for education used by Bocconi et al., 2012 which are the following. See the original document for all the details and the original references.

1. **Nature of innovation** (incremental, radical, disruptive¹³⁶): this captures the progressive levels of change from the introduction of some new elements (incremental), to a relevant number of innovative elements (radical), to a profound and comprehensive change (disruptive) (Cooper, 1998; Doig, 2005; Leadbeater & Wong, 2010; OECD/CERI, 2009).
2. **Implementation phase** (pilot, scale, mainstreaming): this describes the stages of development, ranging from limited application (pilot), to more consolidated up-take (scale), to established use (mainstreaming) (e.g. OECD/CERI, 2010).
3. **Access level** (local, regional/national, cross-border): this captures the geographical coverage of the innovation, from a restricted area (local), to a broad realm (regional/national), up to an international/world-wide level (cross-border) (OECD/CERI, 2010; Punie, et al., 2006).
4. **Type of innovation** (process, service, organisation, marketing innovation): this illustrates the extent of innovation following the Oslo Manual (OECD & Eurostat, 2005).
5. **Target** (single actors = individual teacher, multiple actors=whole school, a wide range of actors=stakeholders): this describes the actors targeted by the innovation, from a specific group (single actors), to a diverse set of actors (multiple actors), up to a variety of stakeholders (wide range of actors) (Cairney, 2000).

¹³⁶ Several terms have been used, including *sustaining*, *evolutionary*, or *continuous* innovation instead of *incremental* as well as *discontinuous*, *breakthrough*, and *revolutionary* instead of *disruptive* (Ansari & Krop, in press; Carayannis, Gonzalez, & Wetter, 2003; Leadbeater & Wong, 2010; Shavinina, 2003; Xu, Houssin, Caillaud, & Gardoni, 2011). Forkosh-Baruch et al. (2008) define three levels of pedagogical innovation: assimilation, transition and transformation.

I. LeerKRACHT (NL) and Prof'Essor (BE): Focus on in-school teacher collaboration and coaching

1. Introduction to the design of the model

This part first discusses the design of the professional development model as it is implemented in LeerKRACHT and Prof'Essor. It then further analyses its various elements underpinning the discussion in the framework chosen for this study outlining seven design elements of the effective teacher professional development model (Darling-Hammond et al., 2017). The brief overlook on LeerKRACHT and Prof'Essor is given as part of the examples ([ex.2](#) and [ex.3](#)).

Roles to take

When a school participates in the professional development programme in question, the first thing is to plan the roles within the school. Whereas the full engagement of the school management is needed, the role of the in-school coach is the most crucial one to take, as this is the person who takes a major role in supporting the implementation of the tools and the method while working with both the teacher teams as well as the school management. The main roles are illustrated in Figure 5, they are Teacher, School management, School coach and Expert coach. The same generic roles apply to Prof'ESSOR.

Different roles within the LeerKRACHT-programme

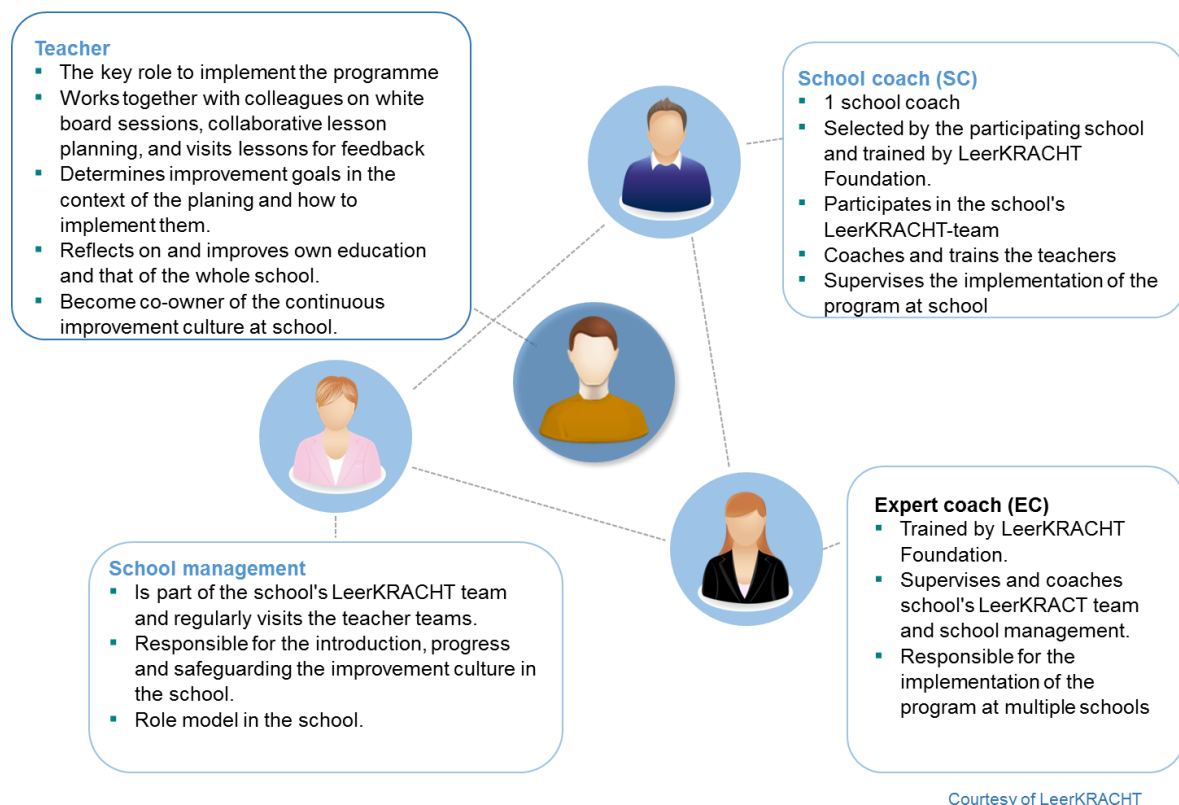


Figure 5. The members of the LeerKRACHT school team are connected by the dotted triangle, whereas the roles within the schools are written with a blue font.

These roles are also illustrative at the general level. Each school has two types of teams: on the one hands, the school forms its own LeerKRACHT team, this **school team** consists of member(s) of the school management, the in-school coach and an expert coach on behalf of LeerKRACHT. The **expert coach** guides and supports the

school team in implementing the method and all its tools, also focusing on the personal development of the school coaches and the school management. The **school team** prepares the launch of the programme in the school, sets the goals for the overall implementation and also monitors and steers it. On the other hand, schools form **teacher teams** (6-12 teachers), they are not necessarily discipline-specific teams. Teams start at the same time and implement the method during 8-weeks of an initial training phase, after which a reflective session is organised before starting a new period. In Prof'Essor, the same roles are repeated, but the role of Expert coach is undertaken by one of the pedagogical advisors of the Catholic school network.

The internal **time investment by school staff** should be planned and coordinated by the school management. McKinsey estimates that during the initial training phase of 8 weeks, for teachers to undertake all the activities, for example, 4 hours per week should be foreseen. As for the in-school coach, the time allocation during the initial phase is one day per week. Over the long run, once the tools and methods are "the new normal" (e.g. after the initial training phase), teachers are estimated to spend 2 hours per week and the coach only some 1 hour per month. The school principal's time investment varies from 4 hours per week at the start of the programme to one hour per week at a later stage.

Tools

Three sets of tools are put in place in order to support various activities that the method requires from the participating schools. One set of tools is geared to teacher teams, whereas another set of tools supports the change management and monitoring the progress. Last, there are also tools that support exchanges of practices and experiences between coaches, principals and even between whole schools. Below, we briefly explain the main features.

Three main tools for teachers

All the teachers' tools within the programme are designed to enhance teachers' collaboration and co-operation within the school, thus breaking the isolation teachers say that they often feel in their profession. Secondly, teachers seldom receive feedback on their practices, therefore tools to co-plan and reflect on practices together are provided.

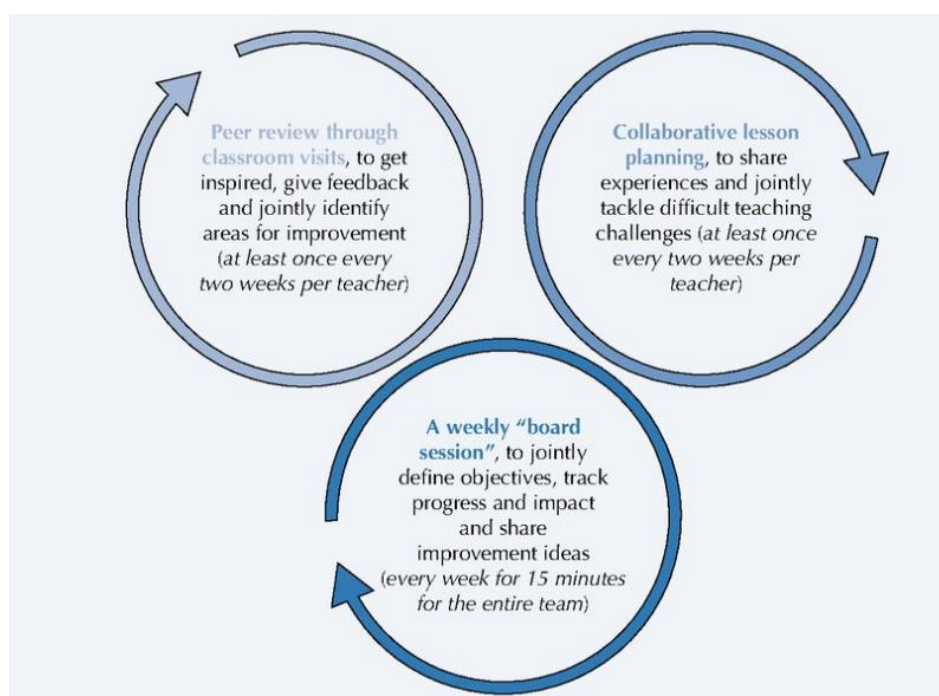


Figure 6. The common tools for teachers to use, source: OECD (2016 p. 106)

The basic model foresees three tools for teachers which are shared among the two programmes these are: the weekly white-board sessions, a bi-monthly collaborative lesson planning session, and classroom visits to observe each other's' teaching, to give feedback and receive it. Figure 6 presents these three tools. Additionally, in LeerKRACHT students' feedback loop has been added. The role of the school coach is to support teacher teams to use and actively implement these main tools during the initial training phase.

The white board sessions are at the heart of the method (Figure 7). The underlying aim is to introduce teachers to setting concrete objectives for their team and actions to reach them. The board sessions act as a weekly forum to share concerns and to make collaboration visible. Each session only takes 15 minutes, it is important to have them weekly to set the routine and stay with it. The role of the school coach is crucial for these sessions, especially in the beginning, in order to help using the tool but also to support teachers in setting the goals and actions to achieve them.



Figure 7. Teachers during a white-board session. Picture is courtesy of LeerKRACHT

Especially during the initial training phase in schools, regular use of the tools is emphasised so that new collaborative routines could be established and that they would become part of practices. In a study by Heemskerk & Schenke (2016, see [the English summary](#) p. 95), which observed a small number of schools implementing LeerKRACHT over a long period of time, it was observed that schools eventually implemented the LeerKRACHT-programme differently. In some cases school leaders and teachers took decisions such as organising fewer lesson visits and devoting more time to whiteboard sessions. On the other hand, the coordinators of the Catholic school network estimate that within Prof'Essor, the start of the use of the new tools is not the most challenging part, but the real challenge lies in changing the way of working to really include collaboration and sharing. In their experience, for example, visits to observe other teachers' lessons seem to be the one that is dropped first, as it still seems to demand quite a lot from teachers in terms of changing their behaviour, but also accepting totally new practices for their professional learning.

Tools for management

A set of survey tools are provided which will help the school team to ensure that there is progress and that the transformation takes place. "School culture survey" helps establish a baseline and to fosters fact-based discussion on various aspects of the implementation, e.g. collaboration, leadership and efficiency of ways of working. Other types of surveys are also provided that help, for example, to identify friction points (e.g. team atmosphere) and to set up actions to correct things. Other examples include a survey tool for the team to get feedback of its own progress and to use the

reporting as a means for a dialogue about the functioning of the team. These survey tools and data are also used to support the School team in implementing the programme. Additionally, forums are available for coaches and principals to share their field experiences, both positive and negative, and to receive peer support. In Belgium, these tools are supported by McKinsey. The LeerKRACHT Foundation disseminates its own questionnaires, the items of which are analysed by a research team of the University of Utrecht (e.g. factor analysis).

The above-mentioned study (Heemskerk & Schenke, 2016) estimates that for a sustainable implementation of the LeerKRACHT-programme, it is important that the programme is given a clear space within the school organisation and that teachers are facilitated in order to participate. Similarly, the Catholic school network's coordinator estimates that school management's support and vision is crucial. For example, if there is a new school principal arriving to a school that already is part of Prof'Essor, there is a high risk for teachers to drop out of using the tools. Therefore, the coordinators have set a new strategy to intervene immediately in order to help sustain and continue the use of Prof'Essor methods and tools. Similar views regarding the need of school management's support become clear from existing research on school improvement.

School events for sharing

Events where participating schools can get together and share their experiences are also part of the support tools for the programme. In the Netherlands, these are called the "pizza sessions" whereas in Belgium, they have a different name. Nevertheless, the function is the same: to exchange best practices, to boost motivation and to celebrate success among the participants. Events are organised about once every two months.

Within school sessions are also organised, usually at the end of the 8-week cycle. For example in Prof'Essor, the coordinator considers these moments of sharing crucial; sharing learning experiences is important as it can also facilitate the process of adoption by those teachers who are still hesitant in the first place.

Coaching

The onus of the success is on effective coaching and support actions for the school to implement the programme. Two types of coaches are used, the expert ones and those appointed within the school.

The expert coach has a thorough knowledge of the programme's tools, methods and techniques, and they will be able to contribute examples from other schools that they have coached. They ensure quality of overall coaching. Their first mission is to train the school team and the school coach with methods, so for example in LeerKRACHT, they (co-)organise a 2-day start event with all the in-school coaches, where the main training of the tools take place. Over the initial training phase of 8 weeks, the expert coach support the school team, but also the teacher teams, and is ready if there is a question about the content or if they find themselves in a difficult situation. The expert coach's job is to help appropriate the tools and methods, and to best fit them in the situation of the school to root the improvement culture in the everyday life of the school. Their task is also to make sure that the gained knowledge will stay within the school after the initial training period.

The profile of these expert coaches is important. They should be passionate about teaching and school improvement in general with a mind to start and install new processes and ways to collaborate among teachers. They usually have previous experience/studies in coaching and a high level of proficiency in facilitating large groups. In the case of LeerKRACHT, expert coaches come through the Foundation, whereas in the case of Prof'Essor, they are the employees of the school network who

already work as pedagogical counsellors. Each counsellor is responsible for following 1-2 teacher teams during a period (e.g. 8 weeks) in 1 or 2 different schools.

The in-school coach, on the other hand, is a member of the staff who normally has no previous knowledge about the programme but who, for example, might be someone considered as an influencer or opinion leader among colleagues. The in-school coach is trained to use the tools and methods by the expert coach. The in-school coach works directly with teacher teams. For example, they help conduct the first sessions using the three teachers' tools in the beginning of the initial training period, and their role is to keep giving support and encouraging teachers to independently apply method. The in-school coach helps the teacher team get the best out of themselves, for example by asking powerful and challenging questions. According to LeerKRACHT's experience, the main challenge of the in-school coach is to find a balance between result that each teacher team wishes to achieve and the act of coaching, while at the same time being part of the school's team in terms of the overall management of the programme and its progress.

A long term time investment

McKinsey estimates that implementing the "Teaching Together for Excellence" programme (e.g. LeerKRACHT, Prof'Essor), it takes a long term investment of a year to 2 years. The process is exemplified in 5 phases. They are briefly explained below.

Even before the start of the implementation, Phase 1 includes a period of 3-6 months to foster support from key decision makers in education (e.g. school authorities) and creating a buy-in from key stakeholders (e.g. school principals). At the same time, a fact-based discussion is needed about school improvement and what could be the local need for establishing such a programme.

Phase 2 is to prepare the first pilot (about one month), this gives time to train principals and coaches and to organise the logistics. Phase 3, which is aimed at building capacity, comprises of the first school pilot of a period of 8-12 weeks. At this phase, the teacher teams start using the tools and gain proficiency in using them for their everyday practices. For example, in the case of Prof'Essor, the initial pilot conducted by the Catholic School Network involved 8 schools. During this pilot, the pedagogical counsellors of the Network were able to gain independence in using the tools and methods, thus becoming independent operators of the programme and able to train the future coaches. Phase 4, another period of 8 weeks, is to foster autonomy in the use of methods and tools and to integrate a culture of continuous improvement within the school. Phase 5 onwards, the full roll-out and continuous improvement is settled, during this Phase, it should be ensured that the majority of teachers (80%) have gone through the programme in order to sustain change in the future.

Future plans

The LeerKRACHT Foundation in the Netherlands has a goal of 1 in 5 of all Dutch schools (primary, secondary and vocational) participating in their programme by 2022. Looking at their website, one can see that new ideas are implemented continuously, for example, the model now has four core tools for teachers to work with instead of the 3 initial ones. The new one is called "Students' voice" where students give more direct feedback to teachers¹³⁷ and they also implement white-board type of activities¹³⁸. Moreover, an alumni type of network/platform for sharing has been established allowing the schools, who started at the beginning of the implementation, keep in contact with the state-of-the-art discussions and continue sharing of practices.

¹³⁷ <https://stichting-leerkracht.nl/onzeles/>

¹³⁸ <https://stichting-leerkracht.nl/bordindekilas/>

The LeerKRACHT website has many illustrative videos appearing to explain the use of the tools and to allow a peak into schools and practices¹³⁹. Efforts are underway to also implement LeerKRACHT in Initial Teacher Training colleges, with now 10 such colleges participating in a pilot wave, as it is important that new teachers are formed in a continuous improvement culture from the start. Last, from August 2017 onward, a new law regulates that schools are supposed to work on continuous improvement which, for example, could be achieved through the LeerKRACHT-programme. The Education Inspectorate, who is responsible for basic quality of education system in the Netherlands, has been tasked by the Dutch Ministry of Education to check that all Dutch schools have such a culture. Moreover, the LeerKRACHT-approach itself has been adopted by the Inspectorate for its own teams, with inspectors working in the primary school system in the Netherlands now using it themselves.

The Catholic school network of the French speaking community in Belgium, on the other hand, plans to continue strongly with the Prof'Essor programme. They estimate that for the moment, their network of 43 pedagogical coaches, who are spread around the different provinces of the French speaking community, can keep up with the demand from the schools. At the same time, there is a policy-push for the programmes such as Prof'Essor thanks to a new "excellence in education programme"¹⁴⁰ which demands for teacher collaborative practices in schools.

2. Analysis of design elements, barriers and innovation

Analysis based on the underlying framework

The framework underpinning the analysis for this study outlines seven design elements that have been found to have impact on teachers' knowledge and practices, successful professional development models generally feature a number of these components simultaneously (Darling-Hammond et al., 2017). In the following, we discuss the structure of the both programmes based on those seven design elements.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	Yes	Yes, through collegial sharing	Yes	Yes	1-2 years	Yes

Both LeerKRACHT and Prof'Essor have a heavy focus on impacting **teachers' classroom practices, however, there is no direct focus on a specific discipline or curriculum subject (1)**; two of the tools aimed at teachers directly deal with this aspect. One of them is the classroom visits to take advantage of peer-observation and the possibilities it gives for giving and receiving feedback. The other one is the joint lesson planning with the idea that this offers possibilities for **collaboration in the context of work (2)**, which is another design element of effective professional development approaches. According to Darling-Hammond (2017, p. 18), collaborative approaches have been found effective in promoting school change that extends beyond individual classrooms, also something that is heavily emphasised by both LeerKRACHT and Prof'Essor. Regarding the last aspect, in our analysis, we talk about "school-based collaborative professional development", as the target audience is

¹³⁹ In English: <https://www.youtube.com/watch?v=sbIkyH0HiX4> and about students giving feedback: <https://www.youtube.com/channel/UCI6PtVA1gmSGe4vKxTumsfq>

¹⁴⁰ <http://www.pactedexcellence.be/>

multiple actors within the organisation targeting an organisational reform within the institution, not only a single process (e.g. teaching practice) or a service delivered (e.g. digitally improved school-home communication platform). All the activities more or less centre around a common theme of creating learning opportunities for teachers and staff **to learn how to collaborate with their own colleagues** in an authentic setting of their own school, and using the resources that are available.

Both of the teachers' tools discussed above, joint planning and lesson visits, are supposed to be implemented twice a month in alternating way, meaning that teachers are given opportunities for such practices on weekly bases while being also **scaffolded** by an in-school coach. This covers another design element, namely that of providing **coaching and expert support (4)** to ensure effective implementation of new practices in the classroom. According to Darling-Hammond et al. (2017, p. 12) coaches or experts play a critical role, for example, in modelling strong instructional practices, sharing expertise about content and evidence-based practices, scaffolding effective implementation of new curricula, tools and approaches by teachers, and supporting group discussion. In both LeerKRACHT and Prof'Eessor, these generally belong to the job-description of the in-school coaches. As mentioned earlier, especially the in-school coach has a big role in this aspect, which probably is one of the factors that either "make it or break it" in terms of the success of the professional development approach.

Moreover, the underlying theoretical framework for this study calls for teacher professional development experiences that take into account adult learning theories and base their practices on **active learning (7)** rather than generic models involving lectures and other more traditional sit-and-listen models. Practices that engage teachers directly, and that are connected to teachers' classrooms and their students' learning using authentic artefacts and interactive activities can deliver highly-contextualised professional learning (Darling-Hammond et al., 2017, p.7). Both LeerKRACHT and Prof'Eessor focus on practically applicable knowledge thus emphasising active learning in job-embedded context.

On the other hand, they also offer opportunities for **sense-making activities (5)** so that teachers can reflect on their new teaching strategies with the help of colleagues or that of the in-school coach. According to Heemskerk & Schenke (2016), participation in the LeerKRACHT programme contributes to the development of teachers' personal skills such as cooperation, and giving and receiving feedback. Teachers also said to reflect in a more structured way on their actions and teaching, however this remaining sometimes at a rather superficial level. The underlying framework for the study puts emphasis on professional development experiences that offer opportunities **for feedback and reflection (5)**, two distinct practices that work together, stating that they may help teachers move toward the practice that they have learned about or seen modelled during professional development (Darling-Hammond et al., 2017, p. 14). Both of these programmes provide intentional tools for feedback and/or reflection through having built-in time for teachers to think about, receive input on, and potentially make changes to their practices.

On the other hand, the **modelling of effective classroom practices (3)** is placed on the shoulders of colleagues, in-school coaches and the expert coach, as well as the school management team in terms of indicating the overall educational goals of the programme. From the study by Heemskerk & Schenke (2016) we can learn that teachers who participated in LeerKRACHT said to learn more about teaching methods, pedagogical-content knowledge (in TALIS 2013 5.6% of Dutch teachers said to a high need for training in *pedagogical competences in teaching my subject fields*) and their vision on education and learning, however, less so in case of their development of content-knowledge (in TALIS 2013 6.9% of Dutch teachers said to have a high need for training in *knowledge and understanding of my subject fields*) and theoretical knowledge.

Last, in terms of sustaining the practices, both LeerKRACHT and Prof'Essor sustain professional development experiences over time through cycles of programme that encourage following a set schedule so that activities are repeated over a long period. The initial training phase for schools is set from 8 to 12 weeks during which coaching is fortified. After the initial period, schools are engaged in implementing the schedule in similar periods always with sessions to reflect, share practices and vent the feelings either within the school or across them. The support offered by LeerKRACHT to participating schools stretches from 1 year (primary schools) to 2 years (secondary schools and vocational schools), which includes the start-up of the programme and the 8-12 week training phase. According to the underlying framework, professional development experiences that offer multiple opportunities for teachers to engage in learning around a single set of concepts or practices has a greater chance of transforming teachers practices and student learning (Darling-Hammond et al., 2017, p. 15)

Avoiding known barriers to teachers' participation in professional development

This study also focuses on understanding how a professional development programme or a more informal professional learning experience can come around the known barriers to teachers' participation in professional development in general. The TALIS study lists seven barriers (OECD, 2014), below, we analyse this professional development model in view of those barriers.

In terms of barriers such as lack of employer support and conflict with work schedule, both LeerKRACHT and Prof'Essor have fitted their models around them: since the participation in the programme is upon a choice of the school head, and that the management team is engaged in the activity itself, the barrier of "lack of support by employer" is removed. Similarly, potential "conflict with work schedule" is removed, since hours of participation are during working hours at school. However, it is not clear whether teachers still have the same workload to carry in addition to the participation in the programme, or whether some of their tasks been eliminated. In terms of the costs related to participation, the teachers themselves do not have any. Regarding the incentives for teachers to participate in these models, it is not clear whether there are any (e.g. promotion or ability to retain a certain occupational grade). It is also not clear whether participating in one of these programmes is well received by teachers, e.g. if this type of activity is what they would say that they have a moderate or high need of professional development. Last, regarding barriers such as family responsibilities and prerequisites to participate, there is not enough information to consider.

Aspects of innovation

For the purpose of our study, we are also interested in looking at certain trajectories of innovation within the chosen professional development experiences. They are explained in Box 1, situated in the beginning of Annex 2, and presented shortly in Table 3.

Table 3. Analysis of the trajectories of innovation of the model used for LeerKRACHT and Prof'Essor

Nature of innovation	Implementation phase	Access level	Actors	Impact area
radical	Scale	regional-national; cross-border	multiple actors= whole school	Service/ process/organisation

In terms of nature of innovation, we consider this model as "radical" as it introduces a number of innovative elements to the way professional development activities could be provided. The implementation phase is past piloting reaching "scale", however, it is

not yet mainstreamed, as the programme in neither of the countries could not be considered as an established feature of the professional development offerings, for example. The access level is “regional and national”, latter especially being the case in the Netherlands, but also cross-border, as the model has been implemented in more than one countries. In terms of target area of the professional development experience, it focuses on “multiple actors” within a school. Regarding the type of innovation, it is a combination of many. First of all, it represents product innovation, as the whole programme is a new service provided in the market. It is also process innovation, as it attempts to affect teaching practices (“process”). Last, it also introduces new means for teacher collaboration and also undertakes “organisational reform” at the institution, thus it also being of the type of organisational innovation.

Box 2. A short summary of research by Heemskerk & Schenke (2016) in English.

Summary of results in English: Programme LeerKRACHT in Dutch schools

Wouter Schenke & Irma Heemskerk, researchers Kohnstamm Institute, University of Amsterdam.

In an exploratory study (Heemskerk & Schenke, 2016) into knowledge utilization and knowledge sharing by teachers, the Kohnstamm Institute, University of Amsterdam investigated what teachers who participate in the leerKRACHT-programme gain for their knowledge development and knowledge sharing and which school conditions play a role in this. In five secondary schools, group interviews were organised with a limited number of teachers and a short questionnaire for all teachers was set out.

Teachers mentioned the working method of the leerKRACHT-programme as fairly important for their knowledge development, especially for practically applicable knowledge. Participation contributes to the development of their personal skills, such as cooperating and giving and receiving feedback. The scope of the leerKRACHT-programme is on discussing practical issues and supporting each other. Teachers learn more about teaching methods in the classroom, pedagogical-content knowledge and their vision on education and learning.

Teachers point out that they reflect in a more structured way on their own actions and teaching. Colleagues provide them with concrete ideas, for instance on different types of teaching methods. Deeper reflective questions such as what works, for whom and why are not in the central focus of the leerKRACHT-programme, at least by the time this study was conducted. In the meantime, leerKRACHT has integrated methods, such as Lesson Study, with the intention to stimulate teachers to reflect more in-depth on their lessons.

Knowledge sharing mainly takes place with direct colleagues. Teachers mentioned having more consultation and collaboration with these colleagues. Lesson visits have become a more natural course of events. There are also signs of a more open culture arising in these schools, with an increase in mutual trust and a good atmosphere. Harder to realise are school wide knowledge sharing and sharing experiences with other schools.

Conditions: Schools in this study did not all implement the leerKRACHT-programme fully. School leaders and teachers made decisions, such as organising fewer lesson visits and devoting more time to the whiteboard sessions. The study indicates differences in enthusiasm with which teachers participate within the programme and differences in the extent of support for school changes. For a sustainable implementation of the leerKRACHT-programme, it is important that it is given a clear space within the school organisation and that teachers are facilitated in order to participate. For a successful implementation, teachers should be prepared to work with each other and open up to feedback.

Studies on the impact of the professional development model (LeerKRACHT)

A number of independent studies have been carried out on LeerKRACHT, to better understand its potential for ameliorating teacher professional development options in the country, as well as to enhance the overall quality of the education system.

Kohnstamm Institute (2016).

- An in-depth study was commissioned by the Ministry of Education¹⁴¹. The study followed a small number of secondary schools covering a period of 2 to 3 years. It shows that LeerKRACHT contributes to teachers' knowledge development and knowledge sharing and has positive influences on education. Below a summary of the results by the main researchers, which is for the first time published in English (see Box 2).

University of Utrecht (2014, 2017-2021).

- The first study was carried out during school year 2013-2014. It was conducted among some 40 participating primary and secondary schools only 6 months after the start with the LeerKRACHT programme. The researchers conclude that the culture in primary schools was changing in terms of educational practices, as well as the role of school management. However, in secondary schools, a smaller change was measured.
- The second study will be focusing on a long term impact of LeerKRACHT from 2017 to 2021. The study will be conducted among 300 schools during which they participate in the programme. It is sponsored by the Ministry of Education of the Netherlands and carried out by Utrecht University and Oberon B.V.¹⁴².

Transferability of the methods and tools

It is interesting to look at the examples of LeerKRACHT and Prof'Essor side by side. The both programmes have a common core, but there are differences in how they have been implemented and how the tools have been adopted and adapted to work in the context.

To start with, the underlying structure to implement the professional development programmes varies from the context to another. In the Netherlands, the LeerKRACHT Foundation is someone who shapes and develops the initial tools and then offers training and coaching for the schools who participate. As such, they do not have access to schools or have power over any decisions regarding the implementation of school improvement programmes. In both cases, however, schools voluntarily contact the organising bodies to get involved in the training.

In the case of Prof'Essor, the decision to initiate the first pilots was taken by the Secretary General of the Catholic Education who runs a network of 750 Catholic schools in the French speaking community of Belgium. At that point, the tools were already in use in the Netherlands. For Prof'Essor, this was a positive point and it helped the decision makers to buy-in and start piloting. Secondly, the Catholic school network already had the role of pedagogical advisors in place, and although their job description was very different from what they were required to do in the "LeerKRACHT" model, the adoption process was easy. The coordinator of the programme estimates that after the first 8-week piloting period, they gained enough independence in using the tools and thus the ignition to kick-start by McKinsey was sufficient. After this pilot, the pedagogical advisors started offering the professional development programme for the other schools within the network acting as trainers and organisers of the programme.

There are rather small differences in how the programmes have been adapted, many including calling the events or tools in different names. Also, some organisational aspects are different, in the Prof'Essor programme, the first training days on the use of tools and methods are organised for a group of participating schools together so that they can mingle, but in LeerKRACHT, the training events, called Bootcamps, are school specific. This also reflects the differences in the way the programmes are financed; whereas the Dutch schools pay for their participation in the programme, the Prof'Essor is a service provided free of charge by the network for its schools.

¹⁴¹ <https://www.nro.nl/nro-projecten-vinden/?projectid=405-15-541-docenten-die-kennis-creeren-en-benutten-voor-onderzoek-en-praktijk>

¹⁴² A research blog at: <https://promovendaangela.wordpress.com/>

In the case of Prof'Essor, on the other hand, the coordinators estimate that one period of 8 weeks is rarely sufficient to sustain new practices in schools. More follow-up is provided through pedagogical coaches but also through between-school exchanges focusing on sharing of pedagogical practices among participating schools.

3. Background: McKinsey & Company's corporate social responsibility programme

Both professional development programmes presented in this report, LeerKRACHT and Prof'Essor, have their roots and background in the corporate social responsibility programme of McKinsey & Company, a consultancy that advises companies and governments. In 2007, an education track was started at McKinsey¹⁴³ with a flagship report called "How the world's best performing schools systems come out on top" (McKinsey, 2007) which was followed up by "How the world's most improved school systems keep getting better" (McKinsey, 2010). The latter one includes an opening word by Michael Fullan, a well-known expert on educational reform. Both reports send a strong message to policy-makers on how to improve school system performance at scale.

Disseminating and discussing such work actively with a wide set of stakeholders in education was important for Etienne Denoël, now a retired Senior Partner in McKinsey in Brussels, who was also personally worried about the state of the French speaking school system in Belgium and its performance in PISA (e.g. inequities of the education system). Out of his own initiative, over the last 10 years, he has engaged in discussion with some 12 000 individuals (local and regional decision makers, with parents and students themselves, with teachers, school heads, unions, etc.) around issues related to education. As part of this mission, in 2013, he helped to launch "Fondation pour l'Enseignement", an organization that seeks to build bridges between school networks and the world of business in Belgium, and to launch "Teach For Belgium"¹⁴⁴ (which follows the movement of "Teach for All"¹⁴⁵). It is now active both in the French-speaking and in the Flemish-speaking Communities of Belgium.

One of Etienne Denoël's activities also gave impetus for a model of teacher collaborative practices, called the "Teaching together for Excellence" programme, that have then been implemented in both LeerKRACHT and Prof'Essor. Taking up lessons learnt from the above mentioned reports, and combining them with organisational change management strategies used in industry and corporate world (core business of McKinsey), the model for teacher collaboration as an engine for change in schools started taking shape. The approach intends to help schools create a culture of 'a little better each day' believing that over a longer period of time (e.g. year to two years), the new routines of collaboration become a way of working that brings along better working environment, enhanced teachers' classroom practices and eventually also contributes to learners' better learning outcomes.

The first pilot of the model was implemented in 2012 in the Netherlands by Jaap Versfelt. He had previously also been partner at McKinsey & Company in the Netherlands and his work experience included years of working with "continuous improvement culture" in industry through approaches such as Lean manufacturing¹⁴⁶ and Agile software development¹⁴⁷ which are implemented from car factories (e.g. Toyota¹⁴⁸) to software development frameworks such as Scrum¹⁴⁹. The grand idea, so

¹⁴³ <https://www.mckinsey.com/about-us/new-at-mckinsey-blog/celebrating-10-years-of-impact-in-education>; News: <https://www.mckinsey.com/industries/social-sector/our-insights/how-the-worlds-most-improved-school-systems-keep-getting-better>;

¹⁴⁴ <http://teachforbelgium.org/fr/accueil/>

¹⁴⁵ <https://teachforall.org/>

¹⁴⁶ https://en.wikipedia.org/wiki/Lean_manufacturing

¹⁴⁷ https://en.wikipedia.org/wiki/Agile_software_development

¹⁴⁸ https://en.wikipedia.org/wiki/The_Toyota_Way

¹⁴⁹ [https://en.wikipedia.org/wiki/Scrum_\(software_development\)](https://en.wikipedia.org/wiki/Scrum_(software_development))

to say, is to take small steps of improvement every day to start a culture of continuous improvement in the school, so that new ways of working become a new routine eventually leading to better outcomes. Originally, 15 schools participated in the first pilot in the Netherlands growing into more than 750 schools in 6 years. Today, the Foundation LeerKRACHT implements the programme in the Dutch school context on a not-for-profit-basis.

On the other hands, school pilots were also started in Belgium and helped along by Etienne Denoël as part of the pro bono work by McKinsey. Pilots with Prof'essor started in 2014 by the Secretary General of Catholic education of the French-speaking community involving a network of 750 Catholic schools. Since then, two other pilots have been started in the community of French speaking Belgium, one called "PratiCole" (Pratiques Collaboratives¹⁵⁰) as part of the Ministry of education of the French community and "Collabor Action"¹⁵¹ in the province of Hainaut.

In school pilots, McKinsey's role has been about igniting the process by introducing the model (e.g. tools for teacher teams and school management team; and accompanying activities such as "pizza evenings" for schools to exchange), and training the coaches who eventually become owners of the programme so that there is no need for continuous involvement of McKinsey. Importantly, the tools and processes are also being appropriated to one's own educational and cultural context with some modifications, demonstrating that the continuous improvement culture also should focus on the model itself. This can also be observed when reading the descriptions of the programmes side by side.

Since 2015, Etienne Denoël also supported the Government of the French-speaking Community of Belgium with the reform called "Pacte pour un Enseignement d'Excellence". In September 2018, after his retirement, he set up a NGO called "Agir pour l'enseignement", funded by private foundations and donors to support the implementation of the initiatives of the "Pacte d'Excellence", one consisting of the deployment of collaborative practices (following the Prof'Essor model) among the entire 100 000-strong teacher population in the 2 500 schools in Fédération Wallonie Bruxelles.

¹⁵⁰ <http://www.wallonie-bruxelles-enseignement.be/docs/JourneeCE-24052017-PratiCole.pdf>

¹⁵¹ <https://www.capp-hainaut.be/projets-enseignement/collaboraction.html>

II. Innokas Network (FI) - inducing maker culture and innovation in school's curriculum activities

1. Introduction to the design of the teacher professional learning model

This text first discusses the design of the professional development model as it is implemented in the Innokas Network. In the following, we further analyse its various elements underpinning the discussion in the framework which outlines seven design elements of the effective teacher professional development model (Darling-Hammond et al., 2017). A brief description of the practice is given as part of the main report (Section 4, [ex.7](#)).

At the heart of the Innokas Network are the activities that aim at cultivating active learners for the 21st century and supporting students' acquisition of competences of the future. The activities are all framed by the model of "Innovative school" which translates into education that is often known as "maker culture", an approach for learning by doing in a social environment that is based on informal, fun, typically peer-led and networked learning (Korhonen & Lavonen, 2017). Teacher professional learning and development activities, which support teacher professionalism, are but one pillar of the "Innovative school" model, others focusing on "leadership" (e.g. shared leadership and teamwork), "partnerships" (e.g. collaboration with nearby community) and "learning and learning environments" (e.g. active learning) (Figure 1).

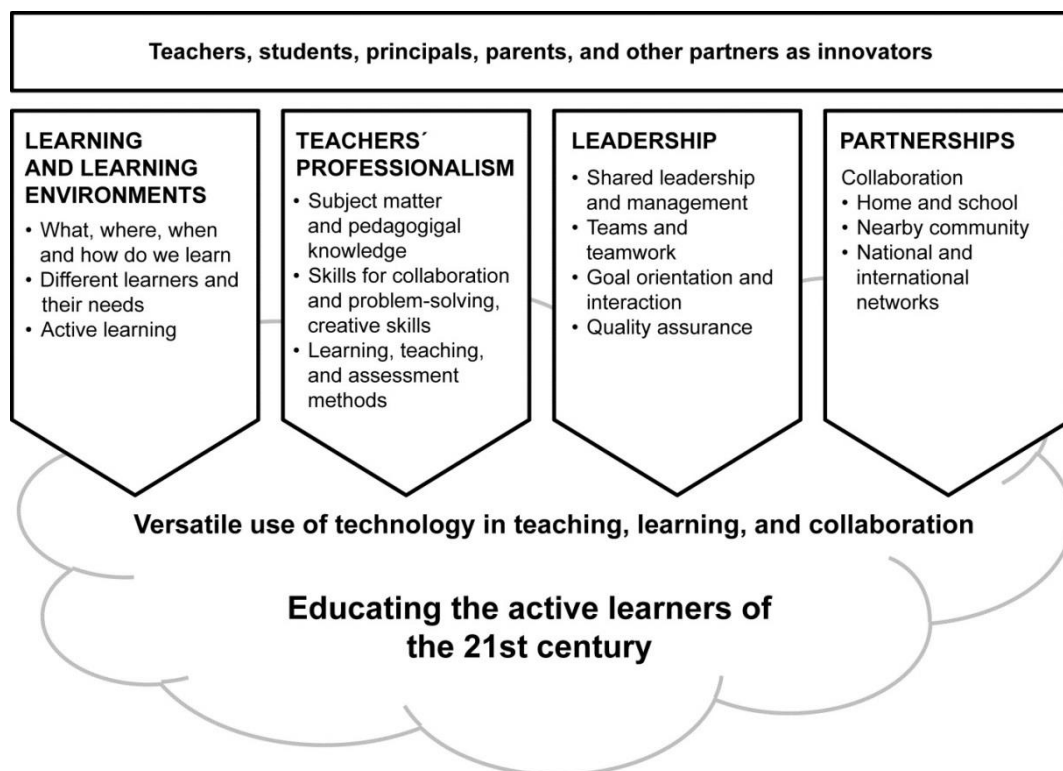


Figure 8. The Innovative School model is based on sharing responsibility and empowering teachers and students.

Roles to take

Regarding **schools participating** in the Innokas Network, in practical terms, any teacher in compulsory education who is interested in joining can sign the school up

using a form on the website¹⁵². There are no formal requirements, but it is suggested that more than one teacher from a school gets involved and undertake the activities. This helps peer-learning for teachers, but also helps them stay engaged and get peer-support/encouragement from each other. As such, the Network has a very low participation threshold.

At the national level, the Network is coordinated together with the Faculty of Educational Sciences at the University of Helsinki (supported by 6 nation-wide coordinators) and 10 local level coordinators¹⁵³. There are 36 trainers spread across the country¹⁵⁴ who allocate one day a week for the activities in the Network, including teacher training and organisation of workshops.

At a more theoretical level, the Innovative School Model, on which the teacher professional development opportunities are also based on, emphasises a participatory model where all actors of the school are involved, calling for establishing partnerships with homes and actors outside the school (Figure 8: top bar). The model further underlies the importance of school leadership's attitude, it being the key factor in establishing an environment that encourages educational innovation.

¹⁵²

https://docs.google.com/forms/d/e/1FAIpQLScJ2V8jf4knAN1Bwi1DEo1r4kOQ8y_VwPcGzxb9DsWC5OBNLQ/viewform for Global network, see: <https://globalinnokas.com/>

¹⁵³ <https://www.innokas.fi/en/contact/>

¹⁵⁴ <https://www.innokas.fi/en/training/>

Tools

Innovative school model

The main tool to work with is the Innovative School model (Figure 8) co-developed by the Faculty of Educational Sciences at the University of Helsinki in collaboration with local coordinators and participating schools. In the model, **teachers and students are encouraged to act as innovators who make use of technologies**, both everyday and emerging ones, in various ways to support learning and teaching – with the goal of educating active learners for the 21st century (Korhonen & Lavonen, 2017). This results in interest-driven technology-rich projects with real-world relevance where one learns about the technology but at the same time, technology is also a tool to achieve a goal. Learning activities and processes take advantage of peer inquiry, innovativeness and interdisciplinary collaboration. Even if the model outlines the elements, there is no single method to implement activities. Each school, in fact, plans and implements its activities according to the needs of their local learning environment, always taking into account their own requirements, conditions and capabilities.



Figure 9. How to teach innovation? The theoretical concept of Innovation Education underpins all activities focusing both on the process and the product (Korhonen & Lavonen, 2017). Images display student designed technological innovations.

For example, some schools may choose to implement Innokas Network activities under one curriculum discipline, e.g. in mathematics, handcrafts/technology, visual-arts, science (environmental studies, biology and geography, physics and chemistry), while others may run the activity in separate projects spanning across multiple disciplines. They could also be part of elective subjects or as an extra-curricular club activity run by teachers or student tutors. Additionally, schools have reported incorporating Innokas Network activities as part of theme weeks, drama or as part of the planning for annual school events and festivities (Korhonen & Lavonen, 2017). Part of the Network's success is the variety of adaptations and different types of local activities which in turn are shared through the Network.

From the point of view of the Finnish curriculum, such activities are very suitable. On the one hand, the core curriculum reform implemented in 2016¹⁵⁵ requires every school to implement one multidisciplinary learning module a year and it also outlines a set of transversal competences to be taught as part of each subject (e.g. thinking and learning to learn; ICT competence; participation, involvement and building a

¹⁵⁵ https://www.oph.fi/english/curricula_and_qualifications/basic_education/curricula_2014

sustainable future)¹⁵⁶. Additionally, coding now being part of the new core curriculum for primary education, too, so robotics and tinkering in general have room to be taken up (see Box 4 below for more information about the new coding curriculum). Regarding school principal, teachers and students, the core curriculum also encourages engagement in continuous development of school operations, in team teaching as well as in instructional processes that are based on feedback and evaluation.

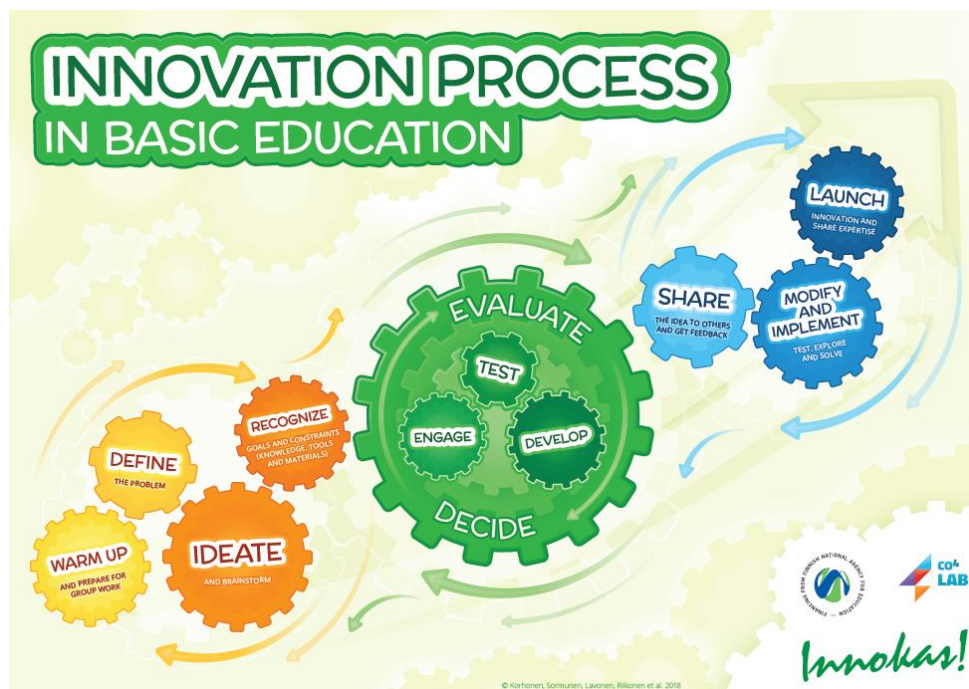


Figure 10. Example of a poster by the Innokas Network to describe the innovation process that students are also taught to apply in their “tinkering”¹⁵⁷

On the other hand, the Innokas Network activities are also rooted in the long tradition of handcraft being a curriculum subject in Finnish basic education, actually, ever since the first public schools were established in 1866 (this also explains why Finnish schools often have space and tools for both textile handcraft and wood/metal work). In these studies, textile and wood/metal works, but also technology topics, are used to guide and encourage both boys and girls to familiarise themselves with creative planning processes, to learn thinking skills, and to engage in teamwork and projects that transcend traditional boundaries between school subjects (Korhonen & Lavonen, 2017).

Teachers’ role, which is especially emphasised by the Network, is to engage in discussions with students on the nature of innovation and inventions and on whether or how each individual student could also become an inventor. In the discussions, the students also identify technological innovations that are in use in contemporary society, the changes these innovations have brought about and are still bringing to society, and the opportunities for using technological innovations in the future (Korhonen & Lavonen, 2017).

Training and networking activities

The teacher training models that are offered through the Network are developed in collaboration with participating schools and the Faculty of Educational Sciences at the University of Helsinki. All have the same starting point: creativity and innovation by reflecting on the role of the learner and the school. Mainly, two different types of

¹⁵⁶ https://www.oph.fi/download/190839_aiming_for_transversal_competences.pdf

¹⁵⁷ <https://www.innokas.fi/en/materials/innovation-process-in-basic-education-poster/>

trainings are organised: one that is more tailor-made to school's needs and is a pay-for service (for example through the funds of municipality), and the others that are more tool- oriented and free of charge for teachers to participate (funding through the National Agency of Education).

Regarding the first area: at the heart of each training, there is the theme of Innovative School model which is used to explore the more general principles of holistic school improvement but it also offers possibilities to delve more deeply into each area of the model: Learning and Learning Environments, Teachership, Leadership and Partnership Networks (see Box 3). For example, "Interested in Coding and Robotics?"- training is from "the Learning and Learning Environments topic", but it can be customised and combined also to take into account organisation's needs.

Box 3. Examples of professional development and learning activities.

Teachership: These trainings prepare and encourage you to share your knowledge, work effectively in teams and to learn from your peers - all in the context of team teaching. You will get familiar with both practical and theoretical aspects of team teaching. The trainings help you in developing your own team while taking into account your team's unique characteristics.

After the training participants can use the competence and resources to effectively guide and support students in achieving curriculum objectives. In addition, participants get to know how they can make use of technology to support a teacher's work.

Leadership: These trainings will guide you towards shared leadership practices and get you excited about them! The trainings introduce shared leadership concepts such as teamwork, team teaching, pedagogical cafe's and headmaster teams in theory and practice.

The trainings guide school leadership to assume a positive and encouraging attitude towards developing school operations. In addition, the trainings cover self-assessment based quality assurance methods and the application of technology to support leadership. During the trainings participants develop their own unit's shared leadership practice and the use of technology in their own unit. See more at: <https://www.innokas.fi/en/training/>

On the other hand, the Network offers training on pedagogical use of tools, for example, for robotics or coding (e.g. LEGO EV3, Micro:bit). These short half- to one day training interventions are organised free of charge with the help of CPD funds from the Ministry of Education. Between 2016-2017, the Network also coordinated a MOOC for coding (see Box 4 for more details). In Finland, most teaching contracts stipulate 3 days of CPD and instructional planning with no mandatory way of delivering them. The tool-oriented trainings are always lead by teachers, or students who act as tutors, not the vendors. An example of such training is a national tour "Are you interested in coding and robotics" in 2015-2016, which had 1500 teachers participating from 164 localities across the country. Organisers regularly poll the participating teachers and it has been noted that such short tool oriented training sessions, which focus on *pedagogical how-to*, can help lowering barriers towards robotics; help gain confidence in the topic; and a change in the individual's attitude towards robotics. Evidently, still the challenge is to kick-start a longer term involvement, but for this, the support of local coaches is important (see Coaching). In general, the organisers take a research-based view on teacher professional development and professional learning experiences and consider that with the help of the Innovative school-model, the professional development activities can be better embedded into the development of the entire school, which on the other hand, can further sustain teacher professionalism.

An Open University MOOC on coding as a pedagogical tool – content created by volunteering teachers and practitioners

From 2016 onwards, the Finnish national curriculum for basic education (i.e. primary and secondary) states that programming, or coding, is to be integrated in education. This requires that teachers are able to understand and meaningfully use coding as a teaching and learning tool. The curriculum states, for example, that to earn a good grade in mathematics, a 6th grader should be able to create simple programs using a visual programming environment (such as Scratch, although other brands are available). Some estimate that about 40 000 teachers were affected in a way or another. A MOOC called “Code ABC” (Koodiaapinen¹⁵⁸) was designed by a group of volunteers¹⁵⁹ to help primary and secondary school teachers to get started with the new concepts.

The MOOC started as a grassroots social pledge in 2014. It was coordinated by a non-profit IT trainers association¹⁶⁰. The first MOOC was ran with a zero budget in autumn 2015. Out of 1300 people who started the MOOC, 511 completed it. For the academic year 2016-2017, a grant from the National Agency of Education was requested with the coordination undertaken by the Innokas network. A wide stakeholder group joined the effort too (e.g. the Finnish Federation of Technology Industries, Aalto University and Helsinki University). More than 3000 people participated in two consecutive MOOCs with a high completion rate.

The novelty of the MOOC lied in the focus on pedagogical training; instead of teaching coding, the participating teachers focused on *how to teach* these topics in a classroom and *how to meaningfully* use coding as a teaching and learning tool.

The course offered participants a clear learning path to the area; basics concepts of teaching coding and computational thinking, a number of tools to use, and it emphasised the pedagogical training of how to teach these topics in a classroom. The course consisted of **theoretical** sections on computational thinking; **pedagogical** sections on how various concepts and tools can be used in classroom; and **hands-on exercises** fitted to various age ranges (ScratchJr for K-2, Scratch for 3-6, Racket or Python for 7-9).

The MOOC, which ran as a six-week online program consisted of 5-8 modules. Required estimated study time was from 30 min. to 2 hours per week. An official certificate and study credits of completed courses were awarded by “Open University of University of Helsinki” (the course provider) with ECTS credits of 2 or 3 depending on the study options. The MOOC was free-of-charge and the content is openly licensed under Creative Commons. It is still available for use, even though the course is no longer offered.

An impact study was conducted in 2017¹⁶¹ which gathered evidence on the usefulness of the course and its applicability to the classroom. A journal article is also available by Toikkanen & Leinonen (2017).

Apart from activities that directly aim at teacher professional development purposes, the Network offers plenty of other activities too. One of the highlights is the annual Innokas Technology Event for schools, organised since 2012. The event also hosts the national “Innokas Robotics Tournament” (see Box 5 below).

Between 2011 and 2015, more than 45,000 persons participated in Innokas Network activities including students and teachers in schools as well as teachers in professional development programs. In addition parents, school administrators, personnel in public libraries, university students and staff, and company representatives attended the Innokas Network events (Korhonen & Lavonen, 2017). The idea behind having such a wide group of participants is rooted in research: user involvement in implementing innovation increases the likelihood of continued use and further development of the innovation (Rogers, 2003).

¹⁵⁸ <http://koodiaapinen.fi/en/>

¹⁵⁹ Credits & names of volunteers and association who contributed to the effort:
<http://koodiaapinen.fi/tekijat/>

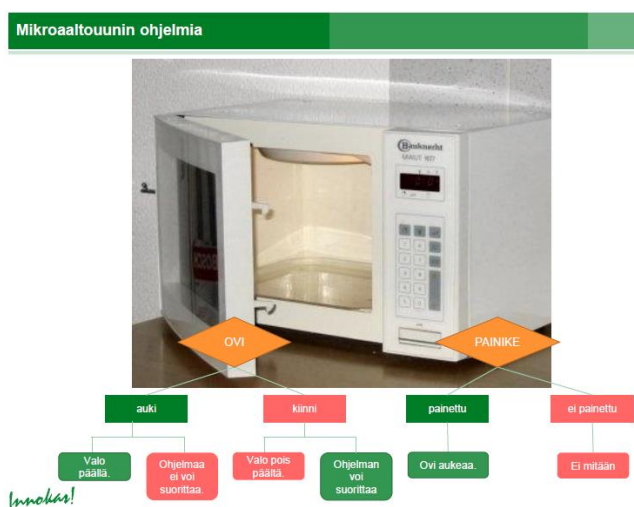
¹⁶⁰ <http://itko.tivia.fi/fi/etusivu>

¹⁶¹ <http://koodiaapinen.fi/2017/05/koodiaapinen-vaikuttaa-peruskoulussa/>

Teaching resources

How to teach innovation? The modelling of practices is at the centre of the Innokas Network and teaching materials play a role in disseminating them. There are different types of digital teaching resources which are shared openly online for non-commercial use, some also exist in English¹⁶². They include worksheets, posters (e.g. Figure 10), videos and case studies, and cover various topics in programming, robotics, and Innovation Education.

The materials are very simple outlines for activities in class, like the one on “Everyday automation and robotics¹⁶³”, which could be used in primary school to observe technologies that are embedded in children’s lives and how the basic automation processes work. Figure 11 shows an example of how to approach the topic with the eyes of primary school children. The material introduces a simple algorithm to heat up a cup of hot chocolate using a microwave oven. This activity invites children to think of the basic logic steps behind the functioning of the microwave oven.



The aim of such exercise is not to teach children how to use a microwave oven as such, but to teach them to observe their surroundings and to help them make sense of it bit by bit. By teaching a simple logic behind the functioning of a microwave oven, or any single technology that they use every day (e.g. lift), is to build their capacity not only to be a consumer of these technologies, but empower them to be an actor and inspire them to innovate their own simple devices that make use of automation, programming and robotics (see items in Figure 9 for examples).

Figure 11. Screen capture of the learning resource: microwave oven and its basic logic (e.g. if the door is open, the light is on and the programme cannot run).

A network to support coaching and peer-learning

The network of Innokas schools already encompasses more than 650 schools across the country. To support it, the area coordinators and coaches who are spread across the country in 10 areas have a central role. Area coordinators act as **lead innovators in their area**, sharing information, arranging local events, coaching teachers and further developing the Network.

The Innokas-coaches, on the other hand, are usually teachers in local schools who have one day a week dedicated to spend on activities to support schools and teachers, and to participate in regional and national activities in collaboration with the area coordinators (those days they do not have teaching duties). Being practicing teachers, the coaches are familiar with the day-to-day challenges in schools, therefore the coaching approach remains pragmatic and down-to-earth. Coaches receive salary for the Network’s activities which is paid by the Innokas coordinator through a dedicated project funding (see 1.4 for more details). Some of the trainers are also workers in local media centers.

¹⁶² <https://www.innokas.fi/en/materials/>

¹⁶³ <https://www.innokas.fi/en/materials/everyday-automation-and-robotics/>

Importantly, 17 out of the 36 coaches are female coaches¹⁶⁴ which could be seen as lever to help to set a balanced role model to the otherwise male dominated field of STEAM. According to the organisers, the gender-balance is not intentionally sought after, however, it might work in their advantage in the future as, according to the intentional studies, Finnish students reported the lowest interest in STEM occupations (11%) in Europe with only under 4% of females who plan to work in STEM occupations (Blasko *et al.*, 2018).

The Innokas Network manages to provide a limited but well-organised support to local areas which guarantees locally relevant training in support of participating schools. Such grass-roots approach to the coordination is one of the success factors, the organisers reckon, as local events and networking can facilitate and encourage sharing among schools, prompting schools to ask whether the same activity could also work as part of their activities or how they could adapt the activity for their own use (Korhonen & Lavonen, 2017, p. 28).

Networking is facilitated through various means both at national and regional level using both face to face events (e.g. fairs and educational conferences) but also online means (e.g. website, twitter). One rather informal way is through a FB group where participants can ask questions from each other and get answered by peer-teachers or coaches. Such networking among participants is encouraged so that links can be created between schools who have specific interests. The coordinators emphasise the importance of immediate help and support. For the organisers, receiving feedback from actors and “doers” in the field is important, too, since many of the processes are iterative applying principals of design-based research into action within the Network.

Future plans and transferability

To keep abreast with innovation in the area, to actively push the boundaries of educational innovation and to sustain its activities, the Network actively seeks involvement in new projects and creates new collaboration with other important actors in the field. It is also the “modus operandi”, as in Finland, there is no continuous funding for organising teacher CPD (funding through projects by the MoE). The main founders include the Finnish National Agency of Education¹⁶⁵; the Centennial Foundation of Technology Industries of Finland¹⁶⁶; Business Finland¹⁶⁷ (previously known as TEKES); Ministry of Education; Academy of Finland. Some of these projects have a national scope, e.g. Crea-ti-ve ex-per-ti-se – building bridges between Initial Teacher Education and Professional Development¹⁶⁸, Growing mind.fi¹⁶⁹, co4Lab¹⁷⁰. Apart from focusing on national projects, there is also a more international co-operation taking places through a European scope (e.g. Erasmus+ project¹⁷¹) or even through international collaborations (e.g. the partner network includes international doers such as FabLearn Labs¹⁷² and Stanford Graduate School of Education¹⁷³). Especially the projects that focus on collaborating with other countries could be considered as a sign for the good transferability of the model.

¹⁶⁴ <https://www.innokas.fi/en/training/>

¹⁶⁵ <https://www.oph.fi/english>

¹⁶⁶ <http://techfinland100.fi/en/>

¹⁶⁷ <https://www.businessfinland.fi/>

¹⁶⁸ <https://www.jyu.fi/edupsy/fi/tutkimus/tutkimushankkeet/kotisivut/ula/ula-creative-expertise/creative-expertise-2013-building-bridges-in-teachers2019-basic-education-and-continuing-education-ula>

¹⁶⁹ <https://growingmind.fi/>

¹⁷⁰ <http://co4lab.helsinki.fi/>

¹⁷¹ <https://www.innokas.fi/en/events/3t/>

¹⁷² <http://fablearn.org/labs/>

¹⁷³ <https://ed.stanford.edu/>

Robotics Tournament: from a local school event to a national TV show

In spring 2018, a 9-episode TV series was aired every Sunday morning in the Finnish TV featuring teams of elementary school children competing in various robotics games such as X-Sumo, Rescue, Freestyle and Dancing with Robots. The novelty: robots were designed and built by the participating teams themselves - with the help of the Innokas Network and its activities. The programme had some 640 000 TV spectators which is a very good coverage for Finnish TV aimed at youth. There will be a follow-up in the coming years.



Figure 12. The 3 teams who qualified to the last part of the FREESTYLE challenge. Each team was composed of girls and boys. The teams came from different parts of the country.

23 robotics teams from across the country participated in the tournament, all of them being part of the Innokas schools with activities in robotics and automation. Such playful tournaments, where robots perform given tasks and challenges, were first organised already in 2003 as a small-scale local school activity with Innokas schools. Year 2018 was the first time when the National Broadcasting Company YLE had approached Innokas about making a TV show out of it. With spotlights, outfits and added extras, the game got to a new dimension! Apart from the jury of experts, there was also a popular vote by spectators through social media.

In X-Sumo, for example, two robots built by the teams “wrestle”, or better, try to push each other out of a circle like wrestlers do¹⁷⁴. In Freestyle, students have to design a robot to achieve some type of a useful task, for example, an autonomous robot to deliver medicines in a hospital¹⁷⁵. In Dancing with Robots, on the other hand, students bring one or more robots together with music, dressed in costumes and moving in harmony – sometimes even with humans!

In the Finnish TV tournament, the children used Lego Mindstorms EV3 robots to perform several challenges, each emphasising cooperative team work, problem-solving, task-achievement aspect and performing under time pressure, especially when the clock is ticking and some of the last programming challenges have to be performed in front of the TV audience.

Interestingly, the concept of the TV series has a strong educational aspect which is a result of a co-design process between the broadcaster and the Innokas coordinators. Especially the “Freestyle challenge” exemplifies this, as in each episode, there is a practical introductory part showing how the technological challenge has a real-life connection. For example, in the challenge of a robot

¹⁷⁴ <https://en.wikipedia.org/wiki/Robot-sumo>

¹⁷⁵ All Freestyle challenges available here: <https://www.innokas.fi/materiaalit/robomestariit-2018-freestyle-tehtavakortit/>

delivering medicines in the hospital, the audience was introduced to a real case of a hospital where a robot performs such a task. The jury, who in this case judged teams' performance, included an expert from the hospital. The underlying idea was that the viewers would be taken by the hand and guided to observe technologies around so that they could build their next innovative idea on the existing one.

The TV format also includes a website with useful resources for school and club activities, featuring also many YouTube videos in a style "making-of", i.e. showing interviews behind the scene and funny episodes of failure or challenges faced.

- Robomestariit: <https://yle.fi/aihe/robomestariit>
- https://www.youtube.com/channel/UChM3KcavvF7O48aEn9a_diQ

RoboCup Junior

The idea of robotics tournaments has a long international history¹⁷⁶, the RoboCupJunior began in 1998 in Paris. The website explains the following: *"For children, the RoboCupJunior initiative provides an exciting introduction to the field of robotics, a new way to develop technical abilities through hands-on experience with electronics, hardware and software, and a highly motivating opportunity to learn about teamwork while sharing technology with friends. In contrast to the one-child-one-computer scenario frequently seen today, RoboCupJunior provides a unique opportunity for participants with a variety of interests and strengths to work together as a team to achieve a common goal."*

In 2003, the Innokas network started with classical RoboCup challenges, but in the last years, the Network has increasingly created its own challenges that are better suited to the Finnish school curriculum and school environment. It is now called The Innokas robotics tournament.

2. Analysis of design elements, barriers and innovation

Analysis based on the underlying framework

The framework underpinning the analysis for this study outlines seven design elements that have been found to have impact on teachers' knowledge and practices, successful professional development models generally feature a number of these components simultaneously (Darling-Hammond et al., 2017). In the following, we discuss the structure of the both programmes based on those seven design elements.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes, STEAM, but also innovation in a larger sense	Yes	Yes, through resource	Yes	Less	Depends	Yes

Content-focused professional development (1) generally treats discipline-specific curriculum such as mathematics, history or languages. It is job embedded, meaning the professional development is situated in teachers' classrooms with their students. The PD offerings and other Innokas Network activities have a heavy content-focus

¹⁷⁶ From 1990's on, see details: http://www.robocup.org/a_brief_history_of_robocup

because of the theme of robotics, automation, technology and coding, subjects which all fit to the Finnish curriculum. So on the one hand; even if there is a focus on discipline specific content-knowledge in the trainings, it is delivered with a heavy emphasis on how to apply it in pedagogical practices with students. The trainings also incorporate **active learning theories** for adult education, as professional development and professional learning activities are connected to classroom practices thanks to the use of authentic artefacts (7).

The professional development trainings, but also a number of other activities within the Network, take advantage of **modelling good and effective practices** (3). The method used is called design-based research where researchers from the faculty of Educational science work in a close collaboration with teachers, students and school partners to identify a challenge and to develop innovative solutions to address the challenge. It often takes a number of iterations with a feedback loop between the users and designers. One example on a big scale is the concept of a **technology-education class**¹⁷⁷ which started from one school in Oulu, north-Finland, and has now become its own project¹⁷⁸ with its own budget¹⁷⁹ and is currently being propagated in schools across the country. The novelty is that activities are fully embedded in the curriculum with a close link to local actors and partners (e.g. visits, collaboration and hands-on practices with local industry & businesses). Other examples include activities by student tutors who give trainings to other students (even at university level¹⁸⁰), but more importantly, have a role in the class to support teaching when implementing technology related activities. The feedback on student tutors has been good, on the one hands, students like learning with tutor students and adults are often surprised to find hidden talents in the youth. Importantly, being a student tutor has been found to be empower learners themselves and see themselves as actors for change.

The Innovative School model focuses on **shared leadership and team teaching** (2), and the Network encourages the participation of more than one teacher of the school. For one thing, this allows for better peer-support but also allows for co-planning and shared practices in schools, for example teaching to groups' across-classes, something that is rather expected from teachers thanks to new curriculum. **Expert support** is provided to teachers "on-demand", either through local coaches or the Network (4) , however, there seem to be less possibilities for a regularly scheduled activities which could also support opportunities for **feedback and reflection** (5) which seem to be left to take place through informal activities or through arrangements in schools. The **sustained duration** of teachers' professional development and professional learning activities is also left to individual's own motivation, the Network encourages teachers to engage in discussions with school heads regarding whole school involvement and the support of the leadership team (6), however, this is left at the level of hints and tips in terms of good practices.

Avoiding known barriers to teachers' participation in professional development

This study also focuses on understanding how a professional development programme or a more informal professional learning experience can come around the known barriers to teachers' participation in professional development in general. The TALIS study lists seven barriers, below, we analyse this professional development model in view of those barriers.

In Finland, according to TALIS, only 60% of teachers said to have participated in 3 day of professional development, the highest barrier to participation being conflicts with

¹⁷⁷ <https://hundred.org/en/innovations/technology-education-class> and <https://rajakylatekno.wordpress.com/technology-education-class/>

¹⁷⁸ <https://teknuoluokka.wordpress.com/>

¹⁷⁹ with funding from National Agency of Education and the Centennial Foundation of Technology Industries of Finland

¹⁸⁰ <http://apkblogi.blogspot.com/search/label/Tutor>

work schedule (52%) and no incentives to participate (43%) (OECD, 2014). There is no predefined or mandatory way of delivering CPD in Finland which makes it possible for networks like Innokas to fill the space with more informal offerings and possibilities for professional learning. Notably, not all of these need to focus on developing individual's own skills and competences, but also of those of the whole school and the teaching force within it. The Innokas network offers some practices for sharing experiences and ideas such as pedagogical cafes and arranged happenings where students and student tutors can also share and teacher others, including teachers.

Aspects of innovation

For the purpose of our study, we are also interested in looking at certain trajectories of innovation within the chosen professional development experiences. They are explained in Box 1, situated in the beginning of Annex 2, and presented shortly in Table 4.

Table 4. Analysis of the trajectories of innovation of the model used for Innokas network.

Nature of innovation	Implementation phase	Access level	Actors	Impact area
radical	scale	National; cross-borders	multiple actors= whole school; wide range of stakeholders	service/ process/organisation

In terms of nature of innovation in organising teacher professional development and learning activities, the model behind the Innokas Network could be considered between incremental and radical as it introduces some new elements to the way the teacher professional development is organised. Where the tool-oriented professional development workshops seem rather a conventional way to offer professional development, the research-based design behind the planning and the content of the courses adds new elements. Also, where the professional development experience is "tailor-made" to correspond to a whole school improvement programme, these could also be accounted for a more radical innovation. Similarly, social networking, peer-learning opportunities, mentoring, and the locally relevant events, which do not necessarily count as professional development but rather for opportunities in professional learning, seem to point towards a more radical innovation.

The goal of the professional development and professional learning is to include a wide range of actors, even those outside the school itself, linking with the community actors, parents, but also businesses and educational institutions, in the area. However, in practical terms this probably varies a lot, there being also cases where the benefits of the PD are reaped only at the level of an individual teacher. Regarding the type of innovation in Innokas activities, there are probably many variations of how it impacts individual vs. institutional practices. Therefore, using the Oslo manual vocabulary, there is some service innovation (e.g. new types of professional learning activities), there is process innovation in terms of new teaching and instructional practices, but also as the underlying model of Innovative school emphasises, Innokas also aims at impacting at the level of organisational innovation, as it focuses on workplace organisation and external relations, too.

The implementation phase is already at scale, and the access level is national; the network of schools covering the whole country, even with remote locations in the north and east of Finland. The network also has activities outside the country.

Studies on the impact of the professional development model

There are number of scientific publications linked to the Innokas network, it being currently coordinated by the University of Helsinki and having explicit research

methodology predominantly based on Design Research. Studies on the impact of the model on students' learning outcomes are underway.

- Korhonen, T. & Lavonen, J. (2017) A New Wave of Learning in Finland: Get Started with Innovation! In Choo, S., Sawch, D., Villanueva, A. & Vinz, R. (Eds.). *Educating for the 21st Century: Perspectives, Policies and Practices from Around the World*. Singapore: Springer, 447-467.
- Korhonen, T., Lavonen, J., Kukkonen, M., Sormunen, K. & Juuti, K. (2014) The Innovative School as an Environment for the Design of Educational Innovations. In Niemi, H., Multisilta, J., Lipponen, L. & Vivitsou, M. (Eds.) *Finnish Innovations and Technologies in Schools: a Guide towards New Ecosystems of Learning*. Rotterdam: Sense Publishers, 99-113.
- Lavonen, J., Korhonen, T., Kukkonen, M. & Sormunen, K. (2014) Rajaton luokkahuone. In Niemi, H. & Multisilta, J. (Eds.). *Innovatiivinen koulu*. Jyväskylä: PS-kustannus, 86-113.

3. Background

In 2004, the Finnish National Core Curriculum for Basic Education was amended with new topics such as entrepreneurship ("Participating Citizenship and Entrepreneurship") and technology ("Human and Technology"). A small group of teachers in Espoo (a town close to the capital city in south of Finland) started brainstorming ways to incorporate the new requirements into everyday practice in schools. In 2007, in order to share best practices with other teachers in a peer-to-peer manner, the group applied for support from the city of Espoo. The new learning center, called "Innokas", started arranging trainings for other teachers in Espoo and established an innovation lab in the school. What started as a small endeavour in one school has, in 10 years, grown into a large-scale, country-wide network of innovative schools and communities (Korhonen & Lavonen, 2017, p. 4-5).

The Finnish name *Innokas* translates into "eager" or "pumped-up" in English. There is also a play in words; "inno" could link to "innovation" and "kas" to a Finnish word of "kasvatus" which means education (Korhonen & Lavonen, 2017, p. 5).

III. Aprende INTEF (ES): online content of various length at your own convenience

1. Introduction to the design of the professional development model

This text first discusses the design of the professional development model as it is implemented by the Spanish Ministry of Education (Intef). In the following, we further analyse its various elements underpinning the discussion in the framework which outlines seven design elements of the effective teacher professional development model (Darling-Hammond et al., 2017). A brief description of the practice is given as part of the main report (Section 4, [ex.10](#)).

Roles and policy context

In Spain, the National Institute of Educational Technologies and Teacher Training (INTEF) is the National Agency for Educational Technology and Teacher Development. It was founded by the Spanish Ministry of Education, Culture and Sport. In 2012, it identified three lines of work to structure a Strategic Framework for Professional Teacher Development:

1. Focusing both initial teacher training and continuous professional development towards a new competency model of the teaching profession in the 21st century
2. Exploring new training roadmaps that facilitate professional collaboration
3. Establishing a common framework that allows the accreditation of professional competences for the teaching profession and the recognition of activities that show contrastable evidence of effective professional development with itineraries that encourage educational leadership.

The professional development and learning offerings described here fall under the second line of work, i.e. a competence-oriented teacher professional development strategy; to open up training so as to foster personalised learning; autonomous training; learning by doing; and training aiming at shared knowledge and exchange of educational practices sustained beyond the actual training periods. Moreover, the underlying training framework aims at helping teachers to improve the level of their digital competence according to the Reference Digital Competence Framework for Teachers (from A1 to C2)¹⁸¹.

The programme fully aligns with European Union policies on Education and Training as they are implemented in the ET 2020 program and those announced in the "Rethinking Education" strategy. Furthermore, they are aligned with the previous Digital Culture Plan For Schools by the Ministry of Education in Spain. The plan outlines professional and digital competencies for teachers.

Teacher training falls under the competencies of the Autonomous Communities and the Ministry of Education within its competence. Nevertheless, the Ministry can also offer continuous professional development throughout the Spanish territory and there is a close collaboration amongst all educative administrations in this field. Apart from the digital courses described in the following, INTEF also offers more conventional teacher professional development (e.g. summer face-to-face courses), teacher mobility programmes with European countries, seminars, conferences and joint educational projects, which are included in the offer by the Ministry of Education.

¹⁸¹ <http://aprende.intef.es/mccdd>

Tools: online platform called AprendeINTEF

AprendeINTEF is a competence-oriented teacher professional development and training model delivered through a digital platform (Figure 13 and 14). The model focuses on competences related to collaboration through the internet, management of autonomous learning and participation in educational communities. According to the website, its aim is "to develop massive training processes based on open and social learning through activities that generate interaction, aggregated production, shared knowledge and the building of professional networks."¹⁸²

The screenshot shows the AprendeINTEF website interface. At the top, there is a header with the Spanish government logo, the text 'GOBIERNO DE ESPAÑA MINISTERIO DE EDUCACIÓN Y FORMACIÓN PROFESIONAL', the 'aprendenitef' logo, and navigation links for 'FIND COURSES', 'SIGN IN', 'SIGN UP', and a 'Language' dropdown menu. Below the header, a section titled 'VIEWING 7 COURSES' includes a search bar and a 'CLEAR ALL' button. The main content area displays a grid of course cards. Each card features a colorful illustration, a title, a description, and a start date. The cards are: 'BYOD for Mobile Learning (1st edition)', 'Creating a comic (1st edition)', 'Creating an Acceptable Use Policy (1st edition)', and two cards for '#twinmoooc' (one with a map of Europe, one with a person). A sidebar on the right titled 'Refine Your Search' allows filtering by Status (Ended, Coming Soon, In Progress), Language (English), Organization (SPOOC-INTEF, NOOC-INTEF, MOOC-INTEF, MOOCINTEF), Course category (MOOC, SPOOC, NOOC), and subject (Aprendizaje mediante objetivos, Acceptable Use Policy, School collaboration).

Figure 13. Easy interface to browse online courses offered by INTEF, some of them are also available in English.

The online content offered through the platform includes a wide range of educational trends such as Flipped Education, Project Based Learning, Formative Assessment, Nurturing Creativity, Digital Citizenship, Digital Collaboration and Communication, Digital Content Creation, Safety, Problem Solving and so forth. AprendeINTEF uses innovative methods in online training such as digital artefacts designing, teamwork, live events for connected educators, online facilitation by "facilitation teams" which includes mentors and instructors, aggregated outcomes and peer to peer assessment.

All the content is delivered **online**. Each course made available through the digital platform has a content description which outlines clearly the competences teachers can acquire (see Figure 14: "Competencia Digital" outlines that this NOOC covers the competence 2.3 called "Engaging in citizenship through digital technologies"). The platform is a customized Open Edx learning environment which is made available in Spanish and English. The customization, for example, includes a portfolio so that the

¹⁸² <http://enlinea.intef.es/about>

proof of learning produced by participants can be made visible and spread, for example through OpenBadges¹⁸³.

#CIUDADANÍADIG - CONOCE RECURSOS Y HERRAMIENTAS DE PARTICIPACIÓN CIUDADANA EN LÍNEA Y SU POSIBLE USO EDUCATIVO.

DESCRIPCIÓN GENERAL

El NOOC 'Ciudadanía Digital' te ayuda a mejorar tu participación ciudadana en línea y a conocer y a manejar diversas plataformas especializadas y opciones de mecenazgo digital adecuadas a tus necesidades. En este curso te mostraremos las claves para que la participación ciudadana en red te resulte más asequible.



Al finalizar las actividades de esta nanoexperiencia de aprendizaje, conseguirás una credencial digital abierta que se entrega como reconocimiento del aprendizaje que habrás desarrollado mediante la realización de las diferentes actividades propuestas y que almacenarás en la mochila de credenciales digitales abiertas "Insignias INTEF".

La estimación de carga horaria es solo orientativa: no se certifican horas de formación, sino que se espera que tu participación en este NOOC tenga como principal motivación tu aprendizaje personal y tu desarrollo profesional, en base a la colaboración con otros docentes que comparten tus mismas inquietudes y creen que el aprendizaje cooperativo puede resultar un recurso educativo de gran valor.

OBJETIVO

Al finalizar este NOOC conocerás diversos recursos y herramientas de participación ciudadana en línea, sus principales características y su posible uso educativo.

COMPETENCIA DIGITAL

La realización de este NOOC te ayudará a alcanzar el nivel C1 de la Competencia 2.3. "Participación ciudadana en línea", del Área 2. Comunicación y colaboración del Marco Común de Referencia de la Competencia Digital Docente.





Course Number	CiudadaniaDIG
Classes Start	Jan 09, 2019
Classes End	Jan 21, 2019
Estimated Effort	180 minutos

Figure 14. An example of the course description on the platform: the learning objectives are described using the Reference Digital Competence Framework for Teachers (see footnote 181)

The online training activities provided by AprenderINTEF are funded by the Ministry of Education in Spain and are free for participants. Over the school year 2016-2017, INTEF has trained 56.929 people worldwide and has issued over 4000 open badges. The Ministry of Education invests over 500 000 euros every school year in online training.

Courses for professional development and learning

The platform offers two main types of courses those:

- Those open *for all*, free of charge and
- those aimed at active teachers from Spanish stated-funded schools within levels prior to the university level. These are called "Online instructed courses" and they last 70 hours. Only a limited number of places are open for participation. A certification is issued with training credits which can be used towards career advancement purposes.

In the following, we **focus only on the first category**. This will allow us to discuss how the decision to open up the online activities scales up to a large number of participants as well as for its aspects of innovation in terms of delivering the content.

AprenderINTEF first started with 3 MOOCs in 2014. As oppose to some conventional distance learning, the MOOC experience was designed as a social event for teachers

¹⁸³ Teacher e-portfolio is available at: <http://insignias.intef.es/>

who wish to share their learning experiences. Main types of free courses discussed in this case study are the following¹⁸⁴:

- **MOOC INTEF**: Massive Open Online Courses on various topics that cover active educational methodologies for continuous professional development. MOOCs are 5 week courses that require between 3.5 and 5 hours a week of learner effort.
- **NOOC INTEF**: Nano Online Open Courses. NOOCs are very short courses, average 3 hours long (from a minimum of 1 hour to a maximum of 20 hours of estimated effort). NOOCs focus on acquiring/developing a single digital competence, achieving a single goal and showcasing it all by means of a digital artefact.
- **SPOOC INTEF**: Self-paced Open Online Courses for those who prefer to learn at their own pace, in their own time, without deadlines.

Open Badges to recognise and incentivise teachers

Every massive online training action (except SPOOC) within the initiative is acknowledged through **open badges** which digitally certify achieved goals and acquired competencies according to issuing criteria. INTEF runs its own Open Backpack, Insignias INTEF¹⁸⁵, that is connected to the INTEF digital learning platform where badges are safely stored, gathered in collections and socially sharable.

From MOOCs to NOOCs: re-iterating and re-designing the training offerings

In 2014, 3 first MOOCs were piloted to deliver training on the "Reference Digital Competence Framework For Teachers". The MOOCs were planned to be 6 week long courses that required 3.5 - 5 hours of work/a week. Based on the analysis of teachers' online behaviour, participation and completion of the courses, the course providers noticed that teachers did not always follow MOOCs in the planned sequences but jumped over some parts and concentrated on others. Using this insight as a guiding principal, shorter learning units were developed. They are called Nano Open Online Learning Experiences (NOOC) and the estimated effort is around 180 minutes. As opposed to MOOCs, which cover many learning goals, NOOCs are designed to achieving a single learning goal, for example, to develop or improve a single digital competence (see figure 14 for an example).

Moreover, since MOOCs are delivered in a paced mode (fixed starting and ending date), there was a demand for self-paced activities, as participants did not always want to, or were not able to, fit their participation in the time constraints of the training. The following development was Self-Paced Online Open Courses (SPOOCs), a pilot experience to foster learning anywhere, anytime and at any pace.

From the beginning, in 2014, up to summer 2017, over 77 000 individual teachers and professionals in the field of education have signed up and taken part in MOOC, NOOC and SPOOC. Interestingly, about 30% of the participants come from Latin-American countries. A more detailed analysis of online log files reveals interesting patterns of the users (Figure 15). The period of log-file analysis was from April 2015 to June 2017 (2 years 3 months) and the data contains 29 775 users enrolled in a single activity (red bars). All course types combined (MOOCs+NOOCs+SPOOCs), this implies 57 171 enrolments (the leftmost blue bar). Looking at the participation across different types, we see that MOOCs were the most popular type of course attracting almost 25 000 individuals. These individuals generated more than 38 500 enrolments, making it on average 1.6 MOOCs each. NOOCs, on the other hand, attracted over 9 300 individuals who produced close to 17 000 enrolments (on average 1.8 NOOCs each). SPOOCs attracted some 1 300 participants who carried out 1 675 enrolments.

¹⁸⁴ Also other types, like Edupills, an APP for mobile micro self training on digital skills: <https://edupills.intef.es/>

¹⁸⁵ Teacher e-portfolio is available at: <https://insignias.educalab.es/>

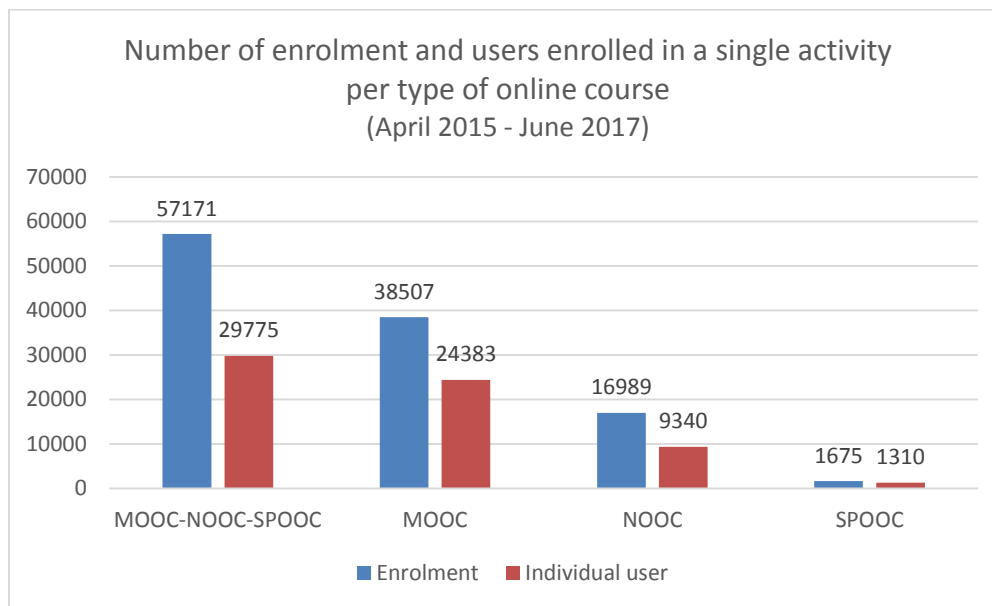


Figure 15. Individual users' participation and enrolment in course.

Based on online log files, other types of participation patterns can also be observed. Figure 16 goes more into details showing that during the observed period of time (April 2015-June 2017), even if most individuals only enrolled in one course, there was still a fraction of people who signed up to more than one activity. For example, of the all MOOC participants (about 25 000), some 29% participated also in other type of courses. In this case, 17% of individuals signed up for two courses, 6% on three courses and another 6% to 4 or more courses. For NOOCs, we can observe that since they are much shorter units of study, there is a slight tendency of enrolling to more than one of them. In contrary, for SPOOCs, which are self-paced units of study, less individuals took more than three of them. This type of analysis of user behaviour is interesting, as they show that offering content in different lengths serve the purpose of the users. This is clearly one of the strengths of the AprendreINTEF platform and its innovative aspect.

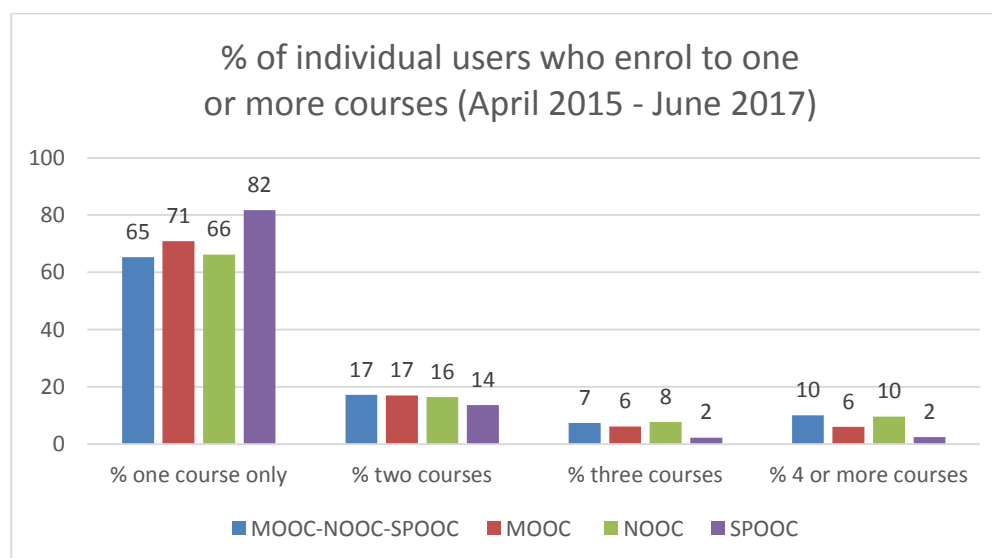


Figure 16. Percentage of individual users who enrolled in one or more courses on the INTEF platform.

2. Analysis of design elements, barriers and innovation

Analysis based on the underlying framework

The framework underpinning the analysis for this study outlines seven design elements that have been found to have impact on teachers' knowledge and practices, successful professional development models generally feature a number of these components simultaneously (Darling-Hammond et al., 2017). In the following, we discuss the structure of the AprendreINTEF open courses based on those seven design elements.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes, at least online	Yes	Yes	Some, less focus	Depends	Yes

Regarding the INTEF courses discussed above, their focus on content and applicability in classroom practices is clear (1). In general, MOOCs with a longer duration offer more time for activities with practices that are directly relevant to classroom, thus fostering teachers' Technological pedagogical knowledge¹⁸⁶. NOOCs, on the other hand, are shorter units of learning focus more on the acquisition of Technological knowledge (especially at lower levels of digital competence). In all types of courses, the content is clearly linked to teachers' acquisition of digital competence according to the Reference Digital Competence Framework for Teachers and its levels from A1 to C2. Additionally, a small number of courses on more transversal competences are offered too, e.g. on project based learning, topics of special education, but also on new and active ways of instruction, which in the short term, could have an impact in a methodological change in schools.

Ways of modelling effective classroom practices in MOOCs include prototyping activities for later use in the classroom, through projects that promote change of roles, change of attitudes and change in the teaching/learning processes (3, 7). Especially in MOOCs, online training activities are based on teachers' cooperation and foster belonging to professional communities of learning. They take advantage of peer to peer learning and promote the impact of a methodological change in schools (2). The peer-learning activities also offer a potential for feedback and reflection with other participants (5).

To support the online nature of the courses, INTEF has specific teams for "facilitation" whose job is to guide, support, accompany and boost participants to reach the end of their learning experience successfully (4). It is estimated that these teams play a key role in keeping teachers engaged and contribute to a successful completion of open online training. The MOOCs, for example, have a good completion rate (see next section for more). The "facilitation" activities are also promoted through blogs and by means of aggregated outcomes that can be enriched by peers. Regarding other social aspects that could play a role for teachers to participate and keep them engaged, there are "live connected events" which are part of each online course. In these events, teachers will "meet" their facilitators and see their faces, an informality which gives it a humane side that other online trainings might lack. It can also enhance the feeling of being part of the learning community.

¹⁸⁶ For Technological knowledge and Technological pedagogical knowledge, see: <http://edutechwiki.unige.ch/en/TPACK>

Regarding the sustained duration of professional development activities (6), each individual course has a fixed duration. The learning experiences can be extended over time through Facebook Groups, Twitter hashtags, and #DirectoINTEF, a series of live connected events for connected educators. The long-term goal is to sustain public social communities so that teachers can remain active even after the training activities are over and become part of professional learning communities that co-build and co-extend good practices. Additionally, the courses are designed so that there is a progression path that can be individualised, so new courses, even in different formats, could be picked up at convenience and added up. A novel feature that INTEF offers is that in order for teachers to acquire competences defined in the Digital Competence Framework for teachers, they can choose either to take a single MOOC or acquire the same competences through a number of NOOCs. This creates an ecosystem of online training offerings that can potentially sustain professional learning over a long duration.

An important underlying driver for the INTEF initiative is the recognition of teachers' participation in professional development and the aim of developing a competence-oriented professional portfolio. Here, a switch is to change the thinking to the competences and skills improved and acquired. This is implemented through an open badge system with an e-portfolio called Open Badge Backpack. With it, teachers can show the micro-credentials of their achievements in a form of digital badges. In the future, open badges from other providers (e.g. universities, private training providers) could also be accumulated thanks to the use of open technical standards. The INTEF initiative also includes the development of a single unique identifier for each teacher so that their lifelong learning could be tracked across Autonomous Communities.

Last, it is important to note that even if teachers receive an open badge micro-credential for their participation, it does not translate into a formally recognised certificate, like the ones gained from "Online instructed courses". For now, open badges cannot be used to accumulate training hours which in the Spanish system can lead to a salary bonus of 100 euros for those at state funded schools. Such salary bonus requires 100 training hours every 6 years which, at least for the moment, have to be delivered in a different way than that of the offerings discussed in this study.

Avoiding known barriers to teachers' participation in professional development

This study also focuses on understanding how a professional development programme can overcome the known barriers to teacher participation in professional development in general. The TALIS study listed several barriers, below, we discuss this professional development model in view of those barriers.

A study by Castaño Muñoz et al.(2018) looked at the MOOCs offered by INTEF with a specific research question focusing on *how can they alleviate existing barriers to teacher professional development in Spain?* The results from participants to INTEF MOOCs show that there is potential **to widen access to professional development**, especially for those teachers who have more difficulties in accessing traditional CPD. MOOCs also seem to be a good option for those teachers who **lack entrance prerequisites, lack school's support to follow other types of CPD or lack time to follow less flexible training**. Teachers, as compared to other groups who take MOOCs, seem to take MOOCs more seriously; when teachers start a MOOC, they are more likely to finish it than participants in MOOCs not aimed at teacher training. Also, more first time participants signed on to INTEF's teacher training MOOCs than to general MOOCs (45% in MOOCs and 23% in NOOCs vs 15% in general MOOCs).

In general, 60% of Spanish teachers considered the lack of professional development **provision** as a barrier to participation (OECD, 2014), however, participants in INTEF MOOCs thought so to a lesser extent compared. This can be explained because the participants in INTEF MOOCs were able to participate in the MOOCs' ecosystem and, therefore, had a professional development opportunity within the reach of everybody.

Moreover, **lack of incentives for participation in CPD** is considered as a barrier by Spanish teachers (80%), however, this became less evident with the participants in INTEF MOOCs when compared to the TALIS sample of Spanish teachers. One possible explanation is that MOOC participants are intrinsically more motivated to acquire new competences and therefore place less value on external incentives/recognition.

Finally, regarding the **support from school** and employers being aware of teachers' participation in professional development activities, the share of teachers who said they felt they received support for their professional development activities from their school was 48% for MOOCs and 67% for NOOCs.

Aspects of innovation: focus on micro-learning

For the purpose of our study, we are also interested in looking at certain trajectories of innovation within the chosen professional development experiences and programme. They are explained in Box 1, situated in the beginning of Annex 2, and presented shortly in Table 5. Before going to the details of it, we introduce some literature about the trend called micro-learning, which is also important in order to understand the innovative aspects of the given example.

The idea of micro-learning is to offer very short nuggets of knowledge, experiences, training, etc. at the time so that learning can potentially take place without much of time-commitment and at sporadic times. An opportunity for micro-learning might appear while travelling in a public transportation, for examples. Different types of micro-learning opportunities have emerged to support teachers' professional development, mostly in informal ways. The use of Twitter, for example, is popular among some groups of teachers. Twitter can work as "the virtual watercooler" where, through a given hashtags, participants can exchange ideas, resources, links and so on. This participatory type of sharing through social media is increasingly studied in academic literature too and can be considered as an informal type of teacher professional development through a network of peers (see below "Background", p.120).

Table 5. Analysis of the trajectories of innovation of the model used by INTEF

Nature of innovation	Implementation phase	Access level	Actors	Impact area
Radical	pilot	regional-national/ cross-border	single actor = individual teacher	Process innovation, marketing innovation

In terms of impact area of innovation, the initiative described here can be considered *service-oriented*, meaning that it introduces a new means for teachers to engage in professional development and professional learning (e.g. instead of participating in face-to-face workshop, an online course is available). In terms of the **nature of innovation**, to progressive level of change could be estimated at being radical, as there are a number of relevant innovative elements. They include, for example, a variety of different length of courses being offered ranging from five-week long Massive Online Open Courses (MOOCs) to small Nano Online Open Courses (NOOCs) that are offered in units of 3 hour instruction time. Also **mobile apps for micro-units** of self-based learning are offered (Edupills). Additionally, the courses are open to all, there are no pre-requisites and the number of places is open, thus accommodating larger number of individuals than the traditional "online instructed courses".

Especially the idea of "chunking" the longer units of learning into small units called NOOCs deserves attention. In the above mentioned study, the MOOCs had a completion rate of 6% and the NOOCs 25% (Castaño Muñoz et al., 2018). This shows a clear impact of workload on completion of the courses. After finalising one NOOC,

83% of participants said that its duration was adequate for the content. Such findings open the door to innovative strategies for professional development design such as offering what is considered the most important content in a short NOOC format (i.e. micro-learning). NOOCs could function as a “stepping-stone theory” to online learning by giving participants a positive experience of completing successfully an online course and having a positive social learning experience with it¹⁸⁷, which could in the future be coupled with an increased probability of the further use.

Another finding supports micro-learning, too. It was also found that the percentage of first-time participants was higher among the Spanish MOOCs participants than among Spanish NOOCs. This might be explained by the duration and structure of the courses, but also with the fact that NOOCs are interrelated courses and therefore it is more plausible that learners participated in several of them (see also Figure 4). This would also allow for a better understanding of relations between pieces of content.

In terms of access level, the online courses are available at the national and international level, however, regarding the **scale of adoption** among the general population of teachers, it is still low (implementation phase: limited application=pilot). For example, in the first half of 2016, INTEF offered 6 MOOCs and 6 NOOCs. In total, 11 654 people enrolled out of whom 77% were teachers. 7,405 were Spanish citizens and 5,662 of those were teachers. This means that of the total number of Spanish teachers, which for the academic year 2015 – 2016 in Spain was 670,398, less than 1% enrolled in the first half of 2016 (Castaño Muñoz et al., 2018). Since 84% of Spanish teachers are said to participate in CPD (OECD, 2014), this number represents a bit more than 1% of those teachers.

Studies on the impact of the professional development model

The Spanish MOOCs offered by INTEF were studied as part of a larger JRC study with a focus on MOOCs in general (MOOC Knowledge project¹⁸⁸). The results are reported in Castaño Muñoz et al.(2018). The study highlighted that the introduction of MOOCs for teacher training expands the existing options and can help to meet the preferences and needs of different groups of teachers. A typical Spanish participant in a MOOC for teachers’ professional development was around 43 years old, female, has a bachelor’s or master’s degree (91%) and is employed on a salary. Interestingly, the data also show that, proportionally, teachers in vocational education and training were significantly more likely to participate in the offered courses. Finally, no significant difference was found between teachers working in public schools and those in chartered (‘concertadas’) or private schools.

The data also explore the link between participation in MOOCs and in other online and face-to-face courses. 52% of participants with no earlier experience of MOOCs had participated in traditional face-to-face courses during last weeks. However, of those who had previously already participated in MOOCs, a smaller share (32%) had also participated in face-to-face training. Yet, in this group 42% had done other online training before, compared to only 20% in the group of MOOC novices. These figures indicate the existence of at least two teacher training profiles, i.e. those that prefer face-to-face courses for professional development and those that prefer online courses.

¹⁸⁷ In general stepping-stone theory explains how the use of drugs “can be coupled to an increased probability of the use of further drugs. Possible causes are biological alterations in the brain due to the earlier drug and similar attitudes of users across different drugs” (https://en.wikipedia.org/wiki/Gateway_drug_theory)

¹⁸⁸ <http://moocknowledge.eu/>

Additional highlights on Spanish MOOCs for teacher professional development (Castaño Muñoz et al. 2018)

- At least two types of preferences of teacher training profiles: those that prefer face-to-face courses for professional development and those that prefer online courses.
- MOOCs are a relatively new channel for teachers' professional development.
- The introduction of MOOCs for teacher training expands the existing options and can help to meet the preferences and needs of different groups of teachers.
- When teachers start a MOOC, they are more likely to finish the MOOC than participants in MOOCs that are not aimed at teacher training.
- Teachers value MOOC-based learning as a way of improving their performance. However, MOOCs are not (yet) formally recognised for professional development by the Spanish Ministry of Education.
- While the MOOCs completion rate in INTEF MOOCs is around 5%, it is five times higher, around 25%, in the case of NOOCs.
- Compared with the wider teacher population in Spain, proportionally fewer female primary school teachers participate in INTEF MOOCs.
- Primary teachers are more likely to hear about MOOCs through personal contacts and internet searches than through their professional communication channels. A more structured flow of information via e.g. schools or teacher organisations could improve awareness and participation.

Transferability of the methods and tools

The participation in the online courses described under this initiative also has a great affordance for cross-border education. According to a study on 7 MOOCs and 6 NOOCs, out of 15,219 people enrolled, 10,903 were Spanish citizens (71%). Participants from other countries were mostly based in Latin America. There is a number of MOOCs and NOOCs conducted in English which are participated both by the Spanish teachers and those from abroad (e.g. Portugal, Italy, Romania).

The above-mentioned study offered some lessons and recommendations that can be relevant for other countries (Castaño Muñoz et al., 2018)

Increase structured information about teacher training MOOCs. The use of MOOCs for teacher training is not (yet) widespread. Awareness needs to be raised on the usefulness of teacher training MOOCs in ICT and education, especially among female primary school teachers. Fewer teachers in this group participate in teacher training MOOCs than their numbers in the general teacher population in Spain would suggest. This can be a barrier if the integration of technology in educational practices and the improvement of teacher's digital competence are policy objectives for primary education.

According to the study, primary school teachers generally find information on MOOCs when using the internet for their own purposes, or from their personal contexts. There seems to be a lack of information and knowledge exchange among colleagues at the school level and only a very small percentage finds information about MOOCs in their professional context. A more structured flow of information via e.g. schools or teacher organisations like unions could improve awareness and participation.

Increase formal recognition of MOOC-based teacher training. Teachers with MOOC experience seem to value this new channel for professional development and,

when they start the activities, are committed to completing these courses. In addition, data from other MOOCs studied by the research team indicate that many teachers also sign on to non-teacher training MOOCs¹⁸⁹.

In order to officially recognise this new format for professional development, reliable, alternative methods of assessment and learner identification, together with changes to regulation to include MOOCs among recognised forms of professional development, could make MOOCs more widely accepted.

3. Background: Micro-learning as a growing trends of this decade

Emerging academic and grey literature on micro-learning

Increasing amount of academic literature is emerging on the use of Twitter and other social networking platforms by teachers for professional development purposes. Many of these studies are descriptive using qualitative methods such as interviews and have a convenience sample meaning that it is a self-selected group of individuals. The outcomes often find that those who participate find the method rather useful for their personal and professional needs, however, rigorous studies on the impact of such informal professional learning on classroom practices or learning outcomes is yet to emerge. Below, we give examples of some literature that was caught through our literature search based on the above described criteria.

The publication by Carpenter & Krutka (2015) draws its results from qualitative data from almost 500 participants who described their perspectives on the use of Twitter for professional development purposes. The results include the following:

"Educators praised the platform as efficient, accessible and interactive. Twitter was credited with providing opportunities to access novel ideas and stay abreast of education advances and trends, particularly regarding educational technology. Numerous respondents compared Twitter favourably with other professional development activities available to them. Members of our sample also appreciated how Twitter connected them to educators beyond their own schools and districts, with mention of exposure to both like-minded and diverse perspectives. Respondents described positive and collaborative professional activity facilitated by Twitter, and many noted how it helped them combat various forms of isolation."

Another study by (Visser, Evering, & Barrett (2014), this time with a smaller sample size, concluded the following:

"The results indicated that teachers highly value Twitter as a means of self-directed professional development. Respondents who reported using Twitter multiple times a day were more likely to use it for professional purposes than personal ones. Chief among the reported perceived benefits was professional development and meaningful relationships that teachers formed with other teachers who use Twitter."

Interestingly, there are not only rosy views emerging on the use of social media for teacher professional development. Kelly & Antonio (2016) focus on teachers' peer support within open groups in social network sites. Even if the study found that teachers in large, open Facebook groups offer predominantly pragmatic advice and social support, teachers in these groups are not reflecting on practice, giving feedback or modelling practice, issues that have been deemed features of effective teacher PD.

Some examples of micro-learning

For synchronous chats, probably the best example is an online catalogue called *Education Chats*¹⁹⁰ which lists more than 390 official weekly chats. The list is managed

¹⁸⁹ MOOC study by Jonatan, andreas...

by a group of educators who maintain and manage it. It lists the chats that take place at a given hour on a certain theme (e.g. English Teachers Chat) or even geographical location (e.g. Dublin city schools). For example the hashtag #EduChat renders lots of tweets on Twitter¹⁹¹, and according to some records, it has been in constant use already since 2009¹⁹². On *Education Chats*, records chats are stored so that participants can go back and review them. Some popular online reading on the topic include blog posts such as "Using Twitter to Supercharge Your Professional Development"¹⁹³; or EducationWorld's original article from 2011 (updated in 2017) "Using Twitter for Professional Development"¹⁹⁴.

On the other hand, micro-learning can also include physical events such as TeachMeet¹⁹⁵. TeachMeet is an organised, but still an informal, physical meeting in the style of an "unconference" for teachers to share good practice, practical innovations and personal insights in teaching. Participants volunteer, for example via the TeachMeet website, to demonstrate good practice they've delivered in their classroom, or discuss a product that enhances classroom practice. TeachMeet method includes the following: micro-presentations (7 min.); nano-presentations (2 min., 3-5 one after the other); round-table break-outs (lasting 15 minutes). There is usually a backchannel to let non-participants participate (e.g. through Twitter). The BETT event 2016 hosted the 10th anniversary of the event, which has gone international. EdCamps¹⁹⁶ offer a similar method as they are designed to provide participant-driven professional development for K-12 educators, although a bit longer form than TeacheMeets.

¹⁹⁰ <https://sites.google.com/site/twittereducationchats/education-chat-calendar>

¹⁹¹ <https://twitter.com/search?q=educhat>

¹⁹² <https://www.clarity-innovations.com/blog/tprichard/armchair-analysis-educhat-twitter-conversations>

¹⁹³ <http://www.connectededucators.org/using-twitter-to-supercharge-your-professional-development/>

¹⁹⁴ http://www.educationworld.com/a_tech/using-twitter-for-professional-development.shtml

¹⁹⁵ <https://en.wikipedia.org/wiki/TeachMeet>

¹⁹⁶ <https://www.edcamp.org/>

IV. Mediacoach (BE): model that re-invents blended learning

1. Introduction to the design of the professional development model

This text first discusses the design of the professional development model as it is implemented in the Mediacoach programme. In Section 2, we further analyse its various elements underpinning the discussion in the framework which outlines seven design elements of the effective teacher professional development model (Darling-Hammond et al., 2017). A brief description of the practice is given as part of the examples in the main document (Section 4, [ex.13](#)).

Roles to take

The course provider: Mediawijs, the Flemish Knowledge Centre for Digital and Media Literacy in Belgium. The course is delivered by the staff as far as possible. Mediawijs has a staff member of 0.6 FTE for organising the training; this person designs and organises the training both on a content and practical level but also delivers lectures and participates in the process of mentoring projects. A second member of staff also responsible for mentoring projects (only for 0.05 FTE). Mediawijs contracts external experts where needed.

Participants: About 100 participants are taken in each school year based on their application letter. The programme is targeted to:

- teachers in primary and secondary education
- coordinators in education: ICT and/or pedagogical coordinators, counsellors
- educational staff of a library
- social-cultural sector: youth workers and social-cultural workers

Knowledge requirement: a certain basic knowledge in digital media and average technical skills are assumed. Enthusiasm for (digital) media is necessary.

Coaches: Coaches are either professionals from the organising body or those who finalised their own training previously. Mediawijs also engages:

- Specific project supervisors, usually from the previous graduates of the programme. Normally 3 or 4 projects/supervisor. For each project supervised, a compensation of 150 e is received.
- Additional trainers or researchers for workshops and lectures (Fee is depending on the kind and duration of the training part)

Partners:

- Cultuurconnect: for mentoring projects, designing parts of the training and specific communication to the library sector (annual budget: 5000 euro)
- LINC vzw and Mediaraven: for mentoring projects, designing parts of the training and giving courses (annual budget 7000 euro for each partner)

Course structure

The course structure is composed of three main elements; an online learning course (MOOC), contact sessions and a personal project. They all are supported by the use of digital platform and other tools. Below, more details are given.

Online course (Mediacoach MOOC)

The online course, also called MOOC as it made publicly available to everyone, offers the theoretical framework for media and digital competence as it is taught throughout the course. The theoretical part of the knowledge is largely delivered online through this course.

The content of the MOOC is designed in modules. It includes 7 content modules with 26 videos in total. In each part, there are short 5-10 minutes videos where experts and academics discuss the theory (see screen capture on the right of the course on *Online identity*).

Links to background material are given so that participants can deepen their knowledge if they wish. After each module, there is a section with a few questions that help participants to reflect on their newly gained knowledge.



MEDIA EN PRIVACY - MEDIACOACH 2016

Online identiteit

Identiteiten zijn vaak erg afhankelijk van de context waarin we ze beleven. Dat is niet enkel offline, maar ook online het geval. We beleven onze online identiteiten door gebruik te maken van digitale zelfrepresentatietools. **Sander De Ridder** (Ugent) legt uit dat online identiteiten complex en meervoudig zijn. Maar ook de sociale media toepassing en (de verwachtingen van) het publiek spelen een belangrijke rol. Tenslotte gaat hij in op het belang van reputatie- en identiteitsmanagement en welke invloed dit heeft op de diversiteit van online identiteiten.

IN DEZE MODULE




☒ Kennisvragen

Start de quiz >

☒ Achtergrond informatie

BIJLAGES

 [Pancartes: Online identiteit](#)

Once the participants have gone through the more theoretical parts online, in-depth discussions will take place during a contact session that better affords for face-to-face discussions (model is also known as "flipped classroom model"). This allows for linking theory with the practice.

The modules are the following:

1. Media Literacy
 - What is Media literacy?; Media Literacy Competence model
2. Use of Media
 - Media use Flanders; Media use - Children and young people
3. Media, online connections and citizenship
 - Media and connections; Young people and online connections; Sexuality and online behaviour; Social media and youth counselling; Social media in your organization? A 10-step plan; Safety planner
4. Media production

- Image culture; Image literacy ; Digital stories ; Multimedia tools; Copyrights and royalty
- 5. Media and privacy
 - Social privacy & privacy management; Online identity; Traces on the Internet
- 6. Media, games and coding
 - (R) evolution of gaming; Game Literacy; Games in education; Coding, programming and computational thinking
- 7. News media, information and advertising literacy
 - Information skills; Filter bubble; Advertisement savvy

Contact sessions

During the contact sessions, which take place once a month, the focus is on practice and exchange around media literacy to process the theoretical parts of the MOOC and to model good practices in different contexts (e.g. school, youth workers, librarians). The contact sessions last the whole day: morning sessions consist of fixed content for all, whereas afternoon sessions are themed allowing for more personalised workshops. During the contact sessions, guidance on the individual project is also provided.

The 1-day sessions are titled as following¹⁹⁷:

1. Introduction to the concept of media literacy and self-administered test for participants' own digital competence profile
2. Introduction to (digital) media use and your role as media coach
3. Media and connections (social media protocols, online sexuality, cyberbullying, tools)
4. Media production ('social influencer' within the (youth) culture; copyright vs. active sharing)
5. Media, privacy and citizenship (social action, hate speech and citizen participation)
6. News media, information and advertising literacy (bubble phenomenon, Fake news)
7. Media and game (learning aspects, addiction, coding in this session)
8. Personal projects presented in front of the jury
9. Inspiration day ('Mediacoach' competence document, go deeper into the projects, new trends)

A project with personal coaching

During the course, every Media coach will realise a personal project that will be implemented in his/her organisation. Together with a supervisor/coach, they reflect on the needs of the organisation, and what is feasible and desirable in the given context. The aim of the project is to bring about a tangible result and change in the organisation during and after the training. A personal coach provides online and offline support where necessary. Coaches are either professionals from the organising body or those who finalised their own training previously.

Digital tools

A set of digital tools are available for the use during the course or later on to implement them in new practices.

Media profile

In the beginning of the course, all participants take a self-administered online test that outlines their digital media profile¹⁹⁸ in a playful way; some are squirrels jumping from one program to another, or a hedgehog who sets up his spines when the word 'online'

¹⁹⁷ <https://mediawijs.be/dossiers/mediacoach-opleiding-2018-2019-inhoud-sessies>

¹⁹⁸ <https://mediawijs.be/tools/10-mediaprofielen>

is mentioned. The ten profiles¹⁹⁹ provide an important starting point to work on media competencies, and participants can also use them later in their work. The test is based on a competence model²⁰⁰ that is also compatible with the DigComp framework of the European Commission.

Media coach tool

The Mediacoach tool²⁰¹ is a set of interactive videos that are based on interviews with participants in the Mediacoach programme. It focuses on the personal project that they have implemented in their own work environment, mostly in secondary education. The 14 short videos first set the scene outlining a problem or an issue that the Media coach wants to tackling and then introduce a possible solution. Videos also include discussion points so that they can be used as a learning material either during the training or future Media coaches can use them later in their work. Videos cover three main themes:

- Media projects aimed at students
- Projects to stimulate and support colleagues in media literacy and use
- Implementation of a media policy in the school

Online platform and group

The participants have access to a closed digital platform (mediacoach.mediawijs.be) where videos, course materials and other information are offered as preparation to sessions and in addition to them. Participants will get different assignments so that they can put into practice and practice the knowledge they acquire during the sessions.

Additionally, a Facebook group is available to participants so that they can ask questions and exchange information with each other, their supervisors as well as Media coaches from previous training. The FB group remains open to those who have completed the course in previous years, so the alumni can still remain active in terms of networking but also helping and peer-coaching others.

Time investment

Over the whole school year:

- 2 -3 hours of preparation for each session (MOOC, assignments, etc)
- 8 contact sessions (9h30 – 16h00)
- 1 project session = 20 min of presentation and questions + preparation of the presentation (half a day)
- Minimum 38h for developing and implementing the project in the organisation (depending on the kind of project and the time schedule of the media coaches. Some invest more time in this project because it is already part of their job or an assignment from the management of the school.

Future plans

The Mediacoach pro-programme is run every school year, 2018-2019 marking the start of the 6th edition. In general, there are still more candidates than the training can accommodate.

For the first time in the school year 2018-2019, the Mediacoach pro-programme was made available to professionals working in basic education only²⁰², as opposed to having a course where also youth workers, librarians, etc. could apply. The aim is to strengthen participants' own media literacy competences, but also to integrate media

¹⁹⁹ <https://mediawijs.be/file/5926/download?token=wqM6XJdQSUVx2043WeOaI5nJd2FxdaGF7UqyiohQ1kI>

²⁰⁰ <https://mediawijs.be/dossiers/dossier-mediawijs-competentiemodel/mediawijs-competentiemodel>

²⁰¹ <https://mediawijs.be/mediacoachtool>

²⁰² <https://mediawijs.be/nieuws/mediacoach-professionals-basiseducatie>

literacy into teaching practice and the organisation. The course consists of 9 contact sessions, the MOOC and an independent project (at least 38 hours).

2. Analysis of design elements, barriers and innovation

Analysis based on the underlying framework

The framework underpinning the analysis for this study outlines seven design elements that have been found to have impact on teachers' knowledge and practices, successful professional development models generally feature a number of these components simultaneously (Darling-Hammond et al., 2017). In the following, we discuss the structure of the programme based on those seven design elements.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
Yes	Yes	Yes	Yes	Yes	Yes, a school year	Yes

The syllabus of the Mediacoach programme is very focused on Media literacy and digital competence as a discipline (1) and there is a strong aspect requiring course participant to embed Media literacy in their practices. For those working in compulsory education this means embedding media and digital practices in their everyday work, as media literacy is part of the Flemish curriculum and with the delivery of a new curriculum, even more focus will be placed on students' media and digital competence. The new curriculum will start for 12-14 years old in school year 2019-2020 (secondary school: grade 1). For 14-18 years old (secondary school: grade 2 and 3) it will be implemented in 2020-2021.

Evidence of such content-focus come through in 14 video interviews from teachers in secondary education who went through the training and who discuss strategies they have used to make their pupils and colleagues more digitally competent²⁰³. The interviews are in three different categories, strategies aimed at involving students; stimulating and supporting colleagues; and implementation of a media policy in the context of the school. Such interviews also reveal evidence of how this professional development model could support collaboration with colleagues in a job-embedded context (2). It is worth noting that the aim of the professional development is that the participants will become a point of contact regarding the pedagogical use of media in their own organisation and that the personal project responds to concrete needs of the organization where the participant work. In their final evaluation of the course, which takes form as a presentation in front of an external jury, the participants are also evaluated on this aspect.

In terms of modelling effective practice during the professional development, the combination of the MOOC and face-to-face sessions, for example, offer ample opportunities for this (3). In the MOOC, there are short 5-10 minutes videos provided where experts and academic discuss the theory. The contact sessions, on the other hands, focus on practical knowledge and practices, which allows for linking theory with practice. During face-to-face sessions, there is room to share one's own practices and experiences, thus also offering opportunities for one's own reflection. The organisers consider that this model has proven to be a very useful format and from a learning theory point of view, it subscribes to practices encouraged for adult education and

²⁰³ <https://mediawijs.be/mediacoachtool>

active learning (7). Regarding modelling of good practice, since the professional development is not only for teachers, but also for youth workers and librarians, not all examples are necessary related to the context of school, which can also allow for bringing in ideas and influences from other sectors.

Regarding coaching and expert support, the model foresees that each participant has a coach to help with the realisation of the project (4). There are 3 sessions planned throughout the training. Coaches are either professionals from the organising body or those who finalised their own training previously. Apart from organised project coaching, there is a vibrant community of alumni who remain active in the FB group for peer-mentoring and ad-hoc support.

In terms of getting feedback and opportunities to reflect on one's learning, several check-points are built-in (5). For example in the MOOC, after each session, there are small assessment units where one can go back and review what has been learned. The contact sessions are offer space for reflecting on practices and what works or not. Importantly, at the end of the course, each participant presents their personal projects to a jury in order to receive concrete feedback. The model stretches over a whole school year (6) thus offering a possibility for the participants to sustain practices over a longer period of time.

Avoiding known barriers to teachers' participation in professional development

This study also focuses on understanding how a professional development programme or a more informal professional learning experience can come around the known barriers to teachers' participation in professional development in general. The TALIS study lists seven barriers, below, we analyse this professional development model in view of those barriers.

The Mediacoach model, teachers themselves are incentivised to participate thanks to their own intrinsic motivation, but the employer support by school head is rudimental as otherwise conflicts of work schedule could be evident. In most cases, when teachers sign up for the course, they are backed up by their school head who agrees to organise free time for training sessions and project implementation, but in most cases also foots the bill of the cost. As the topic of media literacy currently has a high policy profile in education²⁰⁴, it is also something that school inspection pays attention to. The topic of the course can also be seen relevant, according to TALIS (OECD, 2014), more than 40% of teachers in Flanders said to have moderate or high need of training for ICT skills in teaching.

Taken the above country context into account, the Mediacoach model, with its online content and 7 all-day contact sessions located in three different regions of Flanders, has potential to avoid the barrier of conflict with work schedule to a certain point. In terms of incentives, the participants who successfully complete the course requirements get a certificate. It does not guarantee higher pay, though, but the course organisers cite that it is often positive for participants' self-esteem and they also get a sense of belonging to a community of professionals. The alumni network is very active with previous participant often pitching in on the FB group as peer-mentors. Also, some teachers have found new work profiles, for example, working as a half time media coach in their own organisation. However, many report that after the course, the regular work schedule offer less opportunities to act as a media coach helping colleagues or supporting school policies.

Aspects of innovation

For the purpose of our study, we are also interested in looking at certain trajectories of innovation within the chosen professional development experiences. They are

²⁰⁴ <https://en.mediawijs.be/a-media-literacy-concept-note-for-flanders>

explained in Box 1, situated in the beginning of [Annex 2](#), and presented shortly in Table 6.

In terms of nature of innovation, we consider the Mediacoach model radical as it includes a number of innovative elements, for example combining online content and interactions with face-to-face meetings, as well as the practical hands-on implementation in one's own context of work. In terms of implementation phase, it can be considered at scale, as there are already years of implementations with a rather consolidated up-take. Regarding access level, the model is at the regional level in Belgium focusing on the Flemish community, however, as part of the model is originally from another country, this can hint towards a good transferability of the model. Even if the professional development model as such addresses an individual actor, e.g. a teacher in a school, the professional development model as such focuses on organisational innovation, e.g. attempting to introduce aspect of coaching into the way teachers would work around and about media literacy.

Table 6. Analysis of the trajectories of innovation of the model used for Mediacoach

Nature of innovation	Implementation phase	Access level	Actors	Impact area
radical	scale	regional-national	single actor = individual teacher	organisation

Evidence on the impact of the professional development model

In general, one of the impact factors of the program could be considered that the professional development programme has a very good reputation and every year there are more candidates than the training can accommodate. Another factor could be the fact that some of the personal projects realised during the Mediacoach-programme have won national prizes and become best practices of their own (e.g. see for example award list for 2017²⁰⁵ where no:3, Sint-Therese College in Kapelle op den Bos, was conceived through the programme).

The organisers of Mediacoach, the Mediawijs.be, has conducted small scale evaluations and surveys with participants, however, no evaluations on long-term effects of the course on participants, or their colleagues', digital competence have been conducted. However, some steps are taken to better understand the impact. Since the beginning of the 2017 course, every participant was asked to take a digital competence test in the beginning and at the end of training with the aim to measure their media literacy development. The test is based on a competence model which has its roots in the DigComp framework²⁰⁶.

Transferability of the methods and tools

Whereas the whole Mediacoach pro-programme is composed on a MOOC, contact sessions and a personal project, the MOOC alone is open for anyone to take. There is also the book 'Wonderwijze media'²⁰⁷ for educational professionals with the Flemish competence mode, a description of the conceptual model of the Mediacoach programme, display of good practises, tools and general information about media literacy.

²⁰⁵ <https://mediawijs.be/nieuws/5-jaar-mediawijs-bekroond-5-m-awards>

²⁰⁶ <https://mediawijs.be/dossiers/dossier-mediawijs-competentiemodel/mediawijs-competentiemodel>

²⁰⁷ <https://www.politeia.be/nl-be/book/wonderwijze-media/15833.htm>

3. Background and evolution

There is a long history as a background for the development of the Mediacoach programme in Flanders. The early events date back to a project called MediaCoach.eu which was funded under LLP programme (Leonardo da Vinci for vocational education and training) around 2008-2011.

First pilots of the Mediacoach.eu training scheme, which were developed in the programme, were conducted in 2008. One of the project partners from Belgium was Média Animation ASBL, a media and multimedia education centre for the Belgium French-speaking Community. The first training in the French-speaking community in Belgium was offered in September 2009 (this programme is still active²⁰⁸, the school year 2018-2019 being its 8th edition²⁰⁹). After the project, national Mediacoach.eu training programmes were set up. For example, in the Netherlands, the program still trains media educators among professionals in education, libraries and youth work, and awards them with an official certification²¹⁰. Interestingly, a new European funded project was started on the same model in 2017²¹¹, extending the Mediacoach.eu Training Initiative to Cyprus, Greece, Portugal, Romania and Bulgaria.

At the time of the first EU-funded project around 2008-2011, Mediawijs did not exist yet (started in 2013). Since 2011, the Media Coach training program²¹² was organised in Flanders by Linc vzw in collaboration with Mediaraven, Locus (currently merged with Bibnet into Cultuurconnect) and UC Leuven-Limburg. At this time, participants were a mix of teachers and librarians. The program was offered only in Leuven and Ghent. Approximately 60 professionals participated annually.

In early 2015, a new Mediacoach training (as described above) was launched in Flanders which included two separate offerings: a "pro-programme" and a MOOC, an online learning course. The competence model was then based on the DigComp framework and first introduced in 2016-2017. Also, as opposed to many of the original Mediacoach projects, Mediawijs.be did not only rely on face-to-face contact sessions, but the theoretical foundation underpinning media literacy was delivered as an online course in a form of a MOOC, Massive Online Open Course, which was open for anyone to participate, as opposed to the Mediacoach pro-programme, which only accepted a limited number of participants. The MOOC was an initiative of Mediawijs.be, LINC vzw, Mediaraven, Locus and UCLeuven-Limburg. It received funding from the Flemish Government - Department of Education and Evens Foundation²¹³. For the training program from 2016-2017 onwards, Mediawijs took the coordinating role and the training is established in collaboration with LINC vzw, Mediaraven and Cultuurconnect.

In the year 2016-2017, the participants profile started shifting towards more teachers participating and a new location in Antwerp, and in year 2017-2018 almost 3/4 of the 94 participants were teachers, particularly from primary education.

In terms of developing and fine-tuning the syllabus of the MOOC, the organisers observed that in the original version of the MOOC, a high participation activity was observed at the beginning of the course but it was weaning off towards the end. Therefore, a mixture of activities was designed. Regarding the project work, in the early trainings, participants were asked to do a collaborative project amongst themselves, which didn't prove successful, as many of the participants had a too different context and it needed too much time and planning. Therefore, implementing a project in participant's own institution proved more successful and sustainable.

²⁰⁸ <https://media-coach.be/-Training-centers-.html?lang=fr>

²⁰⁹ <https://media-coach.be/MediaCoach-huitieme-edition.html>

²¹⁰ For more information about the programme and its Dutch part, see p. 31

<https://www.mediaenmaatschappij.nl/images/PDF/MediaLiteracyMagazine.pdf>

²¹¹ <https://ec.europa.eu/programmes/erasmus-plus/projects/eplu-project-details/#project/592233-EPP-1-2017-1-CY-EPPKA3-IPI-SOC-IN>

²¹² See handbook from 2010: <http://mediawijs.be/mediabank/mediawijsheidscirkel>, https://www.kennisnet.nl/mijnkindonline/files/Handboek_Mediawijsheid_2010.pdf.

²¹³ <http://evensfoundation.be/programs/media/media-coach-training/>

V. Mini-case study (US): Shadow a student – professional development as a “design challenge”

“Design thinking” is closely linked with co-designing artefacts where users are directly involved in each step of designing the tools that they will use within their own context. In the last 10 years, “design thinking” has emerged in the world of education and training. Today, it can be considered as an integral part of designing educational software and tools (e.g. Leinonen et al., 2010), but it can also be used to help designing more innovative systems, also educational ones²¹⁴. Since recently, interesting examples start to arise of its use as a tool for educators to deploy in their schools and classrooms²¹⁵, too. One of our examples of professional development courses in France focuses on Pedagogical hackathons (example 20). In general, pedagogical hackathons are participatory learning events bringing like-minded people together to co-design educational artefact (e.g. activity, digital tool, programme)²¹⁶.

Another example, which was chosen for this study, is by “d.school” of Stanford University, United States that builds “on methods from across the field of design to create learning experiences”. One of their Labs has a mission to “reinvent professional development for educators²¹⁷”. An excerpt from the website illustrates how design thinking can be deployed to impact on professional development:

“... you notice the space and community in which you are working, use your awareness to empathize deeply, question assumptions, embrace prototyping over debate [...] what we’ve seen is that educators adopting these moves are able to make real progress on keeping students at the center of their work, integrating design thinking in their classrooms, and continuously improving on their school’s model. ”

The website introduces a number of ideas that have been co-designed with schools, including the initiative called “Shadow a Student”-challenge (see [ex.18](#) in Section 4 of the main report). The simple idea is that during one day, the school leader will follow closely one of the students in order to experience the school with the eyes of that student. By putting him/or herself in the student’s place, the school leader will get immersed “fully in the experience of being a student for the day” and get insights of the things that need improvement. Importantly, by following the model of design-thinking, it is essential to plan how the observations can lead to a “hack”, an action that implements a quick change in practices.

It is important to note that there is a difference in the act of shadowing a student and the one of a school head observing a classroom, for example, for quality assurance purposes or for the sake of peer observation between instructors.

1. Introduction to the design of the professional development model

The model of “Shadow a student” is comprised of four parts: preparation, shadowing, reflection on the experience and eventual actions to take. These all are documented in the Toolkit which is freely downloadable on the website²¹⁸.

Roles to take during the preparation phase

The one who shadows: Usually a person from the school leadership team who will take part in the challenge. While the “shadowing” takes place during one school day,

²¹⁴ <https://www.ideo.com/question/how-can-design-advance-education>

²¹⁵ <https://www.edutopia.org/blog/design-thinking-empathy-challenge-discovery-sharing-susie-wise>

²¹⁶ <https://www.edutopia.org/blog/hackathons-as-a-new-pedagogy-brandon-zoras>

²¹⁷ <https://dschool.stanford.edu/news-events/how-might-we-reimagine-teacher-professional-development>

²¹⁸ <https://www.shadowastudent.org/how-it-works>

that day needs to be carefully fully planned in advance. The Toolkit helps with practical tasks, such as carefully planning the goals of the day.

The one being shadowed: It is important that the person to be shadowed during the school day fits well with the learning goals that the school head has set for the day. Examples of learning goals from the Toolkit can help choosing the right student to be shadowed, e.g. (p. 3):

- Student engagement: "I want to shadow a quiet student who may go under the radar and get lost in the shuffle."
- College and career readiness: "I want to see what we are doing to prepare our young men for graduation and their futures compared to other students."
- English Learners: "I want to see if English Learners are getting opportunities they want, not just what we think they need."
- The rest of the teachers and school community do not participate in the act of shadowing, as it is important that the day flows like "business as usual".
- **Community for peer-reflection and support:** the website includes an online section.

Box 6. User experience from the Shadow a Student- challenge from Belgium.

*A student shadowing experience from a primary school in Belgium
by Kurt Klynen, De school Kessel-Lo*

I participated in the Shadow a Student-challenge to get a better understanding of teaching and learning in the school where I work. I've tried this technique in both a Belgian school and an international school in Portugal. For me it is an ideal way to get to know the culture in the school and a quick overview of teaching styles.

After the first visit I immediately knew I wanted to do more. I was surprised at how much "sit and get"²¹⁹ students have. Even when they are presenting to each other, only one student is really active. So that is something we 'hacked' immediately. After reporting this to the leadership team we looked for opportunities to learn. The first step was to have a conversation with students and gather information on how they would want to learn. This resulted in the redesign of an empty classroom to a learning hub for and by the students. This room is available all day long and has a similar feeling to a coffee shop.

Another small hack was to install a television in every classroom facing outward into the hallway so that the principal and visiting parents could always see the learning without disturbing the class. For this we also designed "door hangers" to let you know when a good time is to visit.

2. Analysis of design elements, barriers and innovation

Analysis based on the underlying framework

The framework underpinning the analysis for this study outlines seven design elements that have been found to have impact on teachers' knowledge and practices, successful professional development models generally feature a number of these components simultaneously (Darling-Hammond et al., 2017). In the following, we discuss the structure of the programme based on those seven design elements.

According to the analysis framework underpinning the study, the model of "Shadow a student" is a good example of professional learning experience that incorporates active learning methods for school heads and staff by engaging them directly into action in classroom and allowing them to engage in the same style of learning as is designed for their students during a regular day of school (7). Besides mere

²¹⁹ "sit and get" is a term used to describe teacher-centered learning

experience of classroom instruction, the idea is that the experience of shadowing is extended to all activities during the school day from lunch to sports, etc. So there is a distinct difference between a school head observing a class for the purpose of overall school quality control and this activity, which focuses more on the experiences that the student have.

1. Is content focused (discipline specific)?	2. Does it support collaboration in job-embedded context?	3. Does it use models and modelling of effective practice?	4. Does it provide coaching and expert support?	5. Does it offer opportunities for feedback and reflection?	6. Is it of sustained duration?	7. Does it incorporate active learning?
No	For reflection and action	Yes	Possibly	Yes	No	Yes

Moreover, the model heavily relies on the power of reflection (5); the person who shadows engages in the analysis of and reflection around the underpinning evidence, reflection on the rationale of the actions and importantly, plans some follow-up actions (i.e. hacks). This reflection can be supported through the community on the website (4) which can provide some support but also coaching and mentoring. Importantly, according to the model, all the shadowing takes place during a period of two weeks (e.g. end of February in 2018), so everyone who participates can share their experiences online more or less at the same time. Through “turning observations into opportunities”, and planning and implementing hacks (i.e. small improvements), the model uses the idea of modelling good and effective practices (3). Equally important is sharing them with the community. On the other hand, the model is neither content focused (1) nor is it sustained in its duration (6). Apart from sharing thoughts and observations with others, e.g. teachers, staff, mentors, the model does not count on job-embedded collaboration, at least not during the shadowing experience itself (3).

Aspects of innovation

For the purpose of our study, we are also interested in looking at certain trajectories of innovation within the chosen professional development experiences. They are explained in Box 1, situated in the beginning of [Annex 2](#), and presented shortly in Table 7.

Table 7. Analysis of the trajectories of innovation of the model used by Shadow a Student-challenge

Nature of innovation	Implementation phase	Access level	Actors	Impact area
Disruptive	pilot	national/cross-border	single actor = individual teacher/school head	Service innovation, organisational innovation

In terms of type of innovation, the initiative of Shadow a student-challenge can be considered as *service-innovation* meaning that it introduces a new means for school heads/management team to engage in a professional learning experience. It also possibly combines aspects of *organisational innovation*, as the goal is to introduce a change in practices in the school through a hack. The programme targets a single actor, the school head. In terms of the **nature of innovation**, to progressive level of change could be estimated at being *disruptive* as there is a profound and comprehensive change in how professional development programmes are conventionally planned (for example, see the description above for details and components).

In terms of access level, the model is available at the national (US) and cross-border, however, regarding the **scale of adoption** among the general population, it is still low thus the implementation phase is still at the pilot phase.

Evidence of the method

Even if rigorous studies to measure the impact of such new and disruptive professional learning models are still lacking, some emerging academic literature starts appearing on shadowing students (e.g. Ginsberg, 2015). Academic literature exists regarding job-shadowing in the other fields which could hold some interesting insights²²⁰.

²²⁰ https://scholar.google.com/scholar?hl=fi&as_sdt=0%2C5&q=job+shadowing&btnG=

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