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Härkki, Tellervo

Routledge
2022-10-25

Härkki , T , Korhonen , T & Karme , S 2022 , Team Teaching in Invention Projects . in T Korhonen , K Kangas & L Salo (eds) , Invention pedagogy : The Finnish Approach to Maker Education . 1 edn , Routledge , London , pp. 148-161 . <https://doi.org/10.4324/9781003287360-13>

<http://hdl.handle.net/10138/350854>
<https://doi.org/10.4324/9781003287360-13>

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11 Team Teaching in Invention Projects

Tellervo Härkki, Tiina Korhonen, and Sorella Karme

Introduction

Team teaching an invention project is a pedagogical choice that aims at creating an inspirational and motivating learning experience for students. For teachers, team teaching translates into innovation, collaboration, shared expertise, and teachers' professional development. In Finland, the model of team teaching usually refers to co-teaching whereby at least two teachers teach in the classroom at the same time (Cook & Friend, 1995). Another approach emphasizes the various roles teachers have as a starting point of teaching, and this model consists of three continuum constituted pedagogically motivated stages: the sequential motif, the distinctions motif, and the dialectic motif (Wenger & Hornyak, 1999). In particular, the dialectic motif is in line with the pedagogical aims of invention projects, such as risk-taking, spontaneity, collaborative knowledge creation, and continuous feedback. However, team teaching in this manner is quite complex, especially in turn-taking (Wenger & Hornyak, 1999), and it requires both training and collegial support for teachers to leverage from it (Aarnio et al., 2021).

In Finnish schools, team teaching occurs infrequently, even though the benefits of team teaching in general are collectively recognized, attitudes toward it as a pedagogical approach are positive, and the importance of collaboration is highlighted in the national curriculum of basic education (Finnish National Agency of Education [FNAE], 2016; Guise et al., 2017; Saloviita & Takala, 2010). Moreover, Finnish teacher education does not equip student teachers with adequate team teaching competence (Aarnio et al., 2021), even if the need to push the traditional student teaching toward a more collaborative direction has been recognized (Guise et al., 2017). However, invention projects are student-centered, multidisciplinary, and phenomenon-based; therefore, team teaching can be seen as essential as teachers' diverse expertise is required to manage the project in a pedagogically meaningful way.

In our research projects, many teacher teams were simultaneously learning to teach invention projects and to teach as a team. A large part of the teachers' energy was spent on learning pedagogical approaches and novel technologies. Thus, at the beginning, team teaching practices emerged and developed along with invention projects rather than being specifically designed in detail in advance. For instance, many invention projects were multilocal: teaching occurred simultaneously in

several classrooms, makerspaces, other internal learning environments, or extramural school premises. Different schools had different facilities, and the teams tailored their team teaching approaches according to their capabilities, ambitions, and available external resources.

Typical for invention projects, teachers' responsibilities, availability, and division of workload influences the design of learning tasks and student assessment. For instance, when done by a team of teachers, student assessment becomes more balanced as teachers can recognize different aspects and nuances of learning (Härkki et al., 2021). However, not only is the availability of expertise likely to be in simultaneous demand by several students, but also the availability of materials, tools, and learning environments need to be considered. All in all, team teaching in invention projects is about sharing one's expertise: knowing the specifics of a disciplinary topic or technology, pedagogical approaches, presentation, and demonstration techniques, promoting constructive interaction, motivating students, supporting student self-efficacy, and organizing supportive learning environments. More importantly, team teaching is about teachers extending their individual skills to become collaborative ones, such as shared orchestration, socially distributed metacognition, and socially shared regulation. Additionally, team teaching and the collaboration of teachers provide a model that shows students how to cooperate, and through that, how to excel in invention projects.

In this chapter, we describe team teaching approaches based on the research literature and our research projects. In the context of invention projects, we discuss how to organize a team and implement essential activities in different project phases to build a well-functioning teaching team. The examples of teachers' experiences come from several research projects. All of these were multiyear, large-scale projects aimed at developing innovative teaching practices in collaboration with teachers. The teachers worked either in primary or secondary schools. Some teachers had long-term team teaching experience, while some teachers generated team teaching practices during the invention projects. The main emphasis is on successfully team teaching an invention project, as an extensive literature already exists on building teams. In this chapter, we also discuss the characteristic activities of a well-functioning teaching team and provide recommendations for further developmental steps.

Blended Model of Team Teaching

While team teaching in general refers to a team of teachers planning, teaching, and assessing together (Thousand et al., 2006), most team teaching models described in the research literature reflect the teachers' roles and activities visible in a classroom. This section describes some of these models that can be applied and blended in invention projects. In practice, variants and dynamic combinations of these models that are applied depend on the invention project specifics, the participating teachers, and the school- or district-level policies.

Based on the teachers' roles and presence in the classroom, White et al. (1998) separated rotational and participant-observer models of team teaching from interactive team teaching. In the interactive team teaching model, simultaneously

present teachers have equal roles and participate in discussions. In the rotational team teaching model, each teacher visits the classroom only for the lessons related to their own area of expertise, while a course coordinator is responsible for organizing the course and communication. In the participant-observer model, teachers alternate as lead teachers, while the others observe and assist while also making comments and providing examples.

A range of models assuming the co-presence of teachers focuses on the students' needs and instructional intent. For instance, Thousand et al. (2006) described four main alternatives: complementary, supportive, parallel team teaching, and teaming. In complementary teaching, teachers enhance each other's instruction. For instance, one provides a lecture while the other paraphrases statements and exemplifies note-taking. In supportive teaching, one teacher leads, and the other teacher rotates among the students to provide support when necessary. In parallel teaching, teachers teach the same content but can differentiate their approaches according to the students' needs. Variations of paralleling include splitting the class between teachers, teachers being responsible for teaching stations or experiments, teachers rotating or instructing particular student groups, and supplementary instruction, in which one teacher works with most of the students and the other teaches a smaller group to apply the taught content, to teach more advanced content, or to repeat some earlier content according to students' needs. In teaming, teachers equally share the responsibilities for planning, teaching, and assessing.

When these models are applied in invention projects, they should support the teachers' division of labor according to their special expertise. A typical variation involves teachers teaching in different makerspaces, which means that teachers no longer reside in the same room. Furthermore, station teaching can be used to provide independent learning tasks for students who rotate between stations, while teachers step in only as they notice a need to elaborate or demonstrate some advanced detail.

The teacher teams in the invention projects we studied developed their own blended models of team teaching. These dynamic models included features of the models mentioned previously, but they seldom fully represent any of the models. Teams have different developmental needs and paths, which are also reflected in which team teaching models are appealing. A fresh team can consist of old colleagues who know each other well, colleagues who barely know of each other, or anything in between. Some teams come together for a one-time project, while some continue working together for years; this translates into different developmental paths as a team. Teachers' eagerness to try team teaching is a fruitful starting point, but successful team teaching seldom happens spontaneously. It requires conscious efforts from teachers, as well as resources and support from the school community (Härkki et al., 2021; Thousand et al., 2006). Each team is unique with unique members in unique circumstances. Therefore, team teaching is simultaneously a focus of and a context for teacher learning (Rytivaara et al., 2019). Yet, it is not just the individual teachers who learn and change. Teams are dynamic entities that learn and develop along the different phases of invention projects.

Team Teaching during the Project Phases

The Beginning of the Project

For a successful team-taught invention project, it is essential that all team members have a realistic understanding of the project's goals and practices. In addition to planning the learning goals for students and the necessities of an invention project, teaching as a team needs to be planned. This forward planning requires time and effort, yet it is time well invested. Moreover, it is essential that all members are provided equal opportunities to contribute. Having a kick-off meeting for the project is a good way to start planning and generate mutual trust.

Learning tasks and invention project schedules are dependent on the available expertise and other needed resources, such as the learning environments, materials, and tools. A demand for a specific expertise could be very different in different phases of the project. For instance, students could benefit from a professional designer in the early ideation phase, but in the later phases, experience in materialization techniques could become essential. Or an invention project could start with technological or material explorations, followed by student ideation and grouping to develop their inventions further. Capitalizing on each teaching team member's expertise and availability requires early discussions about the member's strengths, skills, and knowledge, as well as their personal goals for the project and teamwork and their expectations of it. This kind of appreciation for a team member's expertise could result in increased commitment to the team, enhanced motivation, and greater job satisfaction.

Discussing practicalities (lesson plans, student needs, materials, etc.) comes more naturally to teachers than discussing their personal goals of the invention project and teamwork and the teachers' expectations. These goals could include working within certain pedagogical preferences, introducing certain subject-specific (novel) contents or a new approach to support the student groups' agency. Personal expectations could involve professional development needs or job satisfaction and motivational factors. Bringing these topics to the shared planning table should be explicitly encouraged. Through open negotiations and mutual respect, it is possible to reach the best pedagogical result, as one of our elementary school teachers suggested:

There have always been four adults in it, and those are the perspectives of how to do things. So, it's not just one person's idea, but someone throws an idea and it's discussed, and it's supplemented or the other one throws in a different idea and then we think which is better, and we end up with which one's better. After all, it requires us adults to give space to each other, not just to go with our own mind—to give and take, so to speak.

(Tom, class teacher)

Open discussion about team members' expectations, opportunities, and limitations provides fertile ground for planning the project and for constructive interaction throughout the project. Communication is essential for successful teamwork: who,

what, when, and through which channels. Effective teamwork does not happen by chance; it is built by conscious choices, clear roles, and communication. A common challenge for team teaching is the lack of shared planning time during the project (Härkki et al., 2021). Shared language and effective ways to communicate emerge from shared planning time; these can make or break teachers' day and, more importantly, the students' learning experience.

During the Project

During the invention project, things happen because inventing challenges the students' skills. Teachers must be aware of and sensitive to the complex, shifting interactions constantly occurring between and among the students and the instructional activities within their classrooms. Sharing their awareness of students' learning and other circumstances facilitates coordinating the team's efforts to respond appropriately and effectively. Teachers need to consider several limitations—materials, tools, expertise, schedules—every time they instruct students. At times, unforeseen incidents occur, and teachers need to react and change plans quickly. Flexibility is essential.

All the teachers are responsible for informing their team members about relevant issues and potential conflicts. Often, time for communicating is limited; brief exchanges in hallways during a break are frequently used to pass on vital information. As necessary as they are for passing the torch of practical matters and securing smooth(ish) continuation of the students' projects, these fleeting moments are insufficient for building an effective team. Instead, as one of our secondary school teachers emphasized, it is essential to determine the division of labor:

You really have to share those tasks in such a way that one takes care of this and the other one takes care of that and the third one reminds you of “Hey, now”, and then you can have recess meetings saying “Hey, are all things taken care of right now?” Like a clear arrangement. That's what you have to do.

(Susan, subject teacher)

The time reserved for communication is important, as is what is communicated and how it is communicated. In our research (Härkki et al., 2021), three major factors differentiated the teacher teams in terms of successful collaboration: (1) shared pedagogical priorities, (2) commitment to project goals and developing shared teaching practices, and (3) socially shared regulation. The quality, quantity, and content of communication come together in regulation, which refers to the intentional, adaptive response to new challenges, situations, or failures. According to Hadwin et al. (2018), regulation involves self-monitoring and optimizing one's activities and objectives according to changing situations. In socially shared regulation, these activities and goals are intentionally shared and transactively negotiated (Hadwin et al., 2018). A shared mindset and a positive attitude toward team teaching enhance the chances of succeeding and provide a fruitful breeding ground for collaboration, as an elementary school teacher recalled:

Through experience and reflection, one can immediately find a lot of positive things in it [team teaching]. I see it as a huge positive asset in the work of a teacher for both myself and the children. As for myself, I can share things and I don't always have to reinvent the wheel, it brings out the best parts of both [teachers], and one can patch up one's own weaknesses through the strengths of the other. And for the kids then, there's two adults nearby and they get a different kind of feel for teaching. And I think it enriches [teaching] in that regard too. Designing and planning with the other is sometimes a little challenging in terms of time, but most of all, in responding to such personal chemistries and thought worlds, you have to just fall into those things and principles, and you need to have the same interests, because that person will rise to a pretty big role at that point.

(Peter, class teacher)

Our understanding is that socially shared regulation is the key to successful team teaching. Time and channels for it should be agreed on during the planning phase. Another issue that should be agreed on is how to evaluate the team's performance during the project and after it ends.

Wrapping up the Project

If school days are hectic, term end with the need to submit grades for all the students is even more hectic. However, it is important that the teachers find time to discuss the lessons learned and to evaluate both the innovation project and the team teaching experience. It can be done in a simple and traditional way, as described by a teacher working in a secondary school: "When you get some success, you stop and write down what went well and what went badly. That is what has been done now" (Sarah, subject teacher).

In one of the projects, the researchers interviewed the teacher teams at the end of the school projects. The central idea was to facilitate the teachers' team building and ensure dedicated time for shared reflection, despite the busy term end. Members of one teacher team, subject teachers Vera and Hannah, discussed how to organize extended team teaching in a way that would support transfer of the students' code-writing skills better:

HANNAH: Math teachers taught the basics of coding, two hours. But it felt that students know nothing.

VERA: It is interesting. Because they most certainly did learn coding in math. But the transfer...if students learn something in math, they do not recognize it at crafts. How to organize team teaching...should one of us [crafts teachers] stand there in the math class to make the connection visible? This is an interesting question because this is not the only time this has happened. Students can be like "never heard, dunno what a ruler is, or what to do with one."

HANNAH: Or maybe the math teacher could have come to our classroom to help with coding?

VERA: We need to think about how teaching of coding should be scheduled and organized next year.

Subject teachers Theo and Nita reflected on their long-term teaming experience highlighting the meaning of trust:

THEO: This project has further developed our collaboration. We have done several projects like this, and our collaboration develops all the time. We know that we can work together, and we don't need to think about what the other is doing. We can trust that things are under control. It is really valuable that we can trust each other.

NITA: It would be impossible to work without trust. Maybe it is the trust, you know that the other one wants to do this as good as possible. Personally, this collaboration and doing together is most important.

They also reflected on how they change projects from year to year, based on what they have learned. This time, they noticed that specific learning tasks resulted in an imbalance between the students' needs and the teachers' expertise:

THEO: As usual, we'll make changes, and our next project will be different. This time, the big change will be [the] emphasis on technologies: we'll include coding that both of us can teach.

We also recommend a more formal evaluation of the team's performance. Designing the evaluation criteria and scale could be part of a project's kick-off agenda, but in any case, the team members should agree on the evaluation at the very beginning of the project. How the results are collected and analyzed should also be agreed upon beforehand. Evaluation criteria could include some school-level criteria, some project-specific criteria, and some criteria related to the teachers' personal goals. Moreover, student learning should be reflected in the evaluation criteria. Evaluation could be done as a shared discussion or as an individual task by each teacher separately.

Shared and Extended Expertise as the Backbone of Team Teaching

The learning objectives set for invention projects, the technologies that are used, how the disciplines are integrated, and the teaching methods used can often benefit from expertise not possessed by the core teacher team. Some of this expertise could be needed throughout the project, while some could be required for a limited time at a specific phase of the project. In addition to a more permanent core team, the extended teaching team could include visiting members. Bringing in experts could be highly motivating to students, but also rewarding to the core team teachers, as they could be exposed to new perspectives and the experts' professional practices. As one of our elementary school teachers described, having a group of experts enables large invention projects to be carried out:

This is a lot easier as a team. You don't always have to do everything by yourself. When four people are involved, four heads forget a lot less. If you had to do all this by yourself, it could be quite a big project or would be a big project to carry out.

(Tom, class teacher)

External experts can include professional inventors and designers, specialists in robotics or material technology, and local community members or policymakers. Involving external experts can also take the form of organized visits to school extramural learning environments, such as museums, laboratories, the workshops of craft professionals, etc., which is encouraged by the national core curriculum. These visits could also provide opportunities for students to become acquainted with various tools, artifacts, and work environments organized to support experts in their work, as well as authentic communities of practice (Hakkarainen et al., 2004).

An example of expert roles in an extended teaching team, teacher professional development, and increased job satisfaction comes from a seven-week-long invention project for seventh graders. The Proto-lab for Redesigning School Environment was planned cooperatively by two craft teachers and a professional service designer, who also facilitated the first two ideation lessons for students. After the ideation phase, the teachers took over, and later, the student groups visited a nearby design museum to collect practical tips on specific constructs. We interviewed Mila, one of the teachers.

For me, working with several adult professionals was the most valuable experience. I got so many new ideas and food for thought from discussions with Jean [the service designer]. Jean could have some high-flying ideas, which needed to be brought closer to earth and simplified, closer to the students' experience. However, this project offered versatile learning both for the student and for us teachers, which was most rewarding. For me it was important to realize that even if students produce lots of ideas [with the designer], it is not so straightforward to choose and narrow down what we can actually do within the tight course timeframe. In that sense, the teacher has also an important role in designing.

(Mila, subject teacher)

Another alternative to strengthen the expertise of a teaching team is to use students as tutors (Tenhovirta et al., 2021). A refreshing way to empower students and motivate them to pursue their interests is to encourage them to engage with special expertise relevant for the project and invite them to provide tutoring for their peers as expert members of the extended team. Chapter 12 of this book provides examples and describes the advantages and conditions of engaging students as tutors, but as described by an elementary school teacher, it is noteworthy that shared expertise may expand to the teacher-student level: "It's been amazing how some of those kids have in a way risen up alongside us teachers. It has been really great what kind of skills and enthusiasm can be found there" (Amy, class teacher).

However, having expertise in the team is not enough. For a group of experts to function as a team, each member needs two main types of knowledge. The first type involves the team members' expertise and how that knowledge is related to the learning tasks and project objectives, essential for socially shared regulation and shared orchestration of student work and learning. The second type includes situational, emergent knowledge about evolving circumstances and challenges. This

situational awareness is essential for a team's success (Jones et al., 2019) and socially shared metacognition, e.g., in collaborative building and maintaining of socio-material learning environment that responds to continuously evolving student needs and facilitates meaningful student participation and learning. This awareness is developed with less effort when teachers are co-located and can see each other's interactions with students; otherwise, it requires good communication and shared time to emerge.

Team Teaching: A Means of Professional Development

Team teaching could provide a safe and fruitful environment for teachers to develop and test pedagogical innovations for teaching novel contents and knowledge practices. In invention projects, teachers co-innovate, co-develop, co-reflect and co-teach. This reflects the very idea underlying Finnish teacher education and national core curriculum: all Finnish teachers have a master's level university degree, which equips them to construe and apply rather than implement the curriculum. Therefore, invention projects are often vehicles of teacher professional development: experimentation and even seemingly small events can initiate meaningful changes in a teacher's thinking, beliefs, and practices (Rytivaara & Kershner, 2012). According to one of our secondary school teachers, team teaching can be seen as a means of professional learning and development: "I feel that it [team teaching] is also my continuing training" (Sarah, subject teacher).

Invention projects involve unexpected twists and turns arising from the students' versatile experiments, which requires teachers to be flexible and sometimes, to improvise. A teacher's role shifts from being an omniscient authority to being a facilitator or even a co-learner. Developing instructional approaches in situ contextualizes teacher thinking in the instructional dialogues and versatile project activities. In this way, the connection between teacher learning and new classroom practices is immediate, unlike in many professional development programs; co-developed classroom practices are not only learning outcomes but part of the teachers' learning process (Rytivaara & Kershner, 2012). Team support can also encourage a teacher to try novel things and thus support his/her belief in his/her capability to carry out an invention project, in general. This is seen in the example provided by an elementary school teacher:

At least I would have had the anxiety straight away: "Help! What's being sought here, whether I understood correctly and how can I come up with it?" And I would have been distressed by the fact that do I even dare to do this. It would have taken a little courage if I had been alone, and I would have been a little unsure if I would have dared [to carry out an invention project].

(Lisa, class teacher)

Experimentation and reflection are essential parts of the teacher learning process, and learning experiences are unique for each teacher (Rytivaara & Kershner, 2012). However, to teach as a team, teachers need to make their thinking and learning more explicit as they plan activities and discuss student learning. This

could be challenging but not impossible, as teachers' practical knowledge is implicit and deeply embedded in classroom practices (Rytivaara et al., 2019). Receiving constant feedback, combined with the teacher's willingness to adopt and enhance his/her teaching practices, can be very rewarding. An elementary school teacher described the professional development happening in this sense:

I've been saying all along that I'm in a more delicious position than I've ever been in. Two people who are about to leave us and the quiet information they have, I'm the winner in that exchange. I wouldn't have developed this well professionally if I hadn't done it on a team. Since you get feedback from other adults on that team, it also develops your teaching, and you see others' way of teaching. The same thing and you think, "No jokes, you can do that in that way too?" It gives [me] perspective that my way is not the right way, or you can do things in other ways too; with a little "improvement", push it in a better direction.

(Maya, class teacher)

The teaming model, in which co-present teachers co-teach the same student group, provides teachers with opportunities to directly experience and observe each other's teaching styles and pedagogical decisions in an authentic context. However, there is still the need for individual reflection to develop into shared reflection. Shared reflection and open communication are central for a team to develop into an effective partnership (Pratt, 2014), but also for a successful team-taught invention project.

Elements of Well-Functioning Team Teaching

Common challenges for well-functioning team teaching include establishing roles based on the balanced use of expertise and skills, insufficient time for co-planning, communication, evaluation of success in collaborating, and lack of support from the school community (Pratt, 2014; Thousand et al., 2006). According to Härkki et al. (2021), the challenges specific for invention projects also include the physical learning environments, the class student size and integration, teacher competence, and insufficient in-service training (mostly regarding technologies, but also group pedagogy and team teaching). Moreover, having different pedagogical priorities makes it challenging to build an effective longer-term partnership. Instead of focusing on the teachers' personalities, similarities, or chemistry, we recommend keeping the focus on professional practices and priorities: professional courtesy and creating a working environment in which all the central processes, responsibilities, roles, and goals have been agreed upon from the very beginning of the project.

Sustainable team teaching is built on communication, shared decision-making, mutual support, and positive reinforcement (Kodkanon et al., 2018). Seemingly small actions, such as thanking, encouraging, complimenting, nodding in agreement, being courteous, helping with mistakes, praising, and apologizing, showing respect and professional courtesy, and providing a behavior model for students, good communication and professional respect result in mutual trust (Kodkanon et al., 2018; Pratt, 2014), which is crucial for teaming.

A change from individual teaching to a collaborative culture means not only expanding individual teaching skills to collaborative ones but also thorough discussions on beliefs and pedagogical priorities. Working together effectively does not require team members to agree on everything; in fact, different perspectives can complement each other (Pratt, 2014). Good collaboration can also be built by recognizing and respecting differences in the team members' motivations and expectations of privacy (Thousand et al., 2006). However, differences in pedagogical preferences need to be discussed if they are relevant for the planned project; then, careful listening and the willingness to negotiate solutions and compromise are necessary. Ultimately, the aim is to provide an inspiring and innovative learning experience for students.

Invention projects clearly benefit from well-functioning team teaching. However, especially in invention projects, team teaching is a highly situated, dynamically evolving enterprise, necessarily dependent on the participating individuals' objectives, timely capacities, and needs. It requires re-conceptualization of roles and responsibilities (Hackett et al., 2019). According to Härkki et al. (2021), teachers could overcome the lack of external support if they are motivated to team teach and are capable of flexible time management. However, individual teachers' flexibility is neither a recommended nor a sustainable bedrock for organizing teaching. Rather, organizational-level commitment is essential (Takala & Uusitalo-Malmivaara, 2012). We argue that implementing (and later nurturing and further cultivating) team teaching as a beneficial, widely entrenched practice for invention projects requires supportive structures and systematically aligned activities at the national, regional/municipal, and school levels. Our experience of beneficial support structures and skills for team teaching is summarized in Figure 11.1. This listing is not exhaustive nor fully implemented in Finland either.

The outer levels of this contextualized team teaching model (Härkki et al., 2021) facilitate and constrain the inner levels. While the national level focuses on overall aims and policies at all levels of the educational system, regional and school-level policies and support activities provide details, guidelines, and resourcing specific to that level. At the school level, it is best to base team teaching practices on consistent and continuous building of innovative school culture rather than short-term project-based initiatives. Importantly, national, regional, school, and team levels should have frequent opportunities for feedback between them, preferably supported by collectively agreed on performance and quality indicators.

Discussion

Team teaching is an efficient way to respond to the challenges that come with a teaching job: staying abreast of the emerging knowledge and skills needed to be a teacher (Thousand et al., 2006). We recommend starting with a short project and clear objectives. A short invention project provides a good opportunity for teachers to determine whether team teaching is a suitable approach for them and to test the waters with novel learning tasks. A short commitment gives teachers a glimpse of the benefits, and the possible challenges are smaller in a short-term project than in a longer-term project. Clear objectives from the start help each team member set

National level: policy, resourcing and capacity building

- National core curriculum
- Formal teacher education, train the trainer, continuous in-service training
- Programmes & platforms to facilitate innovative school development, professional networks & mentoring for teachers and principals

Regional level: local policies, resourcing and capacity building

- Regional curriculum adaptations, local training policies, equitable salary systems and incentives for both class teachers and subject teachers
- Development programmes
- Training initiatives, networks, study and development teams, mentoring and coaching for teachers and principals

School level: Leadership and community

- Active leadership: Team teaching as part of school development vision, strategy, objectives, resources, follow up, corrective actions
- Solution-oriented approach that supports professional learning and provides psychological safety and trust
- Understanding of the value of team teaching for innovative school development, teacher well-being and student learning transformed to everyday support activities such as class schedules that support team teaching, shared planning time, working space, measurable objectives
- Collegial development of individual skills to collaborative skills

Team level: Shared orchestration of student work and learning building on

- Metacognitive skills developed to socially distributed metacognition and to socially shared regulation of team work
- Collaborative building of socio-cognitive learning infrastructure to facilitate meaningful participation and learning for all students
- Individual embedded and embodied classroom practices flexibly developed to socially and materially distributed activities suitable for the team

Figure 11.1 Beneficial support structures and skills for team teaching.

realistic yet inspiring personal objectives—and achieve them. This applies to the school-level implementation of team teaching and to the teachers planning a team-taught invention project.

Instead of a set of implemented (or pursued) practices, a team-taught invention project should be seen as a unique learning path taken by a particular team of teachers. The shift from individual teaching to team teaching and shared orchestration of student learning is a major undertaking. When team teaching is initiated by individual teachers who want to develop their classroom practices, it could be characterized as a first-order change. That level of change fine-tunes their work

routines but does not challenge their values or the wider community. However, when team teaching is initiated as a school- or (regional/national) curriculum-wide change, it becomes a second-order change. This level of change entails a paradigm shift, confronts fundamental beliefs about current practices, and leads to new goals, roles, and structures, as well as different ways of thinking and working (Marzano et al., 2005). These two levels of change require different supportive structures. In Finland, the 2016 national curriculum initiated a second-order change regarding team teaching. Currently, there are inconsistencies in the ways regions and schools have been building supportive structures that facilitate emergence and further development of team teaching practices. Moreover, structural, dialogical feedback channels between the school, region, and national levels are underdeveloped.

At its best, team teaching serves as the backbone of both short-term and long-term invention projects. Teachers' shared expertise in the design, implementation, and evaluation of invention projects supports the implementation of entities that go beyond subject differences. It requires creative problem-solving and it supports the different needs of groups of students. Working in a team also supports continuous teacher professional development as a part of the day-to-day life of the school's activities. Above all, working in the team facilitates implementation of multidimensional invention projects in ways that support the student groups' activities that are innovative in terms of content and practices.

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