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LS4VET MODEL

DEVELOPING A LESSON STUDY MODEL FOR VOCATIONAL EDUCATION & TRAINING

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1. INTRODUCTION

This final report is the outcome of IO1-A5: Identifying relevant VET-specific factors in the LS4VET Erasmus+ project. We developed a theoretical model providing guidelines for the adaptation of Lesson Study (LS) as an approach to teacher professional development and education quality improvement to the special context of vocational education and training (VET). The primary target group are teachers and trainers working in upper- and post-secondary VET schools in the participating countries (HU, A, MT, NL).

The LS4VET model was developed with insights gained through:

(1) a study on the prior and current application of the method of LS in VET in general and specifically in the partner countries and by the partner organizations (Mewald et al., 2021);

(2) a comparative analysis of the special VET-specific national (VET system,) organizational (VET school) and individual (teacher/trainer) level factors relevant to the adaptation of LS to VET (Bükki & Györi, 2021);

(3) a focused needs assessment of teachers/trainers of the partner VET schools in relation with the application of LS in VET and education quality improvement (Calleja et al., 2021).

The Model for LS4VET provides a theoretical framework for applying LS in VET, which should guide the development of the LS4VET course within the framework of the LS4VET project and the implementation of the LS4VET Model in VET schools. This report will also be useful to VET teachers/trainers, VET school managers or VET policy makers as a standalone report summarizing prior experiences and the theoretical and practical aspects to consider before introducing the Lesson Study approach in VET.

This final report consists of three main sections. First, in section 2 we describe the need for pedagogical change and adaptive teachers in VET through enhancing VET teachers' collaboration, next, in section 3, we summarize aspects that drive the adaptation of LS to the context of VET and finally, in section 4, we describe the LS4VET model.

2. THE NEED FOR PEDAGOGICAL CHANGE AND ADAPTIVE TEACHERS IN VET THROUGH ENHANCING VET TEACHERS' COLLABORATION

2.1 THE NEED FOR PEDAGOGICAL CHANGE AND ADAPTIVE TEACHERS IN VET

In the 21st century, vocational education and training must face and address multiple challenges all around the world: rapidly changing needs of the economy, transforming jobs and working environments related to fast digital technology development, and the challenging task of educating heterogeneous groups of students with diverse learning needs or school experiences. In addition to continuously improving VET curricula and learning content to bridge the gap between VET and the world of work, increasing emphasis is put on creating more and better opportunities for the initial and continuous professional development of VET teachers, with a focus on "equipping them with the adequate skills and tools for and through digital technologies"[1].

VET teachers' professional development is important not only in terms of maintaining their industry currency but also with regards to improving their teaching skills. Traditional, teacher-centred pedagogies have been widely criticized as particularly inappropriate for VET, because they give undue emphasis to 'inert knowledge' which has no relevance to the expected competences for VET graduates (Cedefop, 2010). Statistically significant correlations were found between particular methods of teaching and learning (such as group work, authentic and interactive learning tasks, well-tailored support) and perceptions of achievement, progression, motivation and likelihood of dropout (Cedefop, 2015). The need for pedagogical change in VET in European countries has been assessed by a few Cedefop reports in the past, but current and systematic data are woefully scarce regarding VET teachers' pedagogical practices and development needs[2].

Although the teaching profession is regulated in most EU countries also concerning the VET sector, initial tertiary level pedagogical education is not always a requirement (typically not for trainers who supervise in-school VET practice), and continuous professional development (CPD) requirements, regulation, provision and monitoring vary significantly across countries (Cedefop, 2016). VET teachers are typically a heterogeneous group of professionals with different backgrounds (Ping et al., 2018). The majority are second career teachers or 'career switchers', starting teaching as a second career following a previous one in a vocation or profession such as nursing or accounting. They often have had limited time to learn how to design and implement their lessons, and how to reflect on them (Van der Klink & Streumer, 2017). Other barriers to pedagogical change in VET relate to the culture of teachers and schools (such as pressure of work, habit, and lack of confidence in competences in making use of new pedagogies), the fact that curriculum and qualifications standards and statements do not always provide pedagogical guidance, as well as weak partnership with enterprises, traditional assessment methods and competing policy objectives (Cedefop, 2015).

[1] Improvement of VET teachers' professional development opportunities has been repeatedly defined by the EU ministers in charge of VET as a short-term deliverable of VET development, most recently in their Osnabrück Declaration of 2020. https://www.cedefop.europa.eu/files/osnabrueck_declaration_eu2020.pdf

[2] A feasibility study of a new Cedefop survey of VET teachers and trainers is currently being planned (https://www.cedefop.europa.eu/en/events-and-projects/events/making-excellence-inclusive-towards-new-cedefop-survey-vet-teachers-and-trainers). The majority of the policy-maker, social partner and expert participants of the related webinar held on 3 February 2021 chose "Pedagogy and didactics applied by teachers and in-company trainers" as the most important topic to be covered in this forthcoming survey. (https://www.cedefop.europa.eu/files/polls_on_key_topics.pdf).

As a result, this 2015 Cedefop report found that although pedagogical change was often advocated, it had not or not successfully been implemented, and traditional pedagogies were still prevalent in VET schools in many European countries[3].

To fulfil this pedagogical change, there is a need for adaptive VET teachers who have the ability to respond quickly and adequately to new circumstances (Markowitsch & Helfer, 2019, p. 9). Adaptive teachers are reflective by nature and "use knowledge of multiple variables and create entirely new and innovative solutions to the complexity of their teaching" (Parsons & Vaughn, 2016). There are two routes for VET teachers to express their adaptability: through being responsive to its students and designing and teaching education which is responsive to dynamics in society and industry (de Bruijn, 2012). Firstly, VET teachers have to deal with a growing diversity of students because VET students differ in terms of cultural backgrounds, language, interests, values, socioeconomic status, academic readiness etc. (Evans, 2019). An important aspect of VET teachers' expertise is therefore to optimize the learning process for each student, tailored both to the students' future work and the student (Placklé et al., 2020). Secondly, VET teachers increasingly put effort into interconnecting learning in school with workplace learning in order to enhance the students' learning process. Instead of considering schools and workplaces as opposites, it is crucial that these two learning sites are reconciled or "integrated" (Zitter et al., 2016). One way in which this can be done is that teachers do not design their education alone or in isolation, but in collaboration with all relevant actors. This can be done by ongoing and regular meetings with key stakeholders on course curriculum development, discussing and reviewing curriculum content and ad hoc meetings to discuss matters of relevance, etc. (Manwaring et al., 2020). In co-designing VET-education, involvement of all actors and stakeholders should be valued, students' involvement none the least.

2.2 TEACHER COLLABORATION IN VET

Professional Development (PD) programs could certainly contribute to developing adaptive teachers. Specifically, PD which effectively builds pedagogical content knowledge through active, responsive, and situated learning and PD that are collaborative in nature which have the effect of teachers working together and sharing successes and problems they encounter (Parsons et al., 2016). Teacher collaboration can support new ideas and challenge existing ones, supports teacher reflection and encourages professional communication and sharing among teachers (Schleicher, 2020). However, not all collaborative activities can benefit teachers' work to the same extent, and deep professional collaboration should be distinguished from "exchange and cooperation": these involve a deeper level of co-operation and more interdependence between teachers, such as teaching jointly as a team in the same class, providing feedback based on classroom observations, engaging in joint activities across different classes and age groups, or participating in collaborative professional learning. Also, teacher collaboration is not very effective if it is "contrived" (Hargreaves, 1994) and there should be a strong balance between and an integration of autonomy and collaboration (Clement & Vandenberghe, 2000). Finally, the content or agenda of teacher collaboration also matters, and collaboration has to be meaningful for the teacher to be effective (Little, 1990; Kelchtermanns, 2006). The strength of Professional Learning Communities (PLCs) of teachers within and across schools lies in their focus on collective, goal-driven professional development activities, routine collaboration between teachers for

[3] This Cedefop study claims that several competence frameworks were developed in the past two decades to help VET teachers adopt the learning outcome-oriented approach and develop students' key competences and transversal skills. These had a profound impact on the development of national VET curricula, however, "the way that defined learning outcomes in written curricula are interpreted and converted into teaching and learning performances is complex and success depends on a variety of factors: the manner in which the learning outcomes are formulated and organised; the manner in which teachers work together to plan the local curriculum; past experiences and culture of teachers; the degree of autonomy that schools and training organisations have to determine the local curriculum; amount of time, the resources and learning environments, and learning materials available".

knowledge sharing and collective improvement, and consistent feedback provided to teachers, thus supporting incremental change and positively affecting instructional quality and student achievement (Schleicher, 2020).

Research findings suggest that collegiality decreases with higher levels of education. Teachers in upper secondary education appear to work less collaboratively and more in isolation than their primary and lower secondary counterparts (OECD, 2020). Secondary schools are typically organised into subject-based departments, often resulting in divided school cultures with competing subcultures, which exert enormous influence on teacher learning (Hargreaves 1994; Timperley et al., 2007). Available evidence suggests that the prevailing model in VET teacher communities is similar or even more individualistic, discipline-divided and course/department-based, and deep level collaboration is rather rare (Bükki, 2021). Obstacles to collaboration may relate to teachers' self-image, low self-esteem and a deeply rooted fear of criticism or revelation of incompetence, while promoters of cooperation connect to the changing practices and desire of sharing with colleagues (Nissilä et al., 2015). Nevertheless, interaction with peers is an important and appreciated form of VET educator learning (Girardet & Berger, 2017). In many countries, teachers of vocational subjects are typically hired from among professionals in the field and have not received (pre-service) teacher education. Also, most of their formal professional development opportunities focus on content knowledge, maintaining industry currency. Therefore, they rely on each other, trial-and-error, student feedback, and peer feedback to develop their pedagogical content knowledge (Hoekstra et al. 2015; Hoekstra & Newton 2017; Tyler & Dymock, 2019). Hoekstra and Pederson (2018) also found that instructors in the different departments of Canadian VET institutions had specific ways of working together. The authors argued that these were related to the specific values, principles, and logic of their original profession/trade.

2.3 LESSON STUDY AS AN EFFECTIVE FORM OF TEACHER PROFESSIONAL DEVELOPMENT THROUGH COLLABORATION

To ensure effective, high quality VET, in addition to continuously improving curricula, there is thus a strong need to introduce systematic approaches to, and opportunities for, the initial and continuous professional development of VET teachers, trainers and mentors. VET teachers/trainers need to continuously improve not only their vocation-specific competences, but also their pedagogical-methodological skills. Lesson Study has been the primary form of teacher professional development in primary schools in Japan for a hundred years, and since the end of 1990s, its use has been spreading all around the world, extending also to other sectors of education. However, while the use of Lesson Study is increasing all over the globe, its application in the special context of VET, considering all special features that are different from general education and might affect its implementation, has never been systematically studied that would be necessary to ensure its proper adaptation for VET.

Behind Lesson Study method we can identify 5 core concepts – with other words: 5 'big ideas' (adapted from Goei et al., 2021):

1. Teachers collaboratively perform research on challenges and opportunities in their teaching practice.
2. LS involves combining practical knowledge and external knowledge in innovative ways.
3. LS is about learning from students' learning.
4. LS is a collaborative effort of teachers with each other and with knowledgeable others.
5. LS requires iterative cycles of research lessons.

2.3.1 TEACHERS COLLABORATIVELY PERFORM RESEARCH ON CHALLENGES AND OPPORTUNITIES IN THEIR TEACHING PRACTICE

The essence of LS is for teachers to discover new, more reflective and effective approaches in their work for the improvement of the students' learning and, in the process, teachers perform research focusing on their own teaching practice. This means that Lesson Study teams identify challenges in teaching, design and research lessons related to this challenge within their own subject and their own students. Therefore, generic lessons are not aimed as an output of Lesson Study. The participants in a Lesson Study team specifically take their own context as a starting point so that they can also fully utilize all context-specific knowledge within the team.

2.3.2 LS INVOLVES COMBINING PRACTICAL KNOWLEDGE AND EXTERNAL KNOWLEDGE IN INNOVATIVE WAYS

One of the constraints of many educational attempts to improve teachers' work is that they are either exclusively based on academic ideas and far-from-practice suggestions, or in an opposite way, they are based only on the practical experiences of the teachers, without solid theoretical bases and the opportunity to learn fresh ideas. In the process of LS, external experts are also involved and active. Their active contribution supports the teachers in combining external professional knowledge with their own teaching practice.

2.3.3 LS IS ABOUT LEARNING FROM STUDENTS' LEARNING

Lesson study is about improving student learning. A very rich opportunity for teachers for developing their abilities in teaching is to learn from their students' learning. Following the LS cycle, teachers can pay close and thorough attention to and learn from their students' learning processes systematically and in subtle ways, in response to the learning goals and opportunities for learning.

2.3.4 LS IS A COLLABORATIVE EFFORT OF TEACHERS WITH EACH OTHER AND WITH KNOWLEDGEABLE OTHERS

Lesson study is a team activity of teachers with knowledgeable others. The seven core activities of LS (see page 5) are essential for effective collaboration in LS. Also, in the LS team, there is continuous and vivid communication among the teachers throughout the seven core activities of LS cycles. However, the team of a LS is particularly open to special professional knowledge and support which are needed for their work. Therefore, their close collaboration with knowledgeable others or external experts related to their topic of interest is relevant for the success of LS.

2.3.5 LS REQUIRES ITERATIVE CYCLES OF RESEARCH LESSONS

An important starting point for Lesson Study is the teachers' view on teaching and its possible improvement in a continuous, never-ending developmental process. It is also an important precondition for teachers to believe in the value of collaboration with other members of their community in practice, which enables them to develop professionally through mutual reflectivity and creative as well as innovative thinking.

LS teams primarily aim to improve the teachers' teaching and via that to improve their students' learning. The LS team members focus on the improvement of certain aspects of their lessons, but not with the vision of a new perfect lesson, rather with the intention of an improved lesson, an improved teacher activity in the teaching/learning processes, which is more responsive to the actual new challenges of education. A well-functioning LS cycle thus contributes to the teachers' understanding of their work to foster their students' development. However, only one cycle is typically not enough, and teachers repeat their LS activities more than once. This iterative activity does not only improve

teaching and learning, but it also opens the doors for the organizational learning of the school, which is an additional valuable outcome of LS. Thus, the iterative nature of LS provides and enables continuous professional development (CPD) of teachers, and it serves sustainability at the same time.

LS is a special approach in teachers' professional development. It originates from Japan, as one of other similar activities there since the 19th century (Sarkar Arani, Keisuke, & Lassegard, 2010). We conceptualize lesson study (LS) as a complex activity of teachers, in which they follow certain steps in a cycle of activity, as they learn about, do research on and develop (L&R&D) certain aspects of their classroom activities (Stigler & Hiebert, 1999). While in a LS cycle teachers learn about certain topics in education, collaborate, share ideas and practical knowledge with each other, they go through conceptual changes as well, which improves not only their knowledge and understanding of certain educational phenomena, but also their understanding of education in general, their beliefs and attitudes regarding education and educational practice.

Most Lesson Study models include four common aspects which a LS team goes through in an iterative way (preparation, realisation, improvement, sustainment). Seven steps can be separated, which follow each other in the same order in every LS cycle:

1. teachers **organise** a LS team with pedagogical goal(s) to improve their teaching activity
2. **study** the relevant literature, consult with an external or internal knowledgeable other on the topic, and refine the goal(s) of the Lesson study research lesson/teaching unit
3. focusing on the goal(s), they collaboratively **plan** a Lesson Study research lesson/teaching unit
4. one of the team members **teach**es the lesson/teaching unit while the other team members (and additional, optionally invited professionals) **observe** the lesson/sequence
5. based on the observation of the Lesson Study research lesson/teaching unit and on interviews of the case students or the whole class about their learning experience, they **analyse and discuss** their results
6. **repeat**: revise, improve, teach, observe and analyse new version(s) of Lesson Study research lesson/teaching unit, therefore steps 3-6 might be repeated in a cyclical Lesson Study process.
7. **reflect** and **disseminate** their reflections on the LS process and results.

These 7 steps can be organized to 4 groups of aspects as followed:

A. PREPARATION of Lesson study research lesson/sequence (steps 1-2-3) /organise; study; plan/
B. REALISATION of Lesson study research lesson/sequence (4) /teach/
C. IMPROVEMENT of the Lesson study research lesson/sequence (5-6) /analyse; repeat/
D. SUSTAINMENT of LS (7) /disseminate/

2.4 ON THE ADAPTATION OF LESSON STUDY

The LS4VET project is applying the authentic Japanese LS model in a new field of education: vocational education and training (VET). Since the authentic Japanese model of LS was presented by Stigler and Hiebert in their 1999 book (Stigler & Hiebert, 1999), there have been many adaptations of this model worldwide. These versions are not easy to group, as it is considered everywhere in the world to develop and apply some local versions of the authentic form of LS.

Adaptation can happen at different levels. Even where the authentic Japanese method is adapted to an entire country's local educational system, there may be minor or major, deeper or less deep further adaptations of the method, for example, school-level adaptations for only one educational district or school, or even an adaptation that adapts the method to the specifics of a particular LS working group.

This is also related to the fact that adaptation often becomes necessary due to the cultural or subcultural or institutional cultural characteristics of the adaptive context (Ebaeguin & Stephens, 2014).

There can also be different depths of adaptation: some adaptations affect fundamental foundations of the method, while other applications create only minor changes. Changes to fundamentals lead to hybrid models (Sheleznyov, 2019). The best-known hybrid version worldwide is learning study (Lo, 2019), but the Chinese centralized training approach can be also conceptualized as a hybrid version (Chen & Zhang, 2019).

Another aspect of LS adaptation is the level of education at which LS is adapted. In this respect, the adaptation of LS to teacher education at university level can be highlighted. These adaptations sometimes themselves create a hybrid LS, such as microteaching LS (Larssen et al., 2018) in a number of teacher education programs.

It is worth mentioning that the introduction of LS can also be characterized by very special adaptation processes. Perhaps the most peculiar of these is the Kazakh example (Kanayeva, 2019), where LS was introduced nationwide, in a centralized, top down way.

We draw on the different versions of lesson study-based teacher education in Japan (see Kim, Yoshida, Iwata & Kawaguchi, 2021) and identify seven key steps that VET teachers need to go through to experience the potential of lesson study as a professional practice and learning tool.

The fundamental challenge of VET-adapted LS is that this educational segment exhibits a great many characteristics that are unknown in the typically used environment of LS, in elementary schools, and in academic secondary education. The very high degree of diversity of teachers and subjects, for example, is one such factor, but also the fact that many vocational subjects are taught only by one teacher in a VET-school, such as theoretical and practical subject teachers. These and other characteristics of VET force us to rethink the authentic Japanese model in several aspects, while noting that VET is a different form of training in each country of the world, where the system of VET education and also the local cultural characteristics are different, and that new adaptation efforts may require that many VET schools have a very specific profile. In other words, in this project we must pay attention to the application of LS to the very special needs of VET, but at the same time we need this new version to have enough openness and flexibility to be further adaptable not only to the local educational system, but also to the individual institutional characteristics.

3. ASPECTS THAT DRIVE THE ADAPTATION OF LS TO THE CONTEXT OF VET.

This chapter summarizes the most important insights gained from the previous activities of the LS4VET project (Bükki & Györi, 2021; Calleja et al., 2021; Mewald et al., 2021). These activities aimed (1) to collect data about previous and current experiences of using Lesson Study in VET and in other sectors of education in the four LS4VET partner countries, as well as (2) to identify the LS-relevant individual and organizational conditions specific to VET and to the partner schools. In sum, the following insights gained from the previous LS4VET project activities had to be considered when designing the LS4VET Model:

3.1 VARIETY IN ROLES IN LS

By comparing the LS models used in the LS4VET partner countries it can be concluded that the role of certain participants varies between countries.

- Not all participating countries include case students within their existing LS cycles. It seems sensible, however – given the heterogeneous student population within vocational education (Evans, 2017) – to give 'case students' a permanent place in the LS4VET model. Next to that - given the age and experience of the students in most VET systems - it could be plausible to give them a more significant role within the LS-cycle.
- The role of knowledgeable others and of facilitators differs between countries too. Given the multitude of possible LS-team compositions and the continuous link with the occupational field, it is important to think carefully about these roles with regard to the model.

To develop a common model for LS4VET, the different experiences and characteristics of the different contexts needed to be considered. The roles of the students, knowledgeable others and the facilitators needed to be reconsidered.

3.2 VARIETY IN TYPES OF LESSONS IN VET

Although there is considerable variety in the organization of education across the LS4VET partner countries, all four countries mention the following types of lessons: a) (theoretical) lessons organized as traditional, standard lessons in a classical classroom environment, b) (practical) lessons organised in lab/workshop environments and c) lessons organised in project work and d) - this is only for the Netherlands and Austria - 'mentoring' or 'coaching' lessons where there is more focus on the individual student. These 'lessons' not only vary in content, but also in organisation such as (class) time, student numbers and level of collaboration between students.

Therefore, the LS4VET model must leave room to use these different teaching methods and contexts as a research lesson.

3.3 CONTEXT OF THE OCCUPATIONAL/VOCATIONAL DOMAINS

Within VET there is a continuous link with the occupation or the vocational domains. This link is considered important. Among other things, it shows that VET education must adapt to the changing field of work and that the curriculum, the ways of teaching and professionalization are in line with this. In addition, teachers indicated that the changing labour market is one of the most important motivations of VET teachers to continue their development.

In addition, each field of work has varying needs and demands of professional development and its own culture that is also visible within the teams and the students. For example:

- The IT sector demands continuous development of teaching content and materials, teamwork is considered important, online education works well.
- In the hotel, tourism and catering industry, for example, practice-based programmes in the Maltese school, there is an established international sequence of learning that is very specific and therefore less flexible to introduce new teaching methods.

When developing the LS4VET model, it was important to consider the link with the vocational domains. In other words, this link had to be part of the model.

3.4 HETEROGENEITY

Heterogeneity within vocational education and training is high. Heterogeneity is visible on different layers within education.

3.4.1 HETEROGENEITY OF THE STAFF

Staff is typically more diverse in terms of teacher qualifications, work experience, taught subjects and teaching formats than those in general (academic) upper secondary education. A significant proportion of VET-teachers combine teaching with working in the field.

3.4.2 HETEROGENEITY OF TEAMS

Teacher teams are formed based on different logics in the different VET systems (e.g., subject departments and horizontal departments in Hungary, teacher teams with sub teams formed by sector and focus teams in the Netherlands). In developing the model, we had to look at how this heterogeneity could be used to optimize learning from each other.

Combining this, we had to consider the heterogeneity of the teaching staff population and the heterogeneity of the school cultures. The LS4VET model must be flexible enough to be applicable within different systems.

3.5 TEACHERS' DEEPER CROSS-DEPARTMENTAL COLLABORATION IS NOT VERY TYPICAL AT THE MOMENT

It became clear that teachers generally are not used to working together on a deeper level across teams in VET, especially with a view to pedagogy (Calleja et al., 2021). This might have an effect on the willingness of teachers to engage in LS. Teachers might also need to change their beliefs regarding the value of collaboration and teacher professional learning, in order to properly understand and appreciate the value of LS. When developing the model, it is therefore important to pay attention to the implementation and sustainability of LS4VET in the organization.

4. DESCRIPTION OF THE LS4VET MODEL

The aforementioned five 'big ideas' as working ingredients of Lesson Study (adapted from Goei et al., 2021) are central to lesson study, also in VET. They are pedagogically powerful as they offer direction to teachers in ways that enhance teaching and student learning. However, the five big ideas do not point out how teachers from different backgrounds, different teams and different domains, learn from each other and how knowledgeable others are exactly involved. Also, they do not point out the sustainability of LS as a professional development activity. Considering the outcomes of chapter 2 and 3, we therefore want to add the following to the five big ideas of LS:

1. **Teachers collaboratively perform research on challenges and opportunities in their teaching practice.** The essence of the first big idea in VET is to improve student learning through teachers' investigation of new teaching methods and their collaboration (also with industry) in the design, implementation, evaluation, and reflection of research lessons over an extended period of time.
2. **LS involves combining practical knowledge and external knowledge in innovative ways.** In a VET context, the second big idea thus includes establishing cross-boundary collaboration with knowledgeable others and/or facilitators from education and/or the industry to create better learning opportunities for students. LS in VET should expand teachers' horizons through co-creating VET education in collaboration with students, colleagues, industry-partners and other teams, sectors, educational institutes, and countries.
3. **LS is about learning from students' learning.** LS in VET should lead to teacher's better understanding of their students' learning and what kind of VET-pedagogy is effective for students' learning.
4. **LS is a collaborative effort of teachers with each other and with knowledgeable others.** In a VET context, LS involves teachers in job-embedded collaboration and research about theories and methods of authentic teaching and learning, wherever possible in collaboration with the labour market. LS in VET should aim at a better learning culture and collaborative professionalism and enable deep collaboration between teachers and stakeholders from industry about challenges and chances they experience in their teaching practice.
5. **LS requires iterative cycles of research lessons**. LS in VET should encourage teacher learning that is disseminated across practices, within and across VET-institutions.

These ideas were translated into objectives of Lesson Study in the context of VET, which influence each other constantly during implementing, carrying out and evaluating Lesson Study in VET:

1. Developing adaptive teachers through inquiry – involves the skill of teachers to deal with unexpected and novel situations. The inquiry component should feature in all stages of the teacher education continuum. We see this as the foundation and starting point for engaging teachers in Lesson Study.

2. Cross boundary collaboration and learning - involves all stakeholders (students, teachers, lesson study facilitators, knowledgeable others, industry-based practitioners). We believe that teachers learn a lot from their workplace in the industry and by observing each other's practices. An implication of this is that LS4VET teams should always include one or more VET teacher(s) in work- and practice-based subjects (e.g.: chef, pâtissière, bartender, etc.).

3. Sustainability - the ultimate aim of the LS4VET model should be that Lesson Study becomes a sustainable process within the institution and possibly beyond. Lesson Study in VET should include aspects of how this sustainability may be attained among participants and actors.

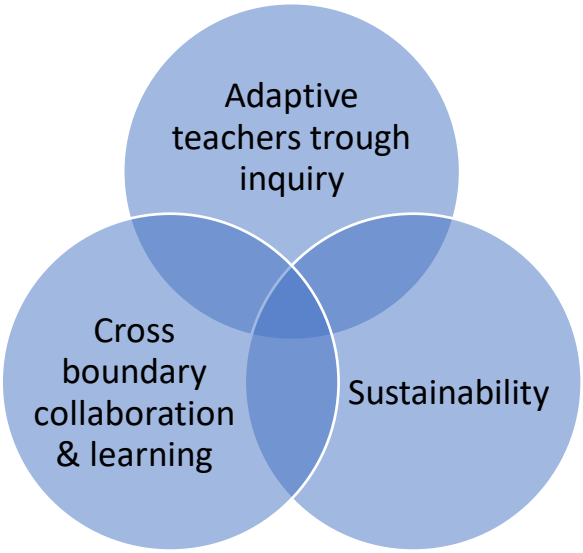


Figure 1. LS4VET objectives

4.1 OBJECTIVE 1: DEVELOP ADAPTIVE TEACHERS THROUGH INQUIRY

In chapter 2 we already mentioned the need for VET teachers to become adaptive. Adaptive teachers will have to deal with novel, ill-structured and unfamiliar situations within and outside the classroom (Männiko & Husu, 2019). In doing so, they have to invent new ways of working by using their expert knowledge in an adaptive way (Hatano & Ignaki, 1986). In a sense, adaptive teachers go beyond standard teaching knowledge and skills. Ideally adaptive teaching practices "emphasise the context-dependent nature of effective teaching and, therefore, adaptive expertise as the hallmark of a professional teacher" (Aitken et al. 2013, p. 4). There has been much discussion about expertise and we follow the definition of Ward (2018) who states that expertise is a process of adaptation and the ability to deal with change, and adaptive skills are one's ability to deal with the non-routine.

Adaptive teachers have the following three characteristics (1) they can pick up routine work more easily, (2) they have better developed meta-cognitive skills, and (3) they are distinguished by skills such as flexibility, innovation capacity, continuous learning, challenge-seeking and creativity (Carbonell et al., 2014). Adaptiveness is expressed in combination with intuitive and conscious-analytical actions while teaching (Mazereeuw & Khaled, 2021). Intuitive action involves quick interpretations of work situations where action is taken and tested on the spot. When acting consciously analytically, teachers take the time to think about the teaching and how they or others can act in it. The assumption is that adaptive teachers teach unconsciously, reflexively, routinely, until something happens to them that requires improvement.

Several review studies show that development of adaptive teachers can be promoted through targeted interventions such as good guidance, feedback, varying tasks, working on realistic complex problems and through boundary-crossing work and collaborative reflection moments (Kua et al., 2021; Wallin et al., 2019). Timperly et al. (2013, p. 5) state that an adaptive teacher "engages in ongoing inquiry with the aim of building the knowledge that is the core of professionalism". LS consists of all aspects of inquiry or research (formulating a research question, collecting data, observing, analysing data etc.), with the addition that it is highly focussed on teachers' own problems and challenges and involves many reflective activities. Therefore, the LS4VET model has the objective of combining the focus on inquiry with central elements that promote adaptive teaching, such as solving challenging problems collectively, critical reflection on teaching experiences for knowledge transformation and integration about student learning (Wallin et al., 2019).

4.2 OBJECTIVE 2: CROSS BOUNDARY COLLABORATION AND LEARNING

By adapting LS to VET, we mean to build on and take advantage of the special features of the VET context, such as collaboration with industry, diversity of teachers and students and teaching and learning environments. Within VET there is a specific opportunity to make targeted use of the knowledge, skills and experiences of all actors involved in Lesson study, due to the heterogeneity of teachers, the collaboration with the work field, the universities and possibly the students, given their age and previous experiences.

By paying attention to the differences between the participants and the teaching context in a VET Lesson study, a deepening of learning could be achieved, for all parties involved. Wenger (cited in Tsui & Law, 2005): "While the core of practice is a locus of expertise, radically new insights and developments often arise at the boundaries between communities" (p. 153). Boundaries are social-cultural differences which could lead to discontinuities in action and interaction (Akkerman & Bakker, 2011). Boundaries could be difficult to overcome, however, boundaries also do have a lot of learning potential. Essentially, teachers, knowledgeable others and students involved in a LS from different contexts are boundary crossers or brokers. When they cross boundaries we refer to a person's transitions and interactions across different sites. In the LS cycle, the teachers of different subjects (vocational theory, practice or general education) should have the opportunity to share their culture/knowledge etc. with the other teachers to learn more deeply and to bring about innovation – among all those involved (i.e., the learning of all those involved is central) creating a culture of 'learning from each other' within and between institutions. In this case, the Lesson study is the boundary object; the artifact that fulfils the bridging function. We see the great advantage that – when investments are made in optimizing the principle of boundary crossing in LS– the 'learning' is broadly secured by all 'practices' involved.

To strengthen the cooperation between teachers (and teams, institutions, universities, industry and education), it is – therefore - important to optimize the competencies that focus on boundary crossing (Fortuin et al., 2020) and on the 'learning mechanism' of boundary crossing itself. Gulikers and Oonk (2019) formulated rubrics for the four learning mechanisms that could occur during such a collaboration: 1) identification, this involves the questioning of the own and others' core identities, and the mutual complementarity of different practices. Identification leads to insights into what the diverse practices concern. 2) coordination, expresses what people learn from seeking communicative connections between diverse practices or perspectives, e.g., by contacting each other to exchange relevant information, or by using languages from different practices 3) reflection, contains perspective-making and -taking. People come "to realize and explicate differences between practices and thus to learn something new about their own and others' practices" and 4) transformation, involves joint work at the boundaries between practices, combining ingredients from different practices into something new (practices or ways of working). The rubrics from Gulikers and Oonk (2019) could be usable for formulating teachers learning from collaboration and the needed competencies.

It is important to mention that in addition to strengthening the boundary crossing competencies of teachers, attention should also be paid to the role of the knowledgeable other, who must have insight into subject content, as well as educational and field innovations and can build a bridge between them. This – even more so than in the lesson study as we know it now – plays an essential role in the success of a lesson study in VET.

In sum, through a LS4VET based on principles of boundary crossing:

- teachers can learn to collaborate, not only within their usual team but across teams and with stakeholders from industry

- teachers learn to become adaptive through reflection and engagement in inquiry, and potentially co-construct new teaching practices
- teachers broaden their horizons related to students' learning and their VET-pedagogy
- collaboration and outcomes of the LS could be more sustainable

4.3 OBJECTIVE 3: SUSTAINED USE OF LS BY TEACHERS AND SCHOOLS

Sustainability with regards to LS can be understood as:

(1) the sustainability of the change in teachers' practices, that is, of the outcome of teachers' learning through their engagement in a Lesson Study, which thus concerns the effectiveness of LS as a teacher continuous professional development (CPD) method; or

(2) the sustainability of using Lesson Study as a CPD method by teachers and by schools, which depends on individual and organizational level factors that encourage, support and eliminate the barriers to, implementing Lesson Study as a PD method.

Nevertheless, as available evidence shows, the effectiveness of LS as a CPD method is actually one important factor of teachers' motivation to keep engaging in LS. The key characteristics of Lesson Study that contribute to its effectiveness as a CPD method were discussed above in chapter 1.3. In developing our model, we focus here on the latter understanding of sustainability, and we aim to develop the LS4VET model so that it would involve features that enhance its sustained use by teachers and schools.

Although relatively few studies focus on designing and supporting LS for sustainability (Druken, 2015), the available literature suggests that the use of Lesson Study by teachers and schools as a CPD method can only be sustained if:

1. teachers are sufficiently motivated, which ultimately depends on their evaluation of the usefulness of LS and the appropriateness of its design and implementation, and
2. teachers get sufficient support from their school, which presupposes that school leaders' educational beliefs are aligned with the general idea of LS and that the cultural and structural conditions in the school allow LS to become embedded as an organization routine (see Diagram 1).

Teachers' motivation to engage in and then keep doing LS is influenced by general factors such as workload and time constraints, their awareness of the importance of teacher CPD in general, and whether they have a collaborative department/team culture, as well as by their perception of the usefulness of Lesson Study and its practices (Lim et al., 2008; Wolthuis et al., 2020; Yoshida, 2012). After they have engaged in LS, this perception of usefulness or "meaningfulness" is shaped by the impact of LS they experience on their own and on their students' learning. This depends, on the one hand, on the effectiveness of Lesson Study as a CPD method in a general sense. On the other hand, the quality of the implementation of the Lesson Study they are involved in is crucial in this respect (Lim et al., 2018). In order to implement high quality LS, teachers need to properly understand the general script and key components of LS correctly (Akiba & Wilkinson, 2014; Wolthuis et al., 2020a, Yoshida, 2014), they need to hold the required skills (lesson planning, observation and reflection), and there should be experienced knowledgeable others/facilitators available to support them (Lim et al., 2018). Misconceptions about LS such as the belief that it is for creating original lessons, or that it is not useful to conduct only a few lesson studies, can greatly discourage teachers to engage in or keep doing LS (Chokski & Fernandez, 2004). Wolthuis et al. (2020a) argue that a key factor for Lesson Study to be productive is that teachers should "view teaching as research and to develop their identities as researchers''. They found that when teachers' "general script" of LS focused on only one of the phases of LS (that is, developing a shared vision, or lesson planning, or observing students), they often did not

want to continue with LS, or if they did, they modified the cycle, considering many elements in-essential and too time consuming.

Teacher beliefs and behaviours that support successful CPD through Lesson Study were found to comprise: the open discussion of failure, mistakes or uncertainty in research lesson designs detached from individual teachers but focused on student learning; the development of new educational beliefs, accepted through collegial dialogue and reflection; the appreciation of collaborative practitioner research and opportunities to celebrate success in staff meetings, conferences, or open RLs; and the sharing of leadership by developing teacher confidence in selecting and adapting strategies that drive school development and innovation (Mewald & Mürwald, 2019). Successful Lesson Study teams maintain high expectations within a set of priorities that benefit student and teacher learning, as well as the whole school. Teachers and students profit from collaborative Lesson Study by developing interpersonal skills, trust, collaboration, and communication. Moreover, Lesson Study develops safe and engaging learning environments which support the volitional and motivational aspects of competence-orientation (Weinert, 2001) for students as well as teachers. Without these aspects, knowledge and skills would remain empty concepts devoid of real application and use, while moving **teachers and learners** from a culture of receiving to one of action and reflection touches on all the components of their competence development.

In addition to ensuring and maintaining teacher motivation to engage in Lesson Study, the other key factor of the sustainability of LS is the school's administrative support (Lim et al., 2018), which includes crediting teachers' time investment (Wolthuis et al., 2020a), rearranging teachers' schedules, and providing resources and opportunities for teachers to engage in LS (Akiba & Wilkinson, 2014, Yoshida, 2014, Murata, 2011). Wolthuis et al. (2020b) argue that LS needs to become embedded in the school as an "organisational routine". They note that there is very little research about the organizational tasks and processes for setting up LS, though practical handbooks do offer some recommendations such as:

- set up ways to arrange participation, schedule lesson study meetings, give participating teachers credit for their time-investment in lesson study, arrange space for teachers to meet, create ways to consolidate and share findings, assign roles and responsibilities (e.g. De Vries et al., 2016; Ermeling & Graff-Ermeling, 2016; Stepanek et al., 2007, cited by the authors);
- create special teams that are responsible for setting up lesson study, make an inventory of all the current work and assess which practices are necessary and which can be handled more efficiently so that time is freed-up for LS, which needs to be undisturbed, protected, focused, and supported (Ermeling & Graff-Ermeling, 2016; Takahashi & McDougal, 2016, cited by the authors);
- develop a master plan for the school research; schedule and lead meetings to find strategies to address the school's research theme based on the ideas of the teachers; plan, edit, and publish school research reports' (Takahashi & McDougal, 2016, cited by the authors).

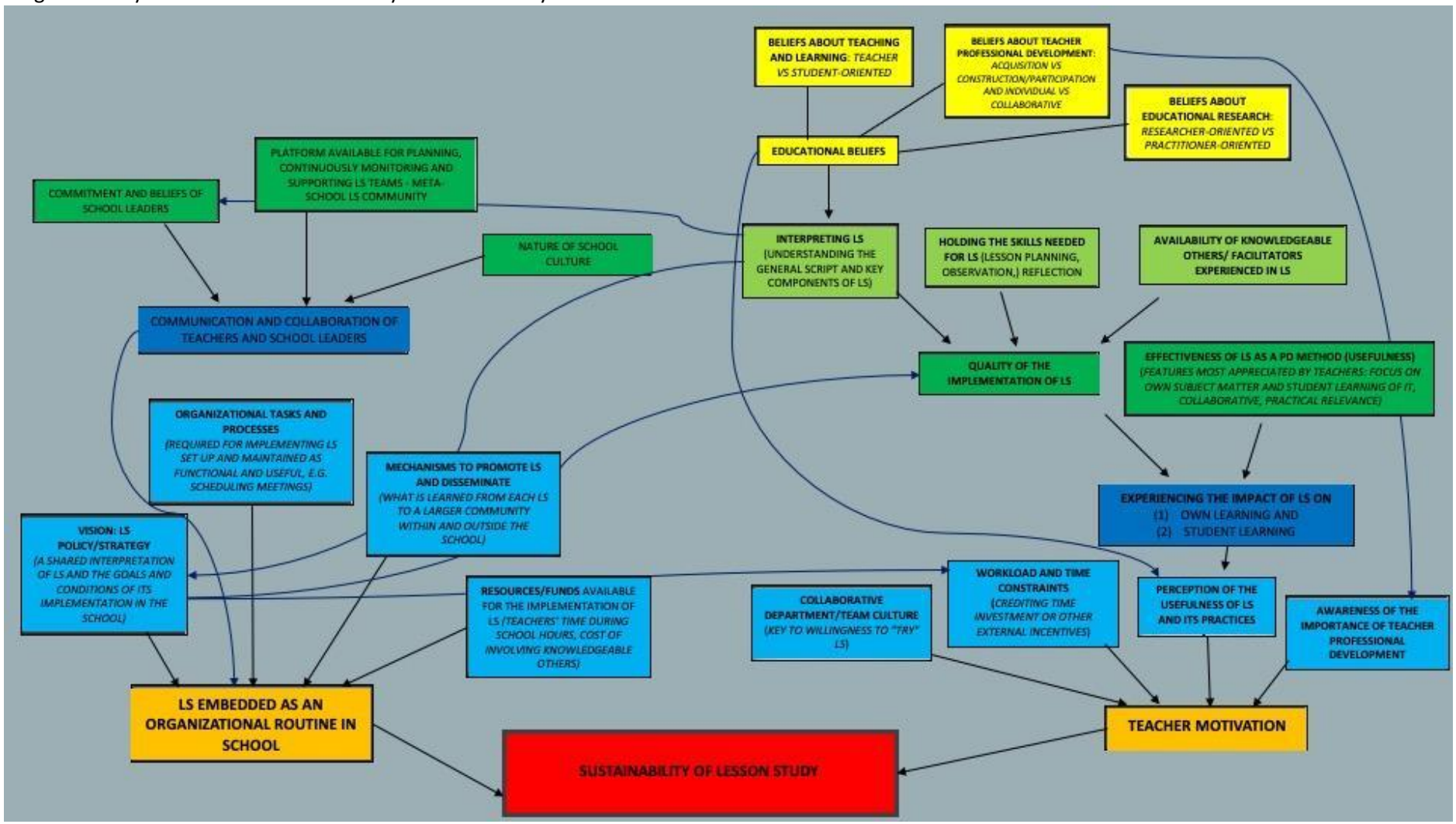
To ensure that the organizational preconditions are set up in a way that is functional and useful, they contend that it is vital that school leaders and teachers make time to communicate and collaborate about the organizational work and carry shared responsibility for setting up the organizational tasks and processes. Sustainable educational innovation is not only about facilitation in time and resources, but also concerns (internal and external) support, a well-informed school management and a vision about the intervention (NRO, 2018).

Finally, school leaders' educational beliefs were also found to be critical to the quality and fidelity of the implementation of LS as these influence their understanding of its general idea (Boom-Muilenburg

et al., 2021). Leaders' student- and collaboration-oriented beliefs are crucial for continuing the work of LS in a school. The 2nd step of the LS cycle, studying data, publications and lesson material, which enables in-depth reflective professional inquiry, may be omitted due to leaders' holding researcher-oriented beliefs about educational research as opposed to practitioner-oriented ones, as well as the organizational context, which mediates whether leaders can act on their beliefs.

Based on the literature, we propose Diagram 1 as summarizing the most important individual and organization factors of the sustainability of LS that our LS4VET model needs to consider.

Diagram 1: Key factors of the sustainability of Lesson Study



4.4 THE LS4VET MODEL

The LS4VET model (Figure 2) provides a theoretical framework and guidelines for the adaptation of Lesson Study as a method of teacher professional development and education quality improvement to the special context of vocational education and training (VET). The model is based on the five big ideas on Lesson Study (Goei et al, 2021) adapted to the context of VET (see page 7-8 of this report). With these big ideas at the base, the objectives of the LS4VET model are as follows (1) to develop adaptive teachers through inquiry, (2) to establish cross boundary collaboration and learning and (3) to stimulate sustained use of LS as PD by teachers and schools.

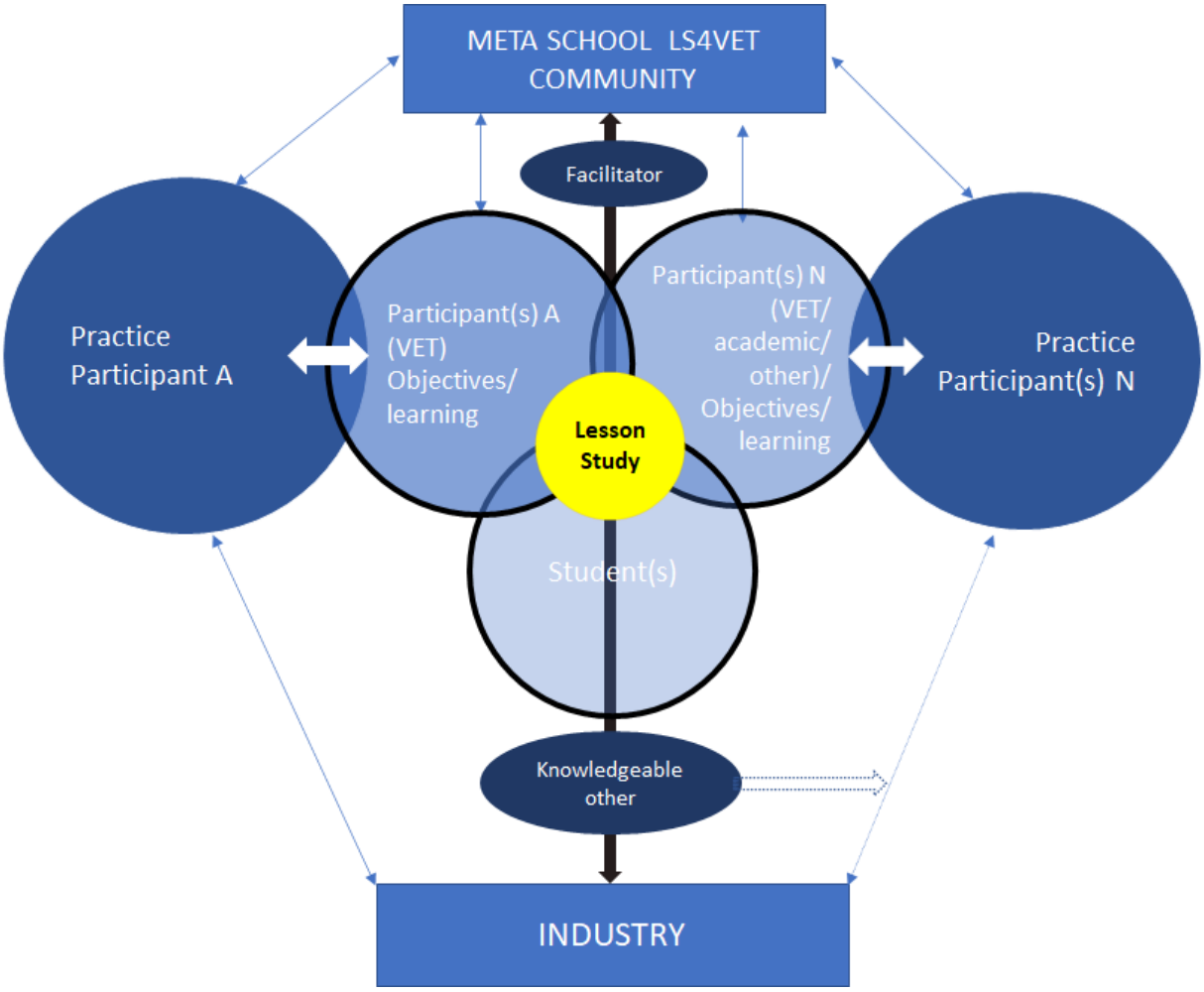


Figure 2. LS4VET model

Below the elements of the LS4VET model and their contribution to achieving its objectives are described.

4.4.1 LESSON STUDY

Lesson Study itself is a boundary object. Within the Lesson Study, the students, participants, and elements of their practices are present. The Lesson Study affords opportunities for the transformation of 'conflicts' between the students, participants, and their practices into a rich zone of learning. Engeström (2001) refers to the kind of learning that takes place in this process as 'expansive learning' (p. 137). Expansive learning, according to him, is typically triggered by existing practices being questioned rather than by any given learning task (see also Engeström, 1999). Within Lesson Study for

VET, new practices are introduced from one actor to another. These insights lead to the creation of new teacher practices that enhance student learning.

4.4.2 THE META SCHOOL LS4VET COMMUNITY

A VET-institute that is working with Lesson Study should build on a Meta school LS4VET community. This community does not only describe a clear vision for LS4VET, it also explains what LS should specifically deliver to teachers and students. The LS4VET Community establishes ground rules around facilitation, time, and resources. Moreover, it ensures that they are complied with. Finally, the LS4VET Community establishes clear communication around all these topics inside and outside the LS4VET Community.

In addition, it is important that prior to starting the Lesson Study cycle, the community is contacted by the facilitator or initiator, to be informed and to secure facilitation, time, and resources. At the end of the Lesson Study cycle, the findings are shared in the LS4VET community and are communicated outside the LS4VET Community.

Teacher leaders are important participants of the Lesson Study. They have an important role as a driving force in Lesson Study and mobilizing colleagues. They could contribute a lot to facilitating the pre-conditions as mentioned in section 4.3 of this report.

We also envision that key actors from the practices of the participants are part of this community, such as team leaders, principals, educationalists, professionals from industry etc. These actors play an important role in supporting the participants.

Because there is always a link with the context of the occupation in LS4VET, the LS4VET Meta School community and the Industry are connected. For example, Lesson Study is the centre of the model (Figure 2), this is where the LS4VET community and the Industry ‘meet’; what is learned in the Lesson Studies ideally spreads within the LS4VET community and Industry; of course, this also applies the other way around, what is learnt in Industry will 'spread' in the Lesson Study.

4.4.3 THE FACILITATOR

The facilitator has a bridge function between LS itself and the LS4VET community. He/she is well aware of the vision, established by the LS4VET Meta School Community, knows what is needed around facilitation (knows the rules drawn up by the LS4VET meta school community in this regard) and ensures that the facilitation takes place. In addition, the facilitator knows the LS4VET cycle and can professionally guide the participants in each of the steps. Given the complexity of the VET system (e.g. the heterogeneity of the teachers, the context of the profession and the intensified role of the student), it seems important to attract an insider who can fully focus on his/her task and therefore does not have a dual role. However, given the fact that the context of a Lesson Study can be very diverse, this is not a hard requirement. Next to that the facilitator is preferably familiar with the VET system.

4.4.4 THE KNOWLEDGEABLE OTHER

The knowledgeable other fulfils (where possible) an important role between the LS and industry. The knowledge that a knowledgeable other brings will always have to be seen in the light of VET pedagogy or the vocational domain. A knowledgeable other can be from industry, from the educational field or from both sites. Since a (large) number of VET-teachers also work within the context of occupation/vocational domain, industry can then be part of a participant's practice directly. An industrial expert can reflect on the industrial meaning of the pedagogical goals and findings, and by this role, he or she can modify e.g. the pedagogical plans of the research lesson. He or she could also

bring practical as well as tacit knowledge to the LS. But since Lesson Study is primarily about student and teacher learning, an academic expert with up-to-date content knowledge and knowledge about VET pedagogy and didactics is highly recommended in LS4VET.

4.4.5 INDUSTRY

Industry has a special connection with Lesson Studies. After all, the students' learning and - by extension - the curriculum (and the lesson as a central part of this) must be geared to the changing context of occupation/vocational domains. Therefore, within LS4VET, the industry could be integrated in the process.

As said before, the industry is connected to Lesson Study through the students, knowledgeable others, or participants and it is connected - through the Lesson Study - with the LS4VET Community. The industry can therefore benefit from the insights that are gained through Lesson Study. Industry based knowledgeable others could, for example, gather new insight into their vocation or teaching their own current staff.

4.4.6 THE PRACTICES OF PARTICIPANTS

All participants bring their own practices to the Lesson Study. Each of the practices have their own rules (about designing and teaching), divisions of labour (roles of actors) and tools (learning materials, teaching formats etc.) and influence the way that participants conduct the Lesson Study. As mentioned before, these differences in practices can lead to opportunities of learning. Therefore, it is important to think carefully about composing LS4VET teams - when it comes to differences in practices - and inviting other actors (like knowledgeable others) to optimize the learning efficiency. Not only for the participants, but also for the professional contexts they come from.

It is not only the team composition that is important for the learning efficiency and the extent to which pedagogy becomes adaptive. Attention is also needed for the team leaders. They have an important role in supporting the participants and in monitoring compliance with the agreements as they are drawn up in the LS4VET Community.

4.4.7 THE PARTICIPANTS

The participants are the 'brokers' (Wenger 1998; in Tsui 2007) between the practice and the Lesson Study. They bring their own rules, divisions of labour and tools and influence the way other participants conduct the Lesson Study. Participants therefore need the capability to cross boundaries and resolve contradictions with members of diverse practices.

The Lesson Study generates a common objective for the participants: adaptive VET-pedagogy through inquiry, collaboration and learning and anchoring what is learned in their own and others' practices (sustainability).

Participant A and Participant(s) N work and learn together through systematically analysing students' learning and adapting their pedagogy. Participant A is ideally a VET-subject-teacher - to ensure the connection with the industry - and Participant(s) N is an (are) other participant(s) in the LS-cycle. Participant N:

- could be one or more teachers (also VET or Academic) from his/her team;
- or one or more teachers from a different teacher team, within or across the VET-institution, or from another VET-institution, or from the industry;
- could also be a knowledgeable other. This is only the case when a teacher chooses to individually go through the LS-cycle.

4.4.8 THE STUDENT(S)

In the LS4VET model, engagement of students is guaranteed; participants learn from the student's learning (n.b. how can they apply adaptive pedagogy in such a way that the student learns what he/she should learn) and vice versa. It's important to engage students in a systematic way (see Norwich et al., 2014) through asking for their feedback about learning difficulties or barriers and through giving them feedback about their progress.

When we look at the possibilities within the LS cycle for students to systematically give feedback, it is important to consider that teachers inevitably have far broader and more informed knowledge of subject content, didactics, and pedagogy than students (Jaworski, 2001; Jaworski & Huang, 2014). Teachers might thus be expected to understand the intentions and placing of particular activities more fully. However, the role of feedback in Lesson Study is two-directional (Hattie and Timperley, 2007) and feedback is given and received by either, students and teachers:

- "Feed-up", as the comparison of the actual learning status with a target status, provides information to students about the learning goals to be accomplished.
- "Feed-back", as the comparison of the actual learning outcomes with previous achievement, provides information to students and teachers about what has been accomplished relative to some expected standard or prior performance. For teachers and learners, the discovery of the learning gap is relevant in guiding future teaching and learning.
- "Feed-forward", as the explanation of the (new) target goal based on the actual learning status provides information to students and teachers which can lead to an adaption of teaching and learning in the form of varied challenges, adaptive self-regulation over the learning process, personalised strategies in accomplishing activities, and more information about what needs to be understood in the future.

Students' input in all three cases should be seen less as a source of concrete suggestions that might be acted upon directly, but more as a source of challenge to teacher ideas from the perspective of the learner. It is up to the teachers when to intensify student involvement in the LS or to decrease student involvement. Teachers can choose to involve the students less intensively in the parts of the cycle in which informed knowledge of subject content, didactics, or pedagogy are called upon, and when they feel that students are not ready to provide input on this because they lack experience. In other cases, teachers can intensify students in these phases, when students are involved in an internship. These students ideally have a connection with the industry because they may be in an internship/apprenticeship at the time of the LS (in whatever capacity) or because they are being trained for a specific occupation. Their "feed-up" about workplace requirements, use of (innovative) strategies and equipment are important parameters in planning LS research lessons in VET which may create impact on the students' actual practice in industry. Moreover, their reports about direct implementation of learning through LS in the industry create "feed-back" for the adaptation of research lessons. Teachers can also involve students more actively at the times when the teachers' perspective can be broadened through feedback given by the students about their learning. The research phase and the discussion therefore seem to be ideal moments to involve the students, for example by interviewing them, while observation during the research lesson creates student feedback that is subject of analysis and interpretation afterwards.

4.5 LS4VET CYCLE AND THE TWO LEVELS OF LS4VET IMPLEMENTATION

4.5.1 LS4VET CYCLE

As mentioned in paragraph 2.3.5., Lesson Study consists of repeated iterative research lesson cycles. After the lesson has been observed and students have been heard (e.g., in interviews), adjustments are made on the basis of reflection, after which the cycle continues. In theory, this can go on indefinitely. It is very conceivable that a Lesson Study team will choose a new focus after a number of repetitions. But the basis of Lesson Study is this continuous search for an ever better understanding of the students' learning processes. Therefore, Lesson Study is not intended as a one-off intervention, but as a structural method for professionalisation.

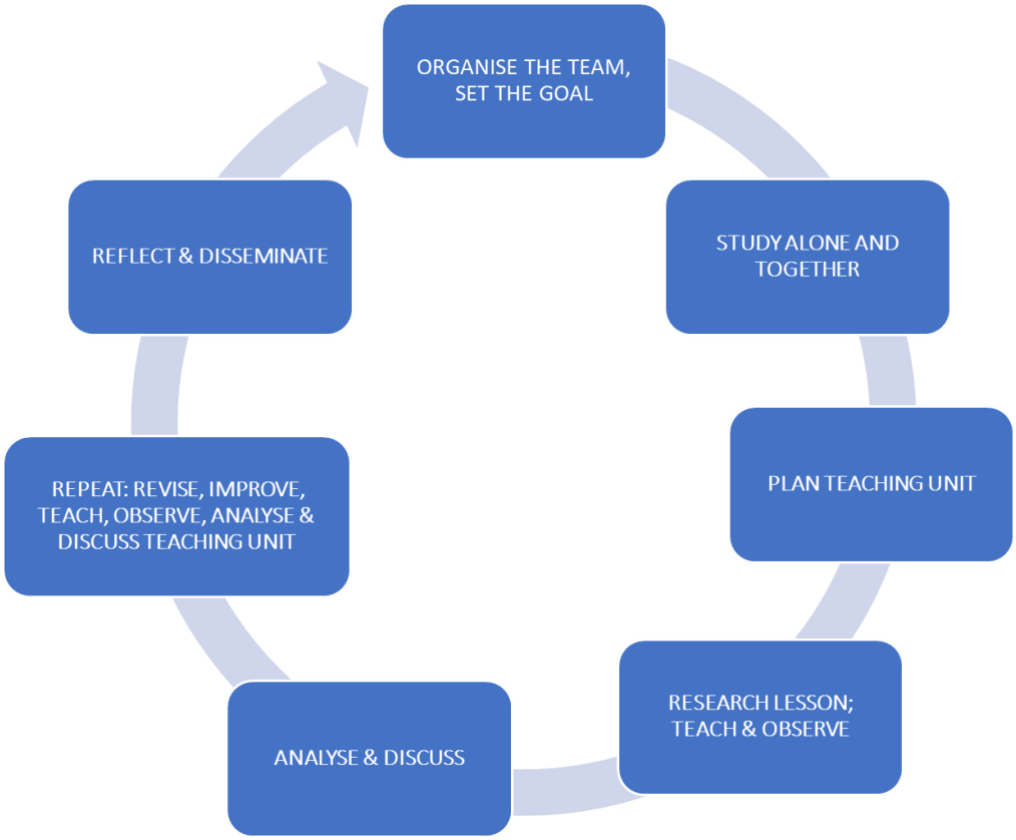


Figure 3. The LS4VET cycle

4.6 TWO LEVELS OF LS4VET IMPLEMENTATION

We also mentioned that our LS4VET Model aims to support the sustained use of LS as an approach to teacher continuous professional development and therefore it involves school-level activities that require the collaboration of teachers and school leaders. Leaders need to understand and appreciate LS and, in collaboration with teachers involved in LS in the Meta School LS4VET community, provide the organisational and logistical support needed for LS to become an organizational routine. Therefore, we formulated, next to the seven LS4VET steps of LS, important actions to be taken at the level of the school organisation.

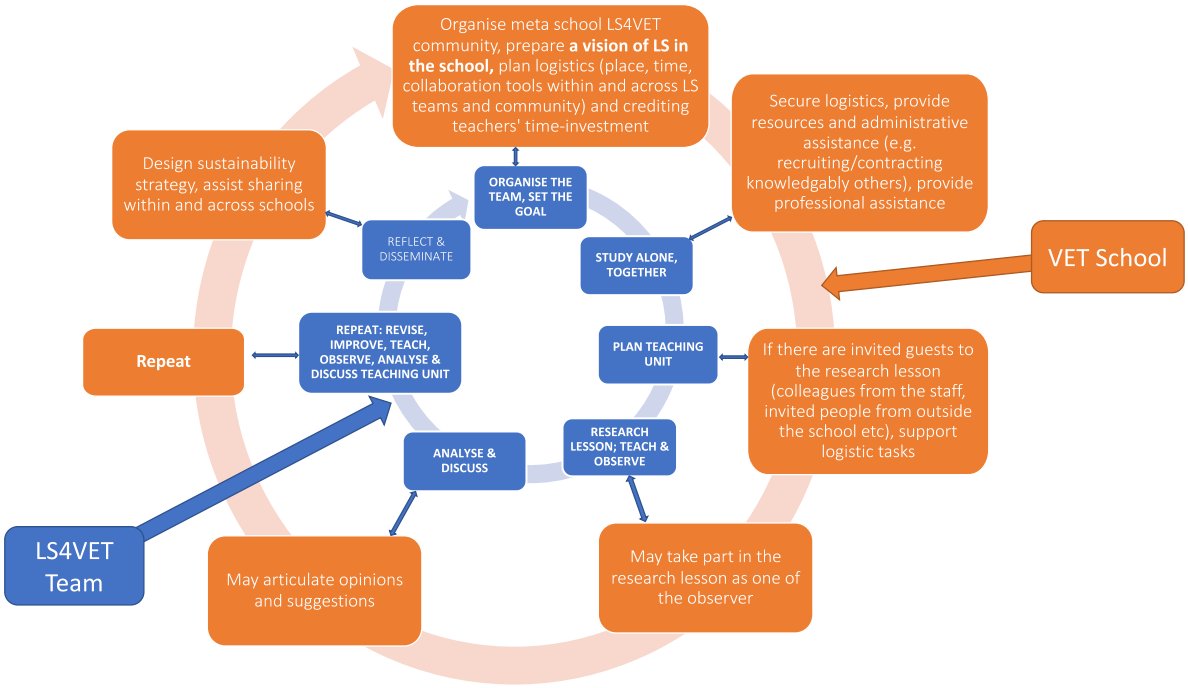


Figure 4. Two types of LS4VET implementation. Inner circle represents the level of the Lesson Study team. Outer circle represents the organisational level.

4.7 TO CONCLUDE

All activities in this project have been aimed at developing a model which provides a theoretical framework and guidelines for the adaptation of Lesson Study to the special context of vocational education and training (VET). The LS4VET model was developed based on an ecological system thinking that conceptualises the interconnections and interplay between the various levels of factors relevant to this adaptation as described in Figure 5.

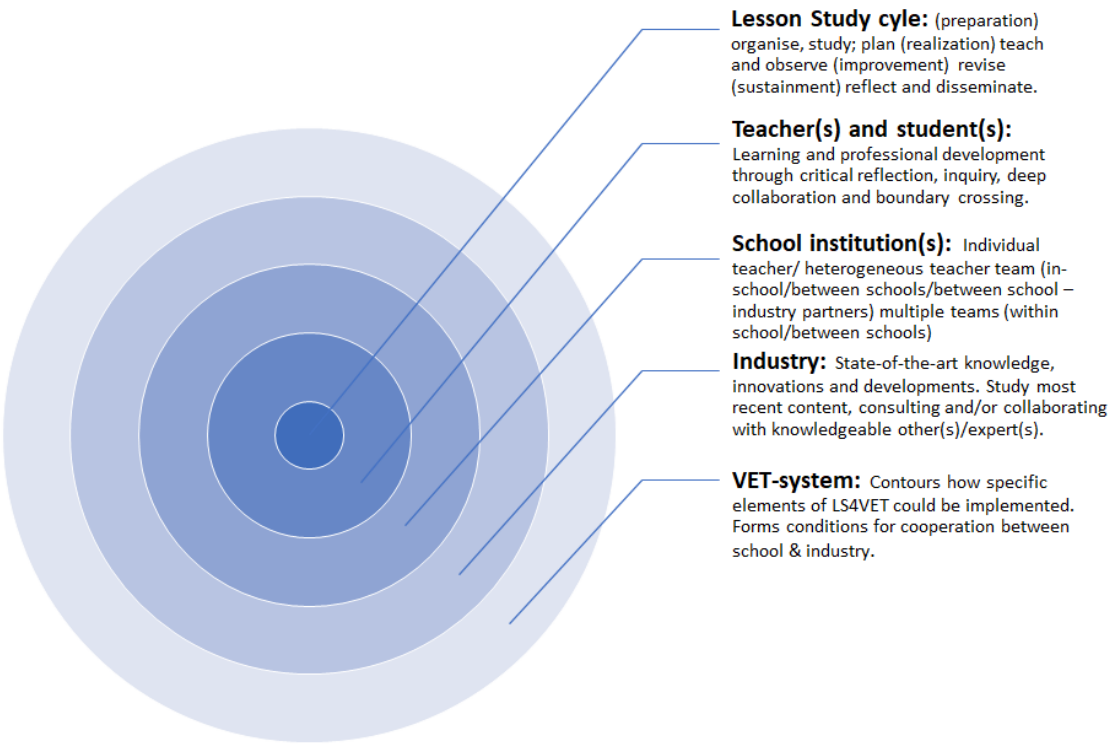


Figure 5. Interplay between factors in LS4VET

The main features of our adaptation of the Lesson Study approach to VET are:

- the LS4VET Model focuses on enhancing the quality of VET and developing adaptive VET teachers through inquiry by involving in the LS4VET team teachers of vocational subjects and general education and by inviting knowledgeable others from the academic context and/or from industry
- the LS4VET Model exploits the learning potential inherent in the heterogeneity of VET teachers (and the apparent difficulty of there being only one teacher of a specific vocational subject, which is not rare in VET schools, depending on school size and school profile) by involving in the LS4VET team teachers of different subjects and from different teams, thus enabling the various learning mechanisms emerging through their boundary crossing and in listening to student voice throughout the process;
- the LS4VET Model explicitly aims to enhance its sustainable use in VET schools by highlighting the importance of organisational development and learning related to its introduction and sustained implementation and suggesting the creation of a meta school Lesson Study community.

Further in the project, this model is used to develop an e-learning course about how exactly one could organize and implement LS within LS4VET. Also, the LS4VET cycle will be further and detailed described by means of a storyboard and an e-Book. Within these materials there will be specific attention for the LS-cycle within the LS4VET-model and the different steps within this cycle.

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