LS4VET

Lesson Study for VET

Teachers' Collaboration
for Improving the Quality of
Vocational Education and Training
2020-2023

LESSON STUDY FOR VOCATIONAL EDUCATION & TRAINING

GOALS AND OUTCOMES OF THE ADAPTATION
OF LESSON STUDY TO THE VET SECTOR
IN THE LS4VET ERASMUS+ PROJECT (2020-2023)

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TABLE OF CONTENTS

LS4VET TERMS AND ABBREVIATIONS

KO: knowledgeable other

LS: Lesson Study

LS4VET: Lesson Study for VET

MSC: meta-school community

VET: vocational education and training

VET teacher: anyone teaching students in a VET school

general subject teacher: a teacher teaching general (academic) subjects (e.g. maths, foreign languages, history etc.) in a VET school

vocational teacher: a teacher (in some countries called trainer/instructor) teaching a vocational theoretical or a practical subject in a VET school

INTRODUCTION

This publication is the final "intellectual outcome" of the LS4VET Erasmus+ project (2020-2023, 2020-1-HU01-KA202-078848). It provides a broad overview of the drivers, main objectives and outcomes of the adaptation of Lesson Study as an approach to teacher professional development to the sector of vocational education and training (VET). This adaptation, the development and piloting of the LS4VET Model and of the LS4VET course that prepares VET teachers to do LS were carried out in the international collaboration of universities, teacher educators and VET schools from four European countries: Austria, Hungary, Malta and the Netherlands. This ebook was designed and written with the intention to address a diverse target group, including VET teachers, VET school leaders, VET decision- and policy-makers at various (school, region, country) levels as well as researchers and teacher educators, whose common interest is to learn more about Lesson Study in VET, although they might be interested in slightly different aspects of our work. In this Introduction we therefore summarise the main goals and content of the following five chapters of this ebook to assist the reader to easily locate and find the information that might be most relevant and useful for them.

Chapter 1 presents the rationale, the theoretical background, and the goals and principles of the LS4VET Model, which defined the framework for our adaptation. It includes an edited version of the final report (Khaled et al., 2021) of the project's first intellectual outcome, the model of Lesson Study for VET, which was developed on the basis of professional discussions, desk research and extensive data collection carried out by the LS4VET partnership (Bükki & Győri, 2021; Calleja et al., 2021; Mewald et al., 2021). This chapter might be most interesting for researchers and those interested in the rationale and theory behind the adaptation of Lesson Study to VET.

Chapter 2 includes descriptions of the LS4VET course as it was adapted to and implemented in the four partner countries (Austria, Hungary, Malta and the Netherlands). The LS4VET curriculum and content of its three mandatory and two optional modules were developed by the university/teacher educator partners and piloted by small teams of VET teachers from the VET school partners in each partner country. The national versions of the learning content of the LS4VET course are published in four ebooks (Dutch, German, Hungarian and English for Malta), available from the project website (https://ls4vet.itstudy.hu/). In this ebook we describe how the national courses were adapted to local needs and circumstances and the format in which they were delivered. This chapter might be of most interest to teacher educators and those interested in how and in what formats LS for VET can be taught and learnt and how the LS4VET curriculum and modules can be adapted and used.

Chapter 3 involves two selected case stories from each partner country, mostly written by the LS4VET teams themselves, based on a common template designed by the LS4VET partnership. We asked the LS4VET teams to describe the context, goals, processes and findings of the Lesson Studies they carried out as part of their learning in the LS4VET course. The case stories include participating VET teachers' reflections about the learning outcomes of their Lesson Studies, not only for their students but also for themselves. We believe these case stories will be very interesting and useful to anyone who wants to learn how Lesson Study in VET works in practice and what benefits it can provide to students and teachers alike.

Chapter 4 presents country analyses of the experiences of Lesson Studies carried out in each partner country, followed by a brief comparison of the similarities and differences across these four countries. Each country report begins with a short description of its VET system that describes the context for the following analyses as well as the country-specific policy recommendations in Chapter 5. The analyses are structured around the three main goals of the LS4VET Model: (1) Developing adaptive teachers through inquiry, related to which we analyse the rationale and nature of the research goals adopted set by the LS4VET teams; (2) Cross-boundary collaboration and learning, where we examine the LS4VET

teams' composition, collaboration within the teams and with knowledgeable others, and the learning resulting from their boundary crossings; and finally, (3) Sustainability, related to which we explore the participating VET teachers' intentions and measures for continuing to do Lesson Studies. This chapter might be most interesting and useful for researchers, teacher educators and those who want to learn more about the main features of Lesson Study in VET as carried out within the framework of this project.

Finally, **Chapter 5** offers policy recommendations by the LS4VET partners addressed to various levels of policy-makers (school, region and country). The country-specific recommendations summarise the significant opportunities for and major challenges of doing Lesson Study in VET and recommend tools and measures to promote and support LS in VET schools in each partner country. This chapter will therefore be most useful and interesting for school leaders and those responsible for regulating and supporting the professional development of VET teachers.

We hope this publication will provide useful information as well as encouragement for all with a stake in vocational education and training who want to learn more about Lesson Study and contribute to the wider use of this excellent tool of teacher professional development and education quality improvement in VET.

1. THE LS4VET MODEL

This chapter presents the LS4VET Model that was developed as the first intellectual outcome (IO) of the Erasmus+ LS4VET project. A slightly edited version of the LS4VET IO1 final report (Khaled et al, 2021) is re-published here.

The LS4VET Model aimed to provide the theoretical framework and 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). It guided the development of the LS4VET curriculum and learning materials to prepare VET teachers to implement Lesson Studies in their VET schools (see chapter 2).

The LS4VET model was designed by the LS4VET partnership based on extensive data collection in the four partner countries (Austria, Hungary, Malta and the Netherlands), including

(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 organisations (Mewald et al., 2021);

(2) an interview study and comparative analysis of the special VET-specific national (VET system,) organisational (VET school) and individual (teacher/trainer) level factors relevant to the adaptation of LS to VET (Bükki & Győri, 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).

This chapter consists of three main sections. First, in chapter 1.1 we describe the need for pedagogical change and adaptive teachers in VET and how this need can be fulfilled by enhancing VET teachers' collaboration. Next, in chapter 1.2, we summarise aspects that drove the adaptation of LS to the context of VET. Finally, in chapter 1.3, we present in detail the LS4VET model.

1.1 MEETING THE NEED FOR PEDAGOGICAL CHANGE AND ADAPTIVE TEACHERS IN VET THROUGH ENHANCING VET TEACHERS' COLLABORATION

1.1.1 THE NEED FOR PEDAGOGICAL CHANGE AND ADAPTIVE TEACHERS IN VET

In the 21st century, vocational education and training has to 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].

[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

VET teachers' professional development is important not only in terms of maintaining their industry currency but also in regard to improving their teaching skills. Traditional, teacher-centred pedagogies have been widely criticised 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, and 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, 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 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). As a result, the 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 the aforementioned 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 their 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 might differ significantly 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 optimise the learning process for each student, tailored both to the student's

[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).

[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".

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 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 through 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, the involvement of all actors and stakeholders should be valued, students' involvement none the least.

1.1.2 TEACHER COLLABORATION IN VET

Professional Development (PD) programs could certainly contribute to developing adaptive teachers. Specifically, there is a need for PD which effectively builds pedagogical content knowledge through active, responsive, and situated learning and which is collaborative in nature with the effect of teachers working together and sharing successes and problems they encounter (Parsons et al., 2016). Collaboration can help teachers develop 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": the former involves a deeper level of cooperation and more interdependence among 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, to be effective, collaboration has to be meaningful for teachers (Little, 1990; Kelchtermanns, 2006). The strength of teacher Professional Learning Communities (PLCs), within and across schools, lies in their focus on collective, goal-driven professional development activities, routine collaboration among teachers for 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.

1.1.3 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 a strong need to introduce systematic approaches to, and opportunities for, the initial and continuous professional development of VET teachers. VET teachers need to continuously improve not only their vocation-specific competences, but also their pedagogical-methodological skills. Lesson Study (LS) has been the primary form of teacher professional development in primary schools in Japan for a hundred years, and since the end of the 1990s, its use has been spreading all around the world, extending also to other sectors of education. However, while the use of LS 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, whereas that would be necessary to ensure its proper adaptation for VET.

Behind the Lesson Study method we can identify 5 core concepts – in 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.

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 their students' learning and, in the process, teachers perform research focusing on their own teaching practice. This means that LS teams identify challenges in teaching and they design and research lessons related to this challenge within their own subject and their own students. Therefore, generic lessons are not aimed at as an output of LS. The participants in an LS team specifically take their own context as a starting point so that they can also fully utilise all context-specific knowledge within the team.

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.

LS is about learning from students' learning

LS 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.

LS is a collaborative effort of teachers with each other and with knowledgeable others

LS is a team activity of teachers with knowledgeable others. The seven core activities of LS 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.

LS requires iterative cycles of research lessons

An important starting point for LS 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 of practice, which enables them to develop professionally through mutual reflectivity and creative as well as innovative thinking.

LS teams primarily aim to improve the participating teachers' teaching practises 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 in order 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, 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, a collaborative teacher professional development approach, originated in Japan since the 19th century (Sarkar Arani, Keisuke & Lassegard, 2010). We conceptualise Lesson Study as a complex activity of teachers, when they follow certain steps in a cycle of activities, as they learn about, do research on and develop (L&R&D) certain aspects of their classroom activities (Stigler & Hiebert, 1999). While in an LS cycle teachers learn about certain topics in education, collaborate, and 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 LS models include four stages that an LS team goes through in an iterative way: preparation, realisation, improvement and sustainment. Within this seven steps can be distinguished, which follow each other in the same order in every LS cycle:

1. teachers **organise** an LS team with pedagogical goal(s) to improve their teaching activity
2. they **study** the relevant literature, consult with knowledgeable other(s) on the topic, and refine the goal(s) of the LS research lesson/teaching unit
3. focusing on the goal(s), they collaboratively **plan** an LS 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/teaching unit

5. based on the observation of the LS research lesson/teaching unit and interviews with the case students or the whole class about their learning experience, they **analyse and discuss** their results

6. **repeat**: revise, improve, teach, observe and analyze new version(s) of LS research lesson/teaching unit, therefore steps 3-6 might be repeated in a cyclical LS process

7. **reflect** and **disseminate** their reflections on the LS process and results

These 7 steps can be organised into the 4 stages as follows:

A. PREPARATION of LS research lesson/sequence (steps 1-2-3) /organise; study; plan/

B. REALISATION of LS research lesson/sequence (4) /teach/

C. IMPROVEMENT of the LS research lesson/sequence (5-6) /analyze; repeat/

D. SUSTAINMENT of LS (7) /disseminate/

1.1.4 THE ADAPTATION OF LESSON STUDY TO VET

The LS4VET project applied the Japanese LS model in a new sector of education: vocational education and training (VET). Since the Japanese Lesson Study was first 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 levels of adaptation: some adaptations affect the 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 the "learning study" (Lo, 2019), but the Chinese centralised training approach can be also conceptualised 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 themselves sometimes 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 characterised by very special adaptation processes. Perhaps the most peculiar of these is the Kazakhstani example (Kanayeva, 2019; Khokhotva, 2018), where LS was introduced nationwide, in a centralised, top down way.

We draw on the different versions of LS-based teacher professional development 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 LS 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 Japanese LS 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 had to pay attention to the application of LS to the very special needs of VET, but at the same time, we needed 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.

1.2 ASPECTS THAT DRIVE THE ADAPTATION OF LS TO THE CONTEXT OF VET

This chapter summarises the most important insights gained from the previous activities of the LS4VET project (Bükki & Győri, 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 (LS) 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 organisational conditions specific to VET and to the partner schools. The following insights gained from the previous LS4VET project activities had to be considered when designing the LS4VET Model.

1.2.1 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 among 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 facilitators had to be reconsidered.

1.2.2 VARIETY IN TYPES OF LESSONS IN VET

Although there is considerable variety in the organisation of education across the LS4VET partner countries, all four countries mention the following types of lessons: a) (theoretical) lessons organised 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 had to leave room to use these different teaching methods and contexts as a research lesson.

1.2.3 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 teaching methods and teacher professionalization should be in line with this. VET teachers often indicate that the changing labour market is one of the most important motivations for them to continue their professional 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, and 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 take into account the link with the vocational domains. In other words, this link had to be part of the model.

1.2.4 HETEROGENEITY

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

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.

Heterogeneity of teams

Teacher teams are formed based on different logic 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 optimise 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.

1.2.5 TEACHERS' DEEPER COLLABORATION IS RARE

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 was therefore important to pay attention to the implementation and sustainability of LS4VET in the organization.

1.3 DESCRIPTION OF THE LS4VET MODEL

The aforementioned five 'big ideas' as working ingredients of Lesson Study (LS, adapted from Goei et al., 2021) are central to LS, 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 discussed above, we added 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 teachers' 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 the 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 (see Figure 1):

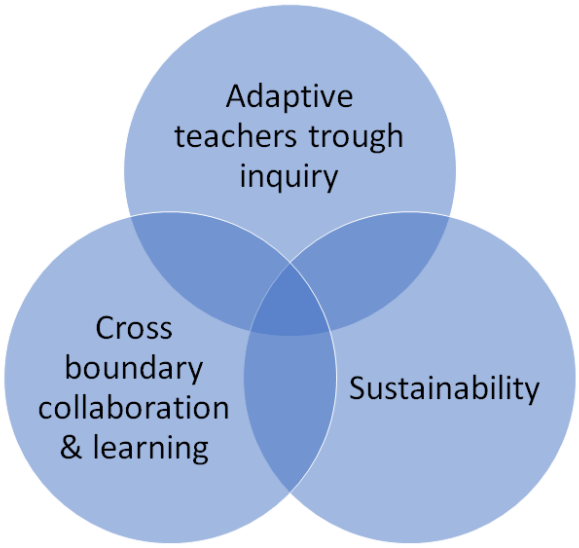
1. **Developing adaptive teachers through inquiry** – involves the skill of teachers to deal with unexpected and novel situations. The inquiry component should feature in all stages of the teacher education continuum. We see this as the foundation and starting point for engaging teachers in Lesson Study.

2. **Cross-boundary collaboration and learning** - involves all stakeholders (students, teachers, LS 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 LS becomes a sustainable process within the VET institution and possibly beyond. Lesson Study in VET should include aspects of how this sustainability may be attained among participants and actors.

Figure 1. *Objectives of the LS4VET Model*



1.3.1 OBJECTIVE 1: DEVELOP ADAPTIVE TEACHERS THROUGH INQUIRY

In chapter 1.1 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, and routinely, until something happens to them that requires improvement.

Several review studies show that the 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 focused 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 and critical reflection on teaching experiences for knowledge transformation and integration about student learning (Wallin et al., 2019).

1.3.2 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 LS, due to the heterogeneity of teachers and 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 LS, a deepening of learning could be achieved, for all parties involved. Wenger stated (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 artefact 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 cooperation among teachers (and teams, institutions, universities, industry and education), it is therefore important to optimise the competences 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, which involves the questioning of own and others' core identities, and the mutual complementarity of different practices; it leads to insights into what the diverse practices concern;

2) coordination, which 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, which contains perspective-making and -taking; people come "to realise and explicate differences between practices and thus to learn something new about their own and others' practices" (Akkerman & Bakker, 2011, p. 144.); and

4) transformation, which 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 used for formulating teachers' learning from collaboration and the needed competencies.

It is important to mention that in addition to strengthening teachers' boundary crossing competences, attention should also be paid to the role of the knowledgeable other, who must have insight into the 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 an LS in VET (LS4VET) based on the principles of boundary crossing:

- teachers can learn to collaborate, not only within their usual team but across teams and with stakeholders from the 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; and
- collaboration and outcomes of the LS could be more sustainable.

1.3.3 OBJECTIVE 3: SUSTAINED USE OF LS4VET BY TEACHERS AND SCHOOLS

Sustainability with regards to Lesson Study 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 an LS, which thus concerns the effectiveness of LS as a teacher continuous professional development (CPD) method; or

(2) the sustainability of using LS 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 in teachers' motivation to keep engaging in LS. The key characteristics of LS that contribute to its effectiveness as a CPD method were discussed above. In developing our model we focused on the latter (2) understanding of sustainability, and we aimed to develop the LS4VET model so that it would involve features that enhance its sustained use by teachers and schools.

Although relatively few studies focused on designing and supporting LS for sustainability (Druken, 2015), the available literature suggests that the use of LS 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 organisation routine.

Teachers' motivation to engage in and then keep doing LS is influenced by some general (not LS-related) 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, Yoshida, 2012, Wolthuis et al., 2020).

After they have engaged in LS, teachers' perception of its usefulness or "meaningfulness" is shaped by what 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 (Wolthuis et al., 2020a, Akiba & Wilkinson, 2014, 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) confirm Watanabe (2018, p. 10) that a key factor for LS 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 include (Mewald & Mürwald, 2019):

- an open discussion of failure, mistakes or uncertainty about 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 LS research lessons; and
- the sharing of leadership by developing teacher confidence in selecting and adapting strategies that drive school development and innovation.

Successful LS 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 LS by developing interpersonal skills, trust, collaboration, and communication. Moreover, LS 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 LS, 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 LS 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 LS, 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);

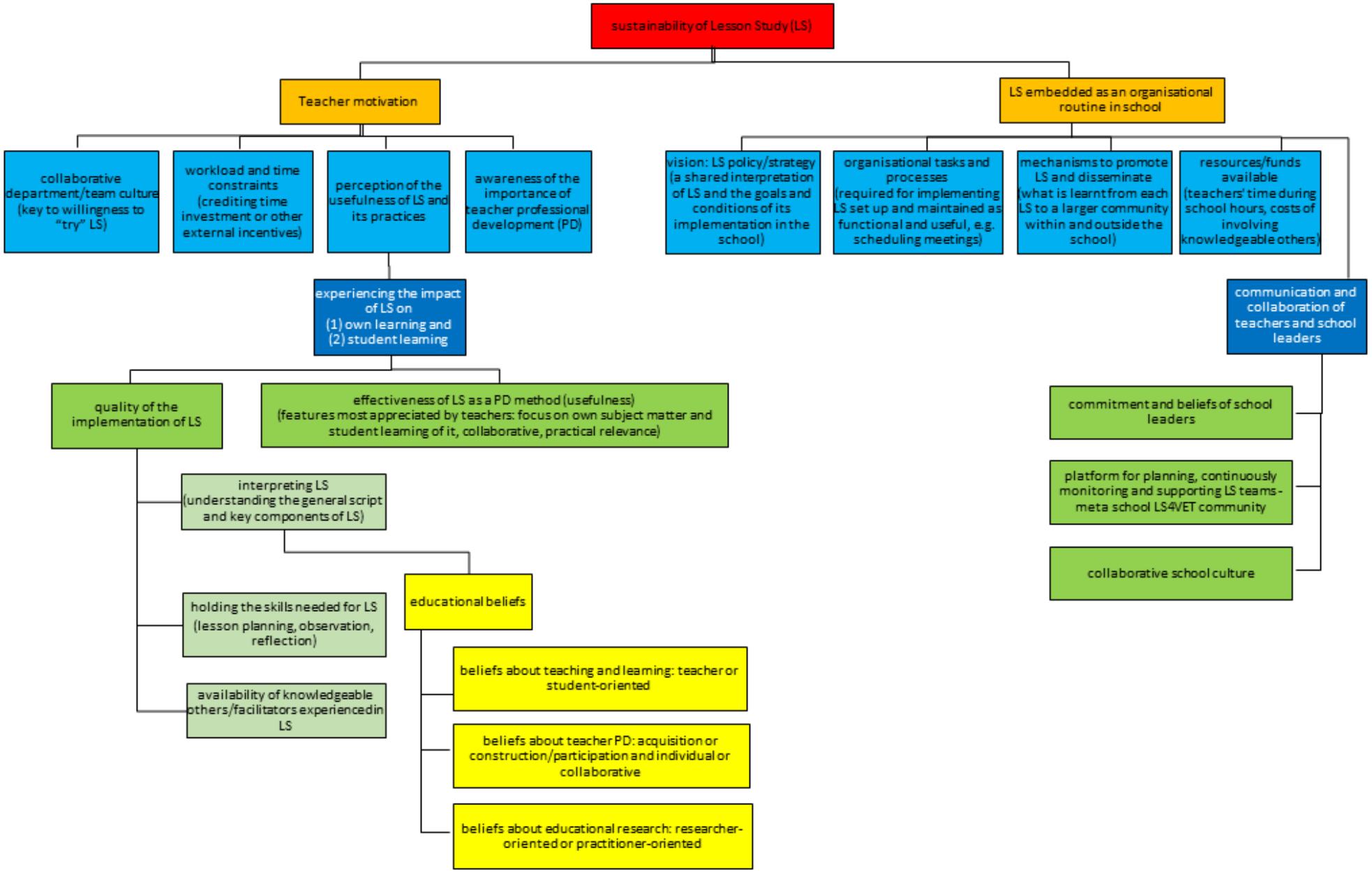
- develop a master plan for the school research; schedule and lead meetings to find strategies to address the school's research theme based on the ideas of the teachers; plan, edit, and publish school research reports (Takahashi & McDougal, 2016, cited by the authors).

To ensure that the organisational preconditions are set up in a way that is functional and useful, Wolthuis et al. 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, well-informed school management and a vision for 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, or the organizational context, which mediates whether leaders can act on their beliefs.

Based on the literature, in Figure 2 we summarized the most important individual and organisational factors of the sustainability of LS that our LS4VET model needed to take into account.

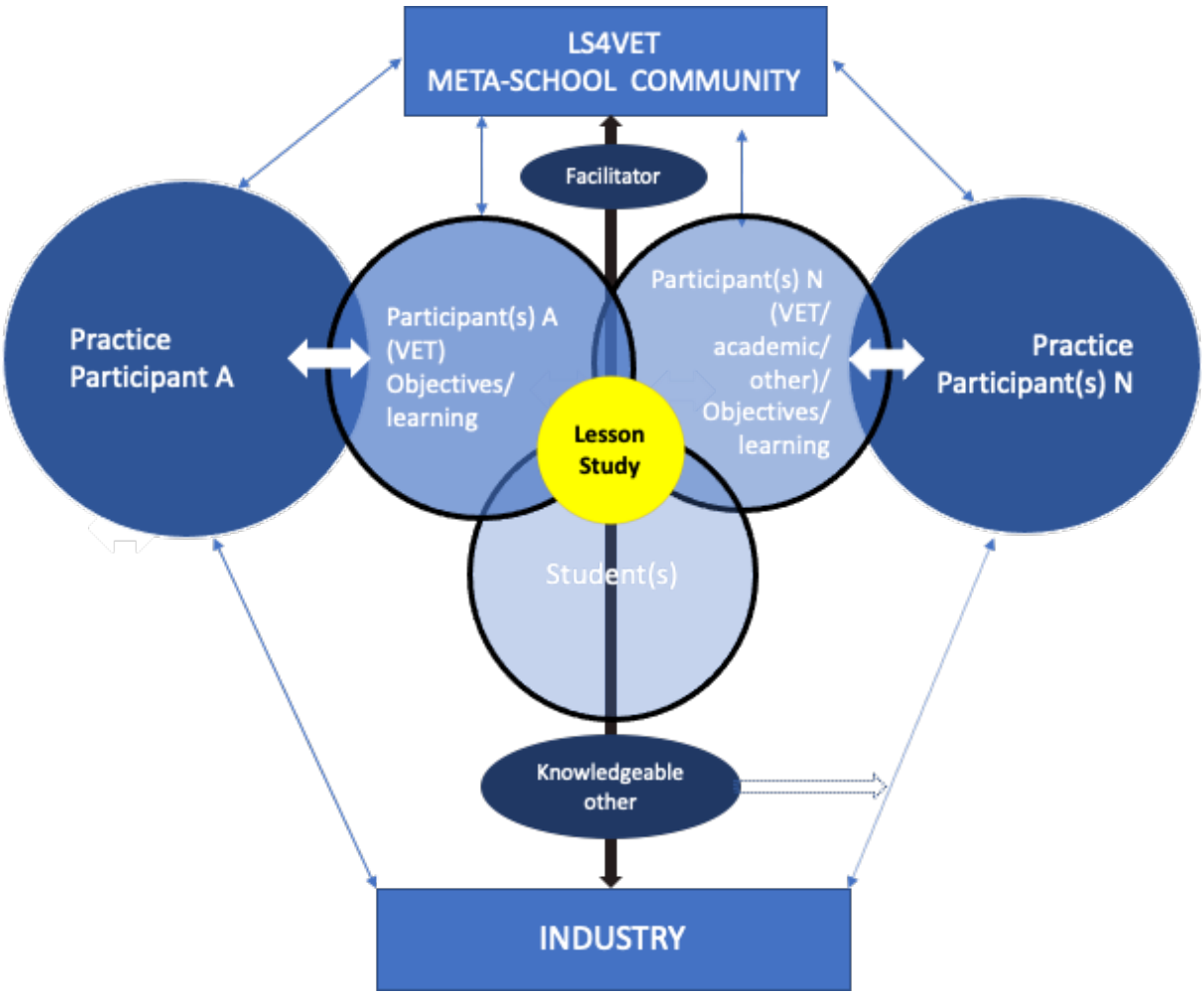
Figure 2. *Key factors of the sustainability of Lesson Study*



1.3.4 THE LS4VET MODEL

The LS4VET model (see Figure 3) 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. 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 a form of PD by teachers and schools.

Figure 3. *The LS4VET model*



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

Lesson Study

LS itself is a boundary object. Within the LS, the students, participants, and elements of their practices are present. The LS affords opportunities for the transformation of 'conflicts' among 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.

The LS4VET meta-school community

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

In addition, it is important that prior to starting a 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 MSC and are communicated outside the community.

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 the industry etc. These actors play an important role in supporting LS participants.

Teacher leaders are important participants of LS. They have an important role as a driving force in LS and mobilizing colleagues. They could contribute substantially to facilitating the pre-conditions as mentioned in chapter 1.3.3 of this report.

Because in LS4VET there is always a link with the context of the vocation being taught, the LS4VET Meta school community and the Industry are connected. LS is the centre of the model (see Figure 3), this is where the LS4VET community and the Industry ‘meet’; what is learned in the Lesson Studies ideally spreads within the MSC and Industry; of course, this also applies the other way around, what is learnt in the Industry will 'spread' in the Lesson Study.

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 LS can vary to a great extent, this is not a hard requirement. Next to that, the facilitator is preferably familiar with the VET system.

The knowledgeable other

The knowledgeable other (KO) fulfils (where possible) an important role between the LS and the 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 in the occupation/vocational domain, industry can then be part of an LS 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 LS 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.

Industry

Industry has a special connection with LS4VET. 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 mentioned before, the industry is connected to LS through students, knowledgeable others, and/or participants and it is connected - through the LS - with the LS4VET meta-school 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 about teaching their own current staff.

The practices of participants

All participants bring their own practices to the Lesson Study. Each of the practices has its 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 LS. As mentioned before, these differences in practices can lead to opportunities for 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) in order to optimise 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 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.

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 by systematically analyzing students’ learning and adapting their pedagogy. Participant A is ideally a teacher of a vocational subject with current vocational practice - to ensure connection with the industry - and Participant(s) N is an (are) other participant(s) in the LS-cycle. Participant N:

1. could be one or more teachers from his/her team; or
2. one or more teachers from a different teacher team, within or outside the VET institution;
3. could also be a knowledgeable other. This is only the case when a teacher chooses to individually go through the LS-cycle.

The student(s)

In the LS4VET model, the engagement of students is guaranteed and critically important; 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 is important to engage students in a systematic way (see Norwich et al., 2014) by asking for their feedback about learning difficulties or barriers and by 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 take into account that teachers inevitably have a 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 LS is two-directional (Hattie and Timperley, 2007) and feedback is given and received by either, students and teachers (Mewald, 2020):

- "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.

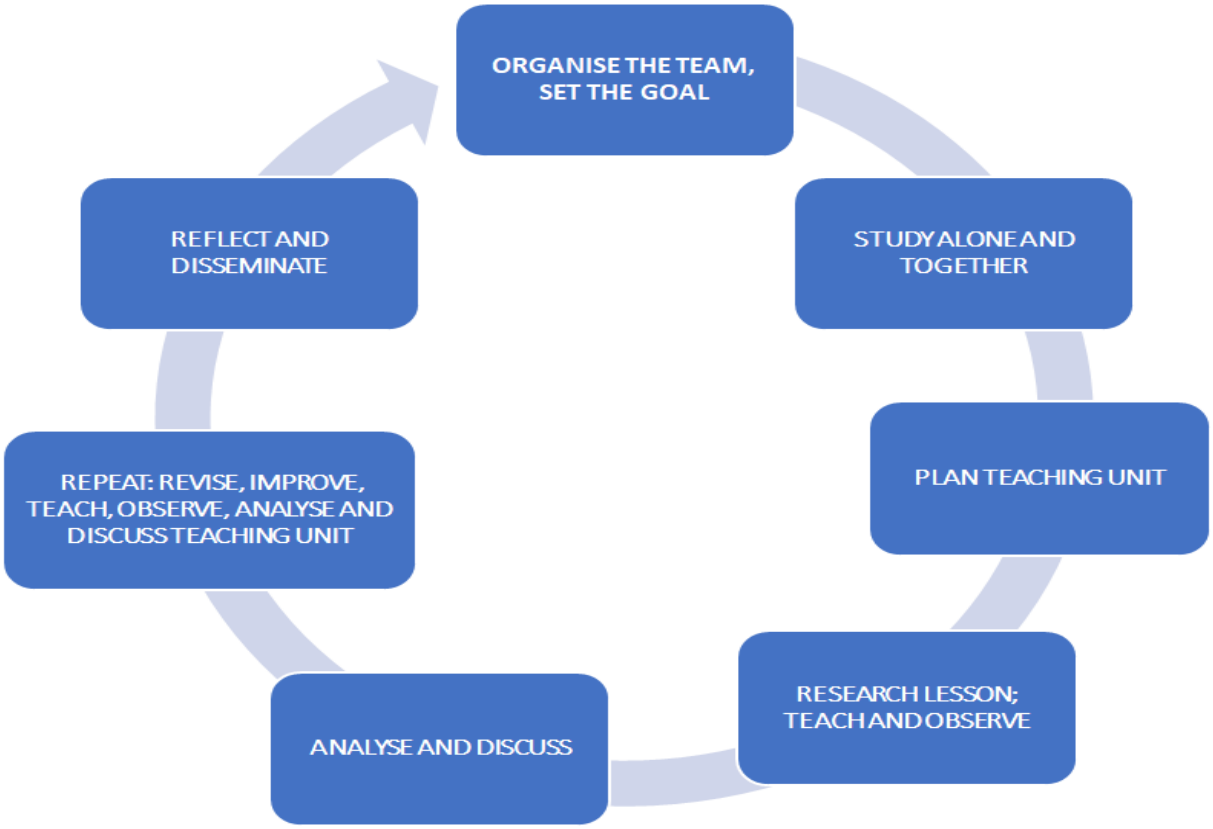
Students' input in all three cases should be seen less as a source of concrete suggestions that might be acted upon directly, but more as a source of challenge to teacher ideas from the perspective of the learner. It is up to the teachers when to intensify student involvement in the LS or to decrease it. 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, and use of (innovative) strategies and equipment are important parameters in planning LS research lessons in VET which may create an impact on the students' actual practice in the industry. Moreover, their reports about the 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 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 the subject of analysis and interpretation afterwards.

1.3.5 LS4VET CYCLE AND THE TWO LEVELS OF LS4VET IMPLEMENTATION

LS4VET cycle

As already mentioned, LS consists of repeated iterative research lesson cycles . After the LS research 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 (see Figure 4). In theory, this can go on indefinitely. It is very conceivable that an LS 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, LS is not intended as a one-off intervention, but as an ongoing structural method for professionalisation.

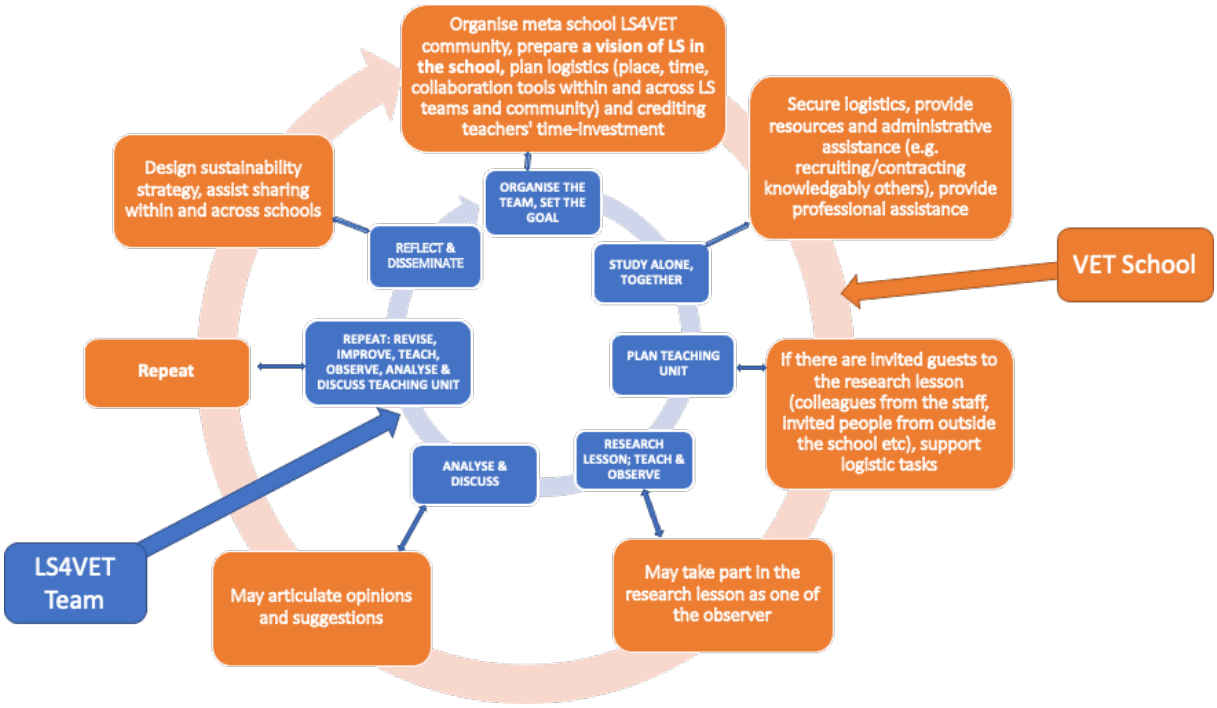
Figure 4. *The LS4VET cycle*



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 as a form of teacher professional development, and, in collaboration with teachers involved in LS in the LS4VET meta school community, to provide the organisational and logistical support needed for LS to become an organizational routine. Therefore, we formulated, next to the seven steps of LS4VET, important actions to be taken at the level of the school organisation (see Figure 5).

Figure 5. *Two levels of implementation of LS4VET*



N.B. The inner circle represents the level of the Lesson Study team; the outer circle represents the organisational level.

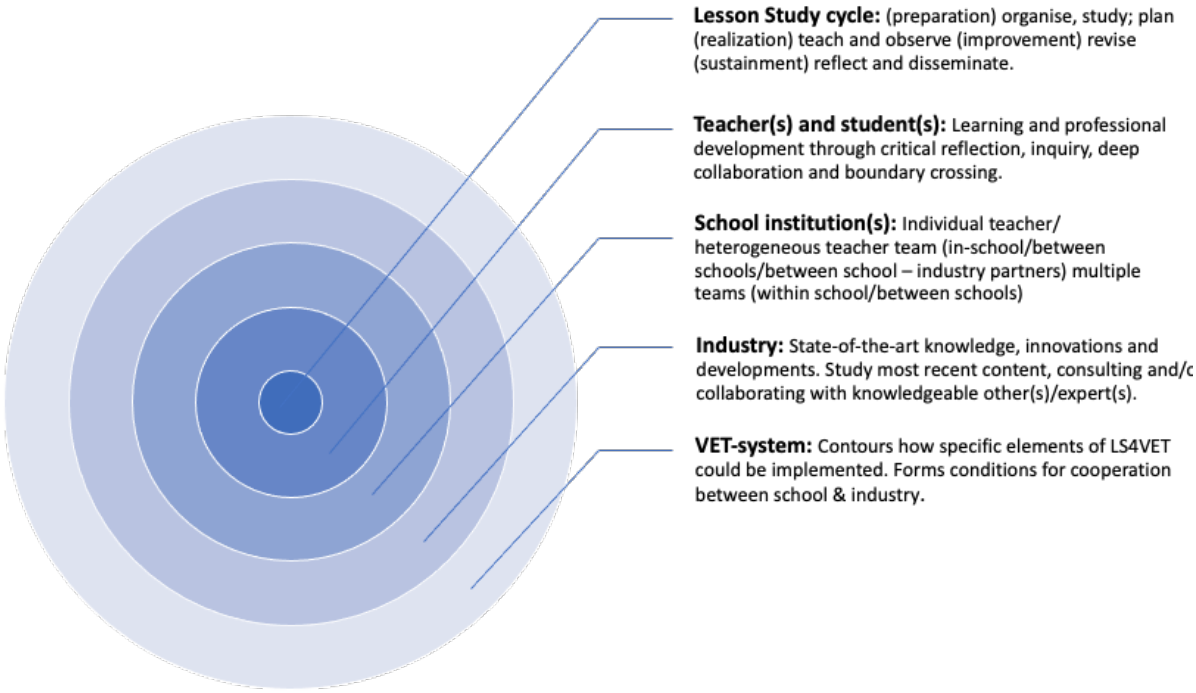
1.3.6 CONCLUSIONS

The main features of our adaptation of the Lesson Study method to the special context of VET can be summarised in the following three points:

- the LS4VET Model aims to enhance the quality of VET and develop adaptive VET teachers through inquiry by encouraging teachers to do collaborative practice-based research, focusing on solving challenging problems collectively and critically reflecting on teaching experiences for knowledge transformation;
- the LS4VET Model exploits the learning potential inherent in the heterogeneity of VET by encouraging the collaboration of teachers of vocational and general subjects and from different teams, by inviting knowledgeable others from the academic context (the field of education) and/or from industry, and by listening to student voice throughout the process, thus enabling the various learning mechanisms that emerge through boundary crossing;
- the LS4VET Model explicitly aims to enhance its sustainability in VET schools by emphasising the importance of organisational development and learning related to its introduction and sustained implementation and suggesting the creation of an LS4VET meta school community.

The LS4VET model was developed based on an ecological system thinking that conceptualises the embeddedness of the various levels of factors relevant to this adaptation as described in Figure 6.

Figure 6. *The ecological system-embededdnes of LS4VET*



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2. THE LS4VET COURSE

This chapter describes the adaptation and implementation of the LS4VET course in the four partner countries. This course was designed as a professional development (PD) programme to prepare and support VET teachers to apply the adapted method of Lesson Study (the LS4VET Model) in their own practice.

The original LS4VET curriculum was developed in the collaboration of the five university/teacher educator partners and each partner developed the content of one of the five modules of the LS4VET course. As a first step, the partnership developed a very detailed competence map, describing the knowledge, skills, and competences VET teachers need for planning and running a successful Lesson Study in their schools. Based on this, the LS4VET course curriculum was designed to include five modules as follows:

- *Module 1 – LS4VET Design – Focus on Planning*
- *Module 2 – LS4VET Implementation – Focus on Process*
- *Module 3 – LS4VET Sustainability – Focus on Progress*
- *Module 4 – LS4VET Impact – Focus on leadership and team collaboration (Optional)*
- *Module 5 – 21st Century Teaching Methods – Focus on the Digital World (Optional)*

The LS4VET course was designed as a hybrid professional training programme, involving individual e-learning through a multilingual e-learning Moodle (Modular Object-Oriented Learning Environment) platform (https://course.ls4vet.itstudy.hu/) and online and offline group work of VET teachers in the LS4VET teams (typically from the same school), supported by e-tutors, LS4VET facilitators and knowledgeable others from the academia and/or the industry. The course was piloted by one team of teachers from the partner VET schools in each country in the spring of 2022. Based on the outcomes of this pilot, the course was adapted to local needs and circumstances. The adapted LS4VET course (learning content) have been published in the national languages (Dutch, German, Hungarian and English for the Maltese version) in **four LS4VET course ebooks**, one for each partner country, available on the LS4VET project website.

In this chapter we present how the national course-adaptations were developed and delivered. In Hungary and Malta, the course was offered as a voluntary in-service teacher professional development programme, while in the Netherlands for most participants it was offered as an optional subject in their (mandatory) didactical training, and in Austria it was implemented as part of a VET teacher education master programme. In all four countries, the format was hybrid including individual e-learning and online or offline team work assisted by facilitators/e-tutors from the university/teacher educator partners, but the four countries differed in the share of synchronous and asynchronous LS expert facilitation, due to the different local conditions. While in the other countries the university-based facilitator was present in all group work sessions, in Hungary there were only a few facilitator-supported group sessions but several online team discussions and several whole-course online workshops were organised.

2.1 THE LS4VET COURSE IN AUSTRIA

2.1.1 INTRODUCTION

This section describes the second pilot of Modules 1 and 2 of the LS4VET e-learning course in Austria, which was implemented between February 25th and April 30th, 2023.

This pilot was part of the compulsory 3-ECTS course *Project Management* within the bachelor's degree programme *Dual Education and Technology and Trade (DATG)* held at the University College of Teacher Education in Lower Austria. The course tutor was Michaela Tscherne, a member of the Austrian LS4VET-team.

The bachelor's programme DATG[4] is a part-time programme for teachers at vocational schools and colleges for intermediate or higher vocational education. It provides pedagogical competences that teachers need for their teaching activities in addition to their expert knowledge from the professional world. The following subject bundles form the three subject areas of dual vocational education and training (VET):

- Subject bundles for "general education and business subjects" (GB)
- Subject bundles for "subject-theoretical subjects" in the respective vocational field (ST)
- Subject bundles for "subject-practical subjects" in the respective vocational field (SP)

Picture 1: LS4VET piloting cohort 2 in Austria

[4] Information and curriculum in German language: https://www.ph-noe.ac.at/de/ausbildung/sekundarstufe-berufsbildung/bachelorstudium-sekundarstufe-berufsbildung

The pilot cohort 2022/23 consisted of 45 teachers, 34 male and 11 female (see Graph 1), from 29 vocational schools and 16 colleges of higher vocational education (see Graph 2).

2.1.2 COURSE STRUCTURE AND ADAPTATIONS MADE

The pilot followed curricular guidelines of Module 1 and Module 2, which were compulsory components for the time between February 25th and April 30th, 2023. The course tutor made use of the German version of the LS4VET Moodle course. All assignments for Module 2 were submitted through Moodle, the assignment for Module 1 was designed and collected by the course tutor via e-mail.

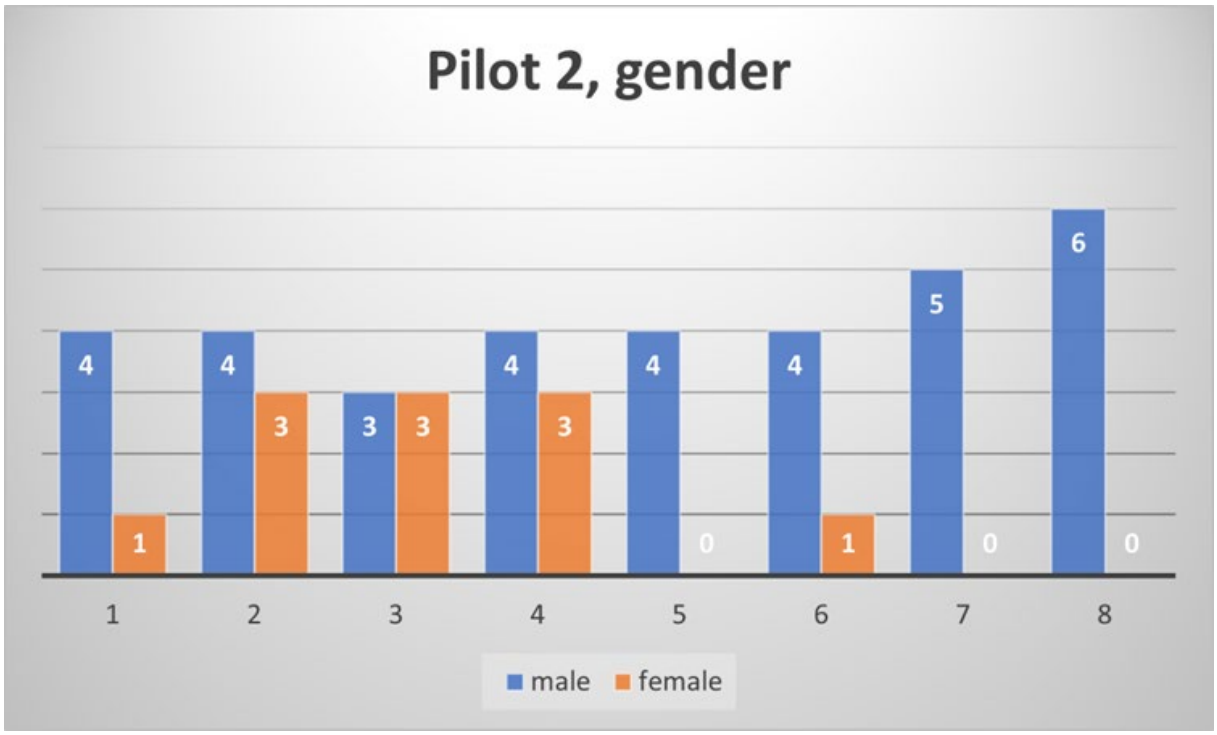
Modules 3, 4, and 5 were elective components within the course *Project Management* with the deadline July 1st, 2023.

2.1.3 COURSE IMPLEMENTATION

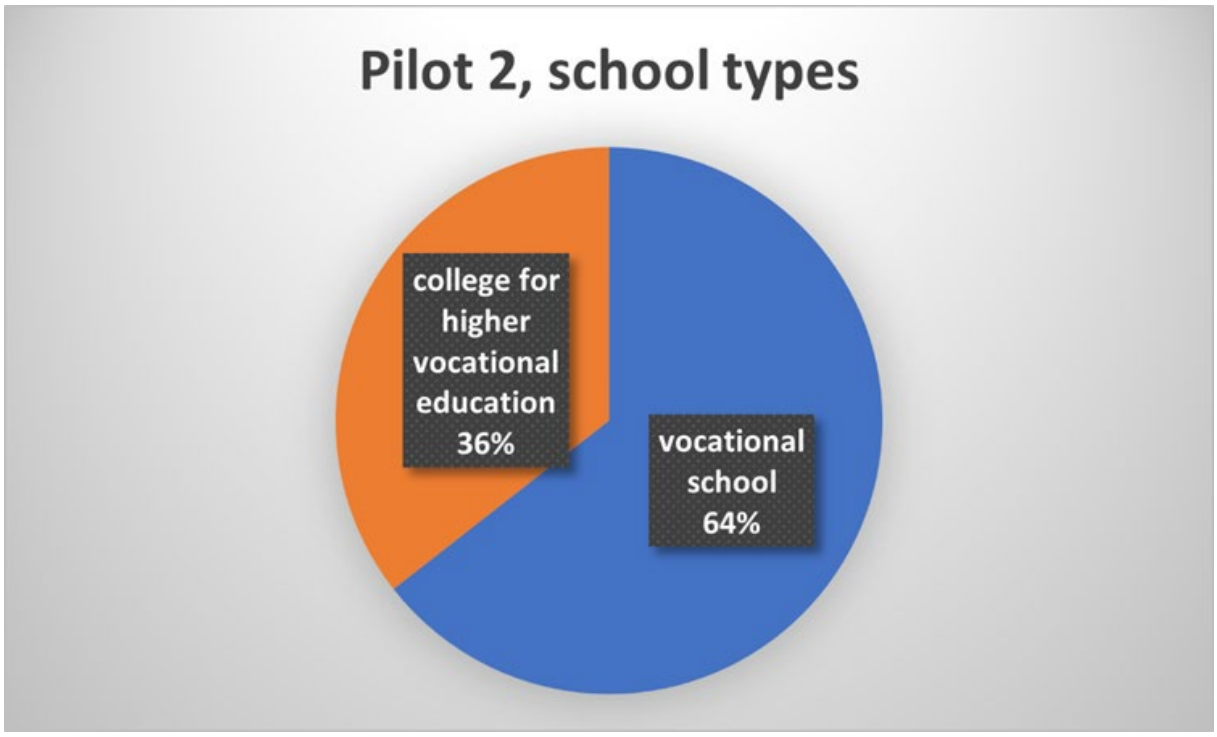
The second pilot of the LS4VET e-learning course in Austria was implemented between February 25th and April 30th, 2023. Forty-five participants had enrolled in the compulsory 3-ECTS course Project Management within the bachelor's degree programme Dual Education and Technology and Trade (DATG).

The cohort represented members from vocational schools (64%) and colleges for higher vocational education (36%) and all three subject bundles: general education and business education (8 teachers), subject-practical bundle (20 teachers), and subject-theoretical bundle (17 teachers). They formed eight Lesson Study-teams, which were organised following existing structures for teaching practice, i.e., teachers coming from the same vocational schools or colleges, or from the same geographic areas formed groups for teaching practice. Making use of these existing structures for the Lesson Study was meaningful because the Lesson Study Research Lesson (LS-RL) became one of a series of lessons taught within the compulsory teaching practice course of the BA programme. This created the possibility for all LS4VET-team members to be present during the LS-RL. This was a big advantage for the LS4VET programme because getting time to observe another class and permission to travel is usually one of the biggest challenges in organising Lesson Study.

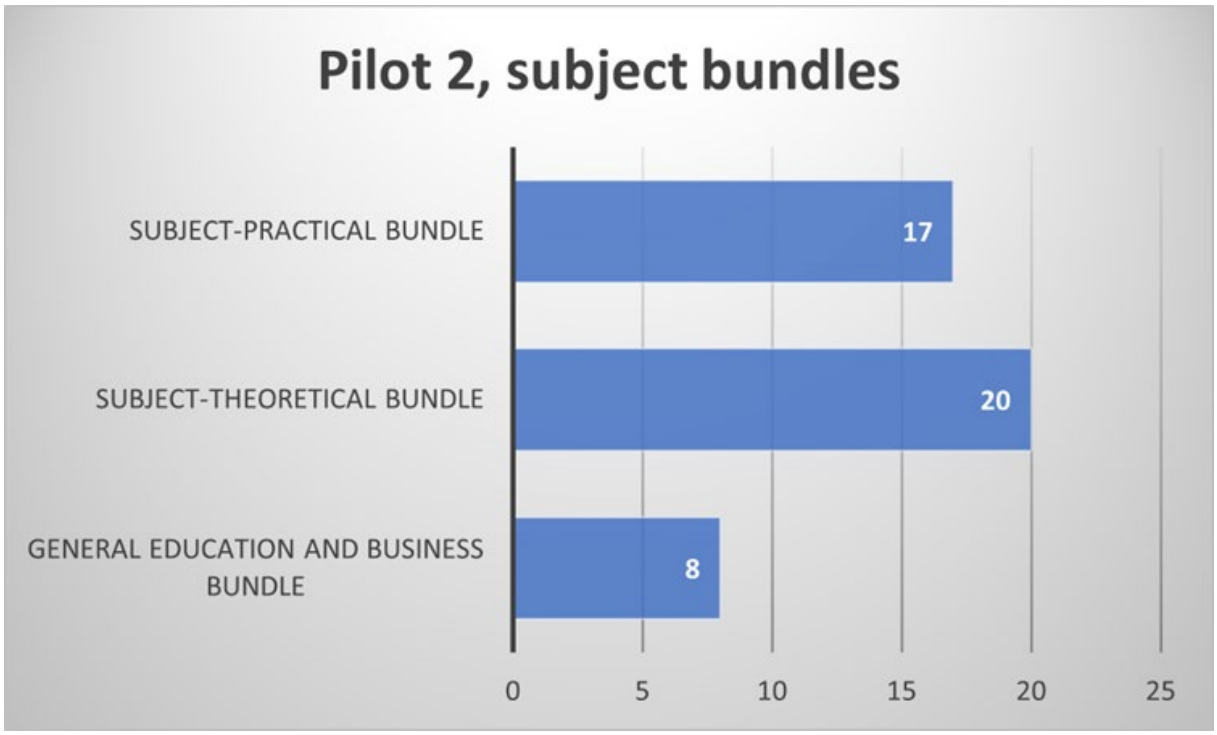
Due to the geographical distance, four knowledgeable others could not take part in the LS-RL, observations, and interviews. The knowledgeable others working with the LS4VET-teams 3,4,5, and 7 could take part in the observation of the LS-RL and in the post-lesson interviews and reflection meetings.



Graph 1: Number of male and female participants in LS4VET-teams



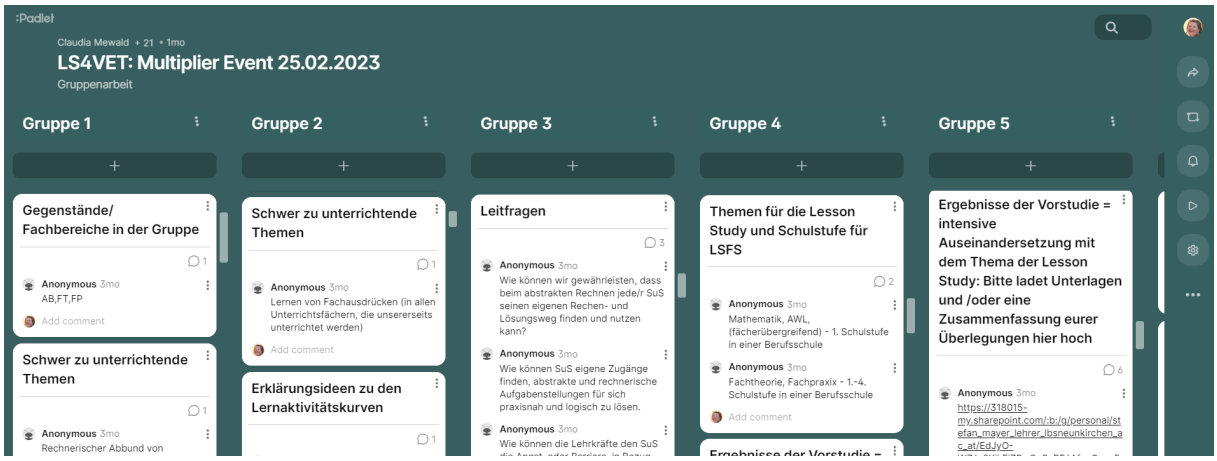
Graph 2: Distribution of participants by school type



Graph 3: Number of teachers in subject bundles

The introduction to the pilot and the LS4VET Moodle course[5] was organised in the context of the Austrian LS4VET Multiplier Event (ME), which was held on February 25th, 2023 at the University College of Teacher Education in Lower Austria, Baden (see Picture 1). During this ME, the participants were informed about the project and the organisation of the LS4VET e-learning Moodle course as part of their course in *Project Management.* All organisational aspects were explained by the course tutor, Michaela Tscherne, and the programme director, Peter Markovics. A brief introduction to Lesson Study, observation, and reflection was given by the keynote speaker of the event, Roland Knoblauch, an expert in LS in VET education from Germany. Claudia Mewald and Roland Knoblauch also organised an interactive workshop, during which the topics for the Lesson Studies of the eight teams were established. Moreover, the LS-teams elected team leaders and set up several preliminary research questions. As a follow-up activity the teams were asked to engage in a theoretical study of the selected topics. All data were collected in a Padlet, which also served as a tool to get in touch with knowledgeable others who were recruited after the ME.

[5] https://course.ls4vet.itstudy.hu



Picture 2: Padlet (extract)

Each team was supported by at least one knowledgeable other from the field of general or VET education who was experienced in carrying out Lesson Study. Moreover, most teams were supported by an additional knowledgeable other with expertise in the selected topic area.

The team of nine possible knowledgeable others had an online meeting[6] on March 8th, 2023. During this meeting the knowledgeable others were familiarised with the LS4VET project and given all necessary information to collaborate with their team(s) in one cycle of a Lesson Study including collaborative planning, implementation, observation, interviewing, and reporting. All but one knowledgeable other received a honorarium for their work and were offered a higher fee if they agreed on supporting their teams in writing up a "case story" following the course guidelines in German language. Most knowledgeable others selected the higher fee and committed themselves to guiding their teams through reporting and case story writing.

The knowledgeable others signed up to their groups in the Padlet including their email addresses and the LS-teams were asked to get in touch with their knowledgeable others. This worked well in most cases. Where no contact had been made until April 4th, the knowledgeable others wrote to their teams. Team meetings were organised using the template in Task 1 of Module 2, email and/or PADLET. Module 2 - Task 1 was uploaded to the Moodle course which provided the Moodle course tutor, Claudia Mewald, with an overview of the development during the initial phase of the Lesson Study. At this stage, the knowledgeable others had not yet gained access to the Moodle course. This proved a disadvantage because Task 1 should also have been seen by them.

Planning notes in Task 1 suggest that meetings with external knowledgeable others were held online, while internal team meetings were held face-to-face. Each team had about four online meetings with their knowledgeable others and about the same amount within the internal teams in face-to-face format.

So far, no decision has been made if the LS4VET Moodle course can be implemented into the regular BA study programme at the University College of Teacher Education in Lower Austria. An overall evaluation of the Austrian LS4VET-team, who will juxtapose all arguments and data collected during the two pilots and an estimate of the probable costs of the programme in the future without European funding will influence their recommendation to the senate and the curricular commission of the institution about a possible institutionalisation of the programme.

[6] Protokoll zum Meeting der LS4VET Wissenspartner.pdf

2.2 THE LS4VET COURSE IN HUNGARY

2.2.1 INTRODUCTION

Participants of the Hungarian LS4VET course were recruited at a Multiplier event hosted jointly by ELTE and ITStudy in September 2022. The invitation to this event was sent to all VET schools in Hungary. 30 teachers and school leaders from 16 VET schools in eight cities attended the recruitment event where they learnt about the project and Lesson Study and collaborated in an interactive workshop, discussing topics they would like to study in a Lesson Study. In the last section of the programme, a "crash course" was delivered for participants who were willing to undertake the role of LS-facilitator in their future Lesson Study team. Following the event, 44 Hungarian VET teachers applied to the course that was offered free of charge and on a voluntary basis, even though the course did not award any officially recognised credits as it had not been officially accredited. Eventually, 43 Hungarian VET teachers enrolled in ten LS4VET teams and started the course and their Lesson Study in October 2022.

2.2.2 COURSE STRUCTURE AND ADAPTATIONS MADE

Based on the Hungarian pilot's experiences carried out in February-June 2022 in a team of three teachers from our partner school, the Neumann János Informatikai Technikum, the ELTE-ITStudy team adapted the LS4VET curriculum and modules - developed by the international partnership - to the local needs and conditions. The Hungarian course included three mandatory modules that cover a full Lesson Study cycle, the participants were then offered the opportunity to continue with Modules 4 and 5. These optional modules prepared the LS4VET teams to reflect on and plan the embedding of Lesson Study as a professional development method into their organisation and to assist their dissemination activities by applying 21st-century digital tools. The ELTE-ITStudy team also edited the content of the compulsory Modules 1-3, supplementing them with detailed learning guides and further Hungarian and foreign examples and templates (for example, the section about lesson plans). Most importantly, we integrated the task of writing a case story in Module 3, which proved to be an effective tool assisting group and individual reflection as well as excellent material for dissemination.

2.2.3 COURSE IMPLEMENTATION

The LS4VET course in Hungary was intended to span over four months beginning in October 2022 but due to unexpected delays (mostly the greater-than-expected course workload and other engagements) the LS4VET teams completed the mandatory modules at different times, most of them by the end of February 2023. The optional Module 4 and 5 were completed in April/May 2023. Participants received a certificate for completing modules signed by e-tutors/facilitators from ELTE and ITStudy.

In the course of the first three months, three of the initial ten teams dropped out due to a lack of time. The remaining seven teams with 34 teachers finished Modules 1-3 and six teams decided to continue to do Modules 4 and 5 as well. Two LS4VET teams were formed in our partner school, one team was from another school in Budapest, and the rest worked in the countryside. There was even one cross-school team, which involved one of the two "single" teachers who applied to the course alone from their schools. School leaders (principals and vice-principals) played an important role in encouraging and supporting their colleagues to join the course and four of the Hungarian LS4VET teams involved them even as team members.

The LS4VET teams met regularly offline or online to discuss and carry out the course tasks and assignments, based on their prior individual reading of the relevant chapters of the modules available in the Moodle platform (as instructed by the detailed learning guides). The ELTE-ITStudy team (4

experts) supported the LS4VET teams by providing e-tutoring, that is, they assisted and advised the teams assigned to them through regular online communication in the Moodle platform, in group chats, and provided feedback on their completion of course tasks and assignments. The two LS4VET teams working in the Hungarian partner school received more immediate support, they also had live online and offline meetings with their e-tutor/facilitator from ELTE, who visited their research lesson and post-lesson discussion as well. In addition, online workshops were also regularly organised for all LS4VET teams to discuss course tasks, Lesson Study-related topics and share their LS4VET experiences (see Table 1 below for more details).

Table 1. *Online whole-course workshops in the Hungarian LS4VET course*

Title of the online event	**Date**	**Participants**
LS4VET workshop as part of the Erasmus+ day of the Neumann János Information Technical School	14 October 2022	All LS4VET teams + ELTE-ITStudy team (e-tutors/facilitators)
Group workshop	December 2022	3 LS4VET teams + ITStudy e-tutor
Workshop focusing on Module 3 and the writing of case stories	13 January	All LS4VET teams + ELTE-ITStudy team (e-tutors/facilitators)
LS4VET mini-conference (completion of Modules 1-3)	24 March	All LS4VET teams + ELTE-ITStudy team (e-tutors/facilitators)

Based on the experiences gathered during the LS4VET course, the ELTE-ITStudy team further improved the course content published in the Hungarian version of the LS4VET course eBook. They also intend to develop the course into a VET teacher in-service training programme that can be submitted to the relevant Hungarian authority to apply for accreditation. Once it is accredited, the course will award credits that can be recognised towards the completion of the mandatory professional development of VET teachers.

2.3 THE LS4VET COURSE IN MALTA

2.3.1 INTRODUCTION

In Malta, registration for the LS4VET course was open to all secondary and post-secondary vocational and training education (VET) educators. This was done through a letter circular issued in September 2022 by the Ministry for Education to all schools that offer VET subjects. The course was also promoted through a multiplier event (held on 16th September 2022), a series of posts on the Facebook page of the Faculty of Education at the University of Malta, a page on the Collaborative Lesson Study Malta (CLeStuM – www.clestum.eu/cpd) website and personal contacts.

2.3.2 COURSE STRUCTURE AND ADAPTATIONS MADE

The course was intended to span over two and a half months (mid-November 2022 to January 2023). However, due to the unforeseen circumstances that participants faced (mostly related to the course workload and the increased workload at their institution), the course duration had to be extended for most groups. To facilitate participation, the course was offered in a blended format with most sessions held online in a synchronous manner. While some post-lesson discussions were held online, the teaching of lessons were all held live without the possibility of remote attendance. Each group was supported by an e-tutor who also acted as the lesson study facilitator and, for 3 of the 6 groups, the e-tutor was also the knowledgeable other.

For successful completion of the course, participants had to do Modules 1 and 2. Modules 3, 4 and 5 were left optional. To our knowledge, no group or participant did any of these optional modules. But there were a number of participants who expressed interest in going over these optional modules at a later stage when they would have more time on their hands.

Table 2 below highlights the main adaptations made to the LS4VET course, mainly to address constraints and limitations posed by the school contexts.

Table 2. *Adaptations in the Maltese LS4VET course*

Module 1 *Self-driven*	**Module 2** *Tutor-led*
One meeting with tutor followed by a series of online meetings and email communications among participants	A series of online weekly meetings with tutor
Integrated elements of tasks 4.1 and 4.2 into task 6	Participants meet in-between meetings either at school or online
Task 6 was adapted into a more guided template	Had to amend tasks (e.g.: Task 1-3)
Offered a template for task 6	Offered a template for the lesson plan
Provided extra guidance on how to do tasks 5.1 and 5.2	Assessment based on a portfolio that includes research lesson plan, student profiles, observation sheet and individual reflection. With some groups, a template for the portfolio was also provided.
Gave assessment submission details of the 4 main tasks	

2.3.3 COURSE IMPLEMENTATION

The course was offered free of charge and it was also voluntary. Those who successfully completed the course – that is, completed Modules 1 and 2 and submitted all required tasks – were awarded a certificate of participation issued by the Faculty of Education at the University of Malta.

The course started in mid-November 2022. However, not all groups could start at the set period, with most groups starting in the beginning of December 2022. One group finished the course as planned,

that is by the end of January 2023. One group finished the course by mid-February 2023 and another by the end of February 2023. The last three groups finished the course by mid-March 2023 (see Table 3 below for more details).

Table 3. *Summary table of the Maltese LS4VET teams*

Course end date	VET subject and lesson theme	School sector
January 2023	**Hospitality** *Lesson on cuts using knives and blades*	Secondary
February 2023	**Information Technology** *Lesson on networking protocols*	Secondary
	Applied Sciences *Lesson on climate change*	Post-secondary
March 2023	**Beverages and services** *Lesson on introduction to beverage*	Post-secondary
	Hair and beauty *Lesson on hair care*	Post-secondary
	Food preparation *Lesson on Mediterranean food*	Secondary

Initially, 33 participants enrolled to do this course and they were divided into 7 groups based on either their requests or according to the subject area and/or school sector - 4 of these 7 groups included participants (VET teachers and/or educators) from different schools.

After the first two weeks, one of the groups decided to terminate their participation as they were finding it difficult to find a common time-slot to meet on a weekly basis. Besides, at their school, the workload seemed quite challenging and they felt they would not be able to cope with the demands of this course. Of the initial 33 participants, 17 managed to successfully complete the course. Of the 16 who encountered challenges and had to drop out, 10 did this at the very beginning (during the first two weeks) and 6 dropped out after Module 1.

They cited the following as reasons:

- Personal issues
- Increased workload at their institution
- Course is too demanding
- Difficulty to work with educators across a different subject

There are currently no plans to use the course curriculum and its content beyond the duration of the project. However, we are discussing possibilities with our partner school, the Institute of Tourism

Studies (ITS), in order that they could continue using lesson study as a professional development model for their lecturers.

2.4 THE LS4VET COURSE IN THE NETHERLANDS

2.4.1 INTRODUCTION

All 21 VET teachers participating in the program worked at Landstede group, one of the large multi-disciplinary VET colleges in the Netherlands The participants were recruited through a multiplier event. The first pilot group also played a major role in facilitating the second round of groups who implemented the program. At a second multiplier event new teachers were recruited to join the implementation of the course.

Notably, one group consisted solely of teachers who were finishing their mandatory didactic training to receive a VET teacher qualification. This was also the most diverse group with members from vocational training in marketing, and administration to agriculture and hospitality. Out of curiosity and enthusiasm one of the teacher trainers joined the LS4VET team as well. The other two groups were formed by teachers who did teach different subjects, but worked in the same faculty.

Two groups finished the course in time, both of these groups had members who had an interest in finishing their LS for their didactic qualification. The third group postponed several meetings due to time and planning constraints and may yet finish the program (we know the team members were enthusiastic about the program).

2.4.2 COURSE STRUCTURE AND ADAPTATIONS MADE

All teams worked on modules 1 and 2. The main adaptations were in the strong role of facilitators of the course. One group was facilitated by an experienced teacher trainer who also prepared teaching material in the form of powerpoints and selected assignments. The other groups were facilitated by experienced and enthusiastic teachers who joined the pilot group.

The modules were translated and the course was offered in a hybrid form. The teams worked in MS Teams, since this is a familiar form of collaboration for them. It also allowed for the facilitators to respond to questions as well as documents that were developed in concept and which they shared there.

Module 3, with focus on dissemination was (and is) done in two ways. First, ‘bottom up’ through the enthusiasm of these last facilitators and members of their teams. They are promoting further implementation of LS4VET with their direct colleagues and managers. Second, Landstede is a partner in this LS4VET Erasmus project through their research group (called practors) which specialises in teacher professional development. They are promoting policy based on the outcome of this project throughout the institution.

2.4.3 COURSE IMPLEMENTATION

The second pilot was implemented between October 2022 and February 2023 in three groups. These each conducted seven or eight in-person meetings, and worked online in between.

As mentioned, teams were guided by facilitators. These seemed to have a pivotal role in the process. Based on their own experience they were able to manage expectations during the first meetings. They were also the ones able to introduce knowledgeable others, and often took the role of knowledgeable other themselves.

During the first module two main obstacles to overcome were planning and identifying a topic. Both were recurring topics since planning had to be adapted and it was difficult to find occasions that matched everyone's agenda. Some meetings were postponed, others planned close together. One team organised two research lessons on two consecutive days.

The facilitator coached the teams in finding a research topic by pointing out similarities in their interests and experiences they shared. The questions they formulated had to be reviewed several times. Although this was seen as a learning experience, it was also a time consuming effort that teams may not have accomplished as successfully without guidance.

3. LS4VET CASE STORIES

This chapter presents two case stories of Lesson Studies in VET from each partner country, carried out by the VET teachers who participated in the LS4VET course, both from the partner VET schools of the project and from other schools. These stories, mostly written by the LS4VET teams themselves or their facilitator, based on a common template designed by the LS4VET partnership, provide examples of how the Lesson Study method as adapted to VET can be implemented in practice. Each describes the context, goals, processes and findings of one Lesson Study, including the participating VET teachers' reflections about the learning outcomes not only for their students but also for themselves.

3.1 PRESENTATION OF A SELECTED CONFECTIONERY PRODUCT FROM THE PERSONAL PORTFOLIO IN PREPARATION FOR THE FINAL EXAM (AUSTRIA)

Elena Lehmann, Nina Snopek

Introduction

This Lesson Study (LS) was carried out with students in the last year of their vocational education and training to be confectioners and bakers. For their final exam, these students must produce and present a cake, which creates an authentic professional task linked with the goal to give an oral presentation to a live audience in English as a Foreign Language (EFL) classes. Thus, the LS-research lessons (LS-RLs) developed within the framework of a 3-week project focused on creating Power Point Presentations (PPTs), handouts, and the rehearsal of oral presentations. The students were given the free choice in selecting the product they would present but they had to follow the organisational and linguistic guidelines provided by their EFL teachers.

The main objectives and key topics of the LS-RLs were the following:

The students are able to

- give a presentation in front of their class.
- prepare a talk using visual aids like PowerPoint and a handout for their peers.
- present their talk using notes in natural pronunciation and intonation but not reading a text word for word.
- understand questions after the talk.
- respond spontaneously and answer questions in a short monologue.

Situation and process

The LS was carried out in a VET school in Lower Austria using the block-release system with students attending 1 block of 10 weeks each year. The school teaches apprentices in the following professions: bakers, confectioners, chocolatiers, dental nurses, and dental technicians.

Based on the concept of the dual education system, vocational education in Austria provides for educational training ranging around 20 % (both theoretical and practical), whereas the work company covers 80% of the apprenticeship training, mainly practical.

The confectioners in this LS were in their 3rd year of apprenticeship and in preparation for the final exam, which includes the production and presentation of several products and is usually carried out in the language of schooling (German).

The LS team consisted of the two subject teachers for EFL (Elena Lehmann and Nina), as well as Claudia Mewald as the knowledgeable other. The LS was implemented in a confectioner class, with 24 students, who were divided into two cohorts of 12 students each.

The syllabus for EFL in the final year requires working on a project, which includes writing and delivering a product presentation on the showpiece of the upcoming final apprenticeship examination in English and discussing their presentation with their peers in English language.

The time frame of the LS was aligned to this project. For this purpose, both EFL units were used in three consecutive weeks for a duration of 50 minutes each. Due to the sequential order of the project work, the first cohort was taught in the 3rd to 6th week and the second cohort in the 7th to 9th week of their school placement. The students of the 2nd cohort and their teacher were thus able to draw insights from the LS-observations in the 1st group, which led to an adaptation/improvement of their own projects already in the process of project development.

Subsequently, four students from each cohort participated in a group-interview with Claudia Mewald after their presentations. The aim of the interview was to find out how working on practical and exam-related subject matter affected their learning in general EFL and in occupational aspects. Moreover, the interview was considered an opportunity to adhere to student voice, which is why it also inquired about the students' experience with the LS in more general terms as well as how they had experienced their integration into the process of designing learning. This included their contribution to self-and peer-assessment. The collaborative development of an assessment scale, which created a backward learning design with the expected performance in mind, was part of this process and reflected in the interview.

Focus

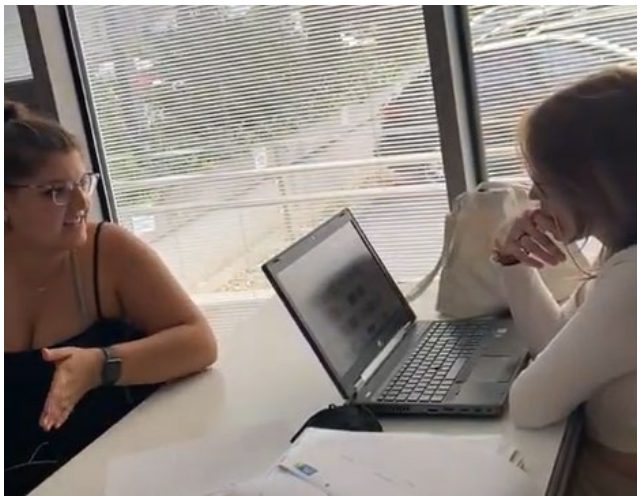
Based on the assumption that the use and activation of subject-specific content in another language would lead to cognitive consolidation, the EFL teachers developed a LS-RL plan including the creation of a product folder for the final exam.

By planning the LS project in two cycles, the LS team wanted to ensure that the 2nd cohort was able to profit from the learning experience and project outcome of the first.

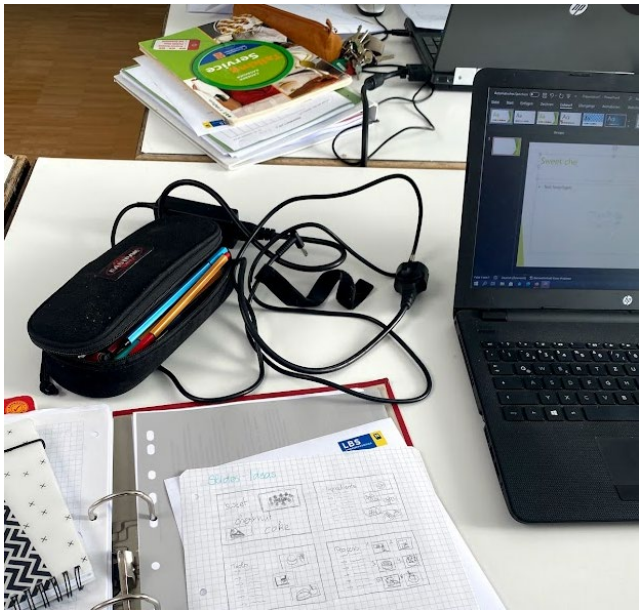
The LS team met twice before the start of the project to discuss the procedure and twice on a weekly basis while the project was developed and presented.

The project consisted of the following steps:

1. the teacher's input and task presentation,
2. the students' selection of a workpiece from their portfolio (see Picture 3),
3. the research of technical keywords, independent work on the presentation in the school's computer lab, the development of a PPT presentation or short video clip and handout (see Picture 4),
4. the actual presentation in class, and student feedback in the interview.



Picture 3: Step 2 - collaborative selection of workpiece and planning



Picture 4: Step 4 - research and independent work on the presentation

Response

The outcomes suggest that the students benefited from participating in the development of an assessment scale for the evaluation of their presentation and that the second cohort gained additionally from being invited to their peers' presentations at the end of the first LS cycle.

Their feedback suggests that learning from an available design (their peers' learning outcomes) was not just motivating but it also functioned as a good-practice-example for their independent work on the presentation.

The interviewees also voiced strongly that working on their product presentation for their final exam in another language made them think about the ingredients, the tools, machinery, and workflow in a more specific way, which seemed to help them to consolidate subject-specific content in the German language as well.

The interviews also showed that researching keywords and speaking English during the presentation made the students feel they had benefitted linguistically as well as professionally.

It seems that dealing with content that is inherently motivating and authentic (e.g., final exam, the need to perform sales conversation with tourists in their confectionery), reinforces the acquisition of a second language and the knowledge of the subject matter as such.

The Lesson Study journey

Based on the students' reflections and the observations, the LS-team obtained various impulses for further improvement. The EFL teachers decided after the LS that giving the students a clear idea of what the grading is made up of and which value certain tasks carry is crucial in learning and that letting students participate in the development of the assessment concept from the start is even more effective for their learning process. This is especially relevant in job-related tasks which refer to real-life activities. The students are expected to become better at evaluating their performance in their jobs if they understand the concept of assessment. Thus, learning to think about assessment as a student-centred activity was the most important takeaway for the teachers int his LS.

Also, developing an appropriate ELF lesson plan and the planning of performances according to the students' needs and expectations, proved to provide a strong contextual connection with the working life and the languages spoken by the students. The LS, its focus on student learning and the expected learning outcomes contributed to the structured thinking about this aspect. Constantly referring to the students' workplace and connecting the languages of schooling, of the workplace, and their idiolect were found to have a beneficial effect on language acquisition as well as comprehension.

3.2 REGULAR EXPRESSIONS IN PROGRAMMING. IDENTIFYING TYPICAL APPLICATIONS OF SIMPLE REGULAR EXPRESSIONS THROUGH INTERACTIVE AND DISCOVERY-BASED LEARNING (AUSTRIA)

Alexander Wöhrer, Michael Krebs

Introduction

This Lesson Study deals with one of the central, yet highly challenging topics in programming. The students of the 2nd year come into contact with this complex of topics for the first time. The LS-research lesson (LS-RL) prepared within the framework of the Lesson Study (LS) is, so to speak, the prelude to a constitutive part of computer science education.

Main objectives and key topics of the LS-RL:

Learners will be able to

(1) identify typical uses of simple regular expressions through interactive discovery learning.

(2) Build sets of words from regular expressions.

(3) form regular expressions independently.

This LS-RL is designed to familiarise students with the mechanics of descriptive languages for pattern recognition. This is particularly important as the same concept is central to databases (Year 3), operating system administration (Year 3 and 4) and web development (Year 3 and 4).

The LS-RL should be designed to create a sustainable learning experience. This seemed to be ensured with the methods of inquiry-based learning.

Although it is a very complex theoretical topic, an immediate, well-supported learning path should be designed. This was to be done by deriving concrete applications and scaffolding through a cheat sheet.

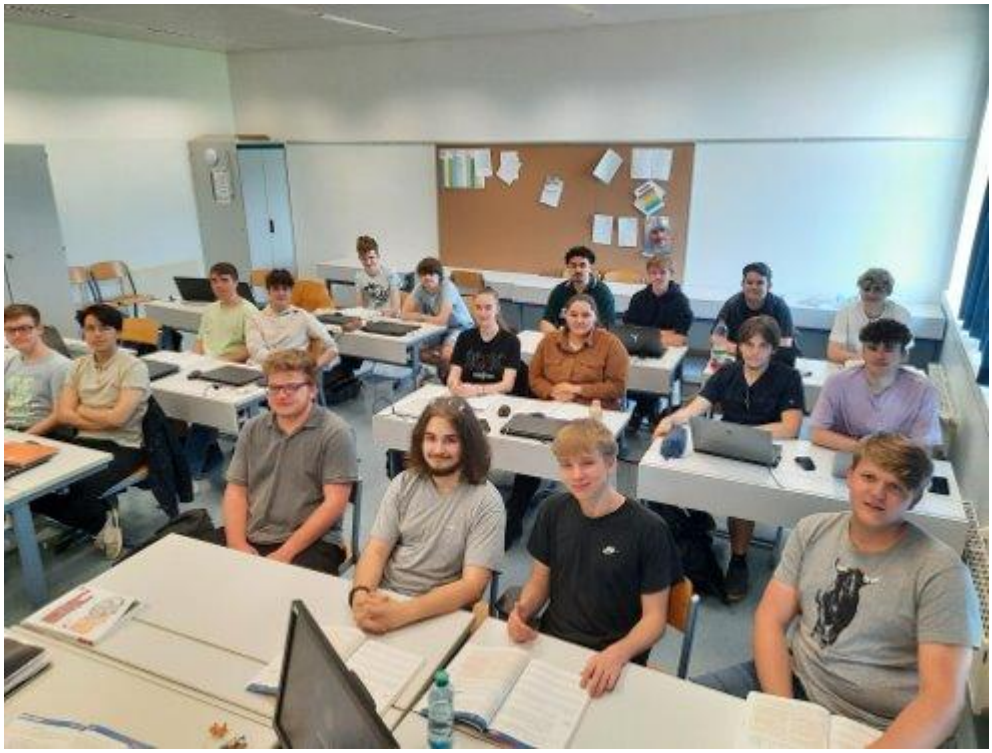
Context and process

The LS took place at the end of the school year, i.e., the class was already familiar with the teacher's methods. As there were only a few topics left, this one was chosen for the LS because of its long-term significance.

The competences acquired from the LS in theory lessons could then be implemented, consolidated, and deepened in the subject-specific practical lessons. Although the contents did not play a role in the assessment at the respective school level, the pupils were aware of the relevance for their further educational career and actively participated in the lessons.

The LS-team consisted of three teachers of subject theory lessons (Harald Haberstroh, Wolfgang Schermann, Alexander Wöhrer), as well as the HS Professor and LS-expert Claudia Mewald as knowledgeable other, observer and interviewer, and the language teacher and didactician Michael Krebs as knowledgeable other and observer.

The students of year 2AHIF of the HTL Wiener Neustadt (see Picture 5), Höhere Abteilung Informatik, were involved in the selection of the LS-topic by voting and were available as interview partners for the follow-up.



Picture 5: 2AHIF of the HTL Wiener Neustadt

The topic proposal "Regular Expressions" seemed particularly suitable to all team members, as it offers rich visualisation possibilities and application examples. Nevertheless, an equivalent alternative was found with the topic "Group Change". The decision on the thematic focus was left to the students.

In a vote on which topic should be taught in the LS, 75% of the students clearly decided in favour of the topic "Regular Expressions".

The LS-RL was prepared by the subject teachers in team meetings together with both knowledgeable others. In these meetings it became apparent that all teachers involved relied mainly on teacher-centred methods. The knowledgeable other Claudia Mewald was therefore consulted with the wish for more interactivity and recommended trying out inquiry-based and scaffolding methods. Now the existing teaching materials were adapted in teamwork, or new working materials were created.

Claudia Mewald and Michael Krebs, as well as the non-lecturing subject teachers, were invited to observe the two lessons.

The two LS-RL (taught by Wöhrer and Schermann) were held as double lessons within one week on different days and discussed and adapted in subsequent feedback rounds. Thus, the second LS-RL by Wolfgang Schermann was already a revised version of the original planning.

The reports were drafted and submitted within the following days using the LS4VET e-learning course materials from Module 2.

Focus

In the team meeting, there was a unanimous wish for increased interactivity and individualisation, which could be implemented in the method of discovery learning.

The observers followed the lessons with the help of prepared observation sheets from the LS4VET e-learning course Module 2 and reported on them in the subsequent discussion. In addition, students from groups predefined according to expected performance levels were interviewed. The results of these interviews were also included in the follow-up.

Results

The fact that a change in teacher behaviour is immediately noticed by the class was one of the strongest impressions of this LS. The students clearly reacted positively and also expressed their satisfaction with the methods used in the feedback interviews. In general, they were very reflective about their own learning experience. They were able to give precise information about what facilitated their learning success and where they still needed additional support.

The very fact that a lesson is defined as a LS research lesson ensures a noticeably increased attention and willingness to make an effort on the part of all participants. The significantly increased time spent on preparing the LS research lesson was also reflected in a measurably better lesson outcome.

After this double lesson, almost all pupils in the class achieved the basic competences in the subject area presented. It is therefore to be expected that the teaching model developed will also be more successful than average in future use.

Both teaching staff and observing teachers benefited from the in-depth reflection phase. Both general and methodological-didactic questions as well as subject-didactic approaches could be discussed and reflected upon.

In any case, the support of a proven expert in the field of LS contributed significantly to the success of the project. For further LS projects, it is highly recommended to bring a competent person into the team who is familiar with the processes, requirements, and potential of a LS.

The Lesson Study journey

Our Lesson Study journey started with building a team. We needed a LS-team that was really willing to collaborate. In our case, fortunately, we were three teachers, all teaching different cohorts in a second class who agreed on a topic together with the pupils for the LS. We also agreed when we would teach this topic, so that everyone could start at the same time. The LS-team members had to be willing to try something new and not just implement their familiar patterns. This team eventually created the research lesson that was originally the lesson of one person, and which became a collaborative product used in two iterations. At last, it became the "improved" research lesson including a flipped-classroom video.

The LS-process included the team's readiness to receive feedback from the first cycle, to change, and to accept this change as the opportunity to make the well-planned collaborative research lesson even better. When the additional feedback from yet another cohort came in, we discovered even more opportunities to improve the learning even more. Although we had considered the first lesson plan perfect, we all realised, "You have to be able to take that."

In this process, we found it was extremely important to have someone who was knowledgeable about Lesson Study. We were fortunate to have a very experienced LS-knowledgeable other who was available, approachable, and an honest partner. Additionally, we had a VET-specialist as the second knowledgeable other: a VET teacher who was not a specialist in programming, but a very experienced educator. He looked at teaching and at classes in a completely different way than one might be inclined to do so as a specialist theorist.

The input through observation and feedback from the "outside-knowledgeable other" and the "inside-knowledgeable other" that LS4VET provided helped us to go beyond borders, possibly even beyond national borders. Our new goals were certainly very idealistic, but they were also connected with the research aspect of Lesson Study: We wanted to present our research lesson at the next international WALS[7] conference because we had realised in this journey that practitioner research should be publicly accessible and shared with as many teachers as possible.

The role of documentation through the observation sheets or the guidelines for the interviews emphasised this. When we started to write this case story, in which we reflected the whole LS again, and when we also had the students' constructive feedback at hand, we understood that this kind of self-reflection was special and not the normal everyday routine.

With this experience we can confirm that LS, as a departmental initiative limited to one subject area, seems quite suitable for bringing the culture of lesson observation within the school or within the subject area to a higher level. Instead of mere, rather passive observation programmes, LS offers an active, reflected form of lesson development. Not only does it serve as a concrete source for suitable lesson models, it also furthers the professional development of the teaching staff.

We will therefore not only recommend LS for other subjects in our department, but definitely establish it as a measure for professional development in all departments and throughout the school as a school-wide continuous professional development because we discovered that the added value of LS is simply that it is available anytime you want to or need to implement it.

[7] World Association of Lesson Studies (www.walsnet.org)

3.3 DEVELOPING READING COMPREHENSION IN YEAR 9 IN THE BEAUTY SECTOR USING A MIND MAP (HUNGARY)

Márta Jimoh (English, Hungarian, class teacher), Mihály Szabó (German, trade, facilitator), Gáborné Perei (digital culture), Anita Czeglédi Szappanos (employment skills, occupational safety and environmental protection, principal), Szilvia Seresné Balla (beauty sector foundation, hairdressing professional knowledge, knowledgeable other from industry)

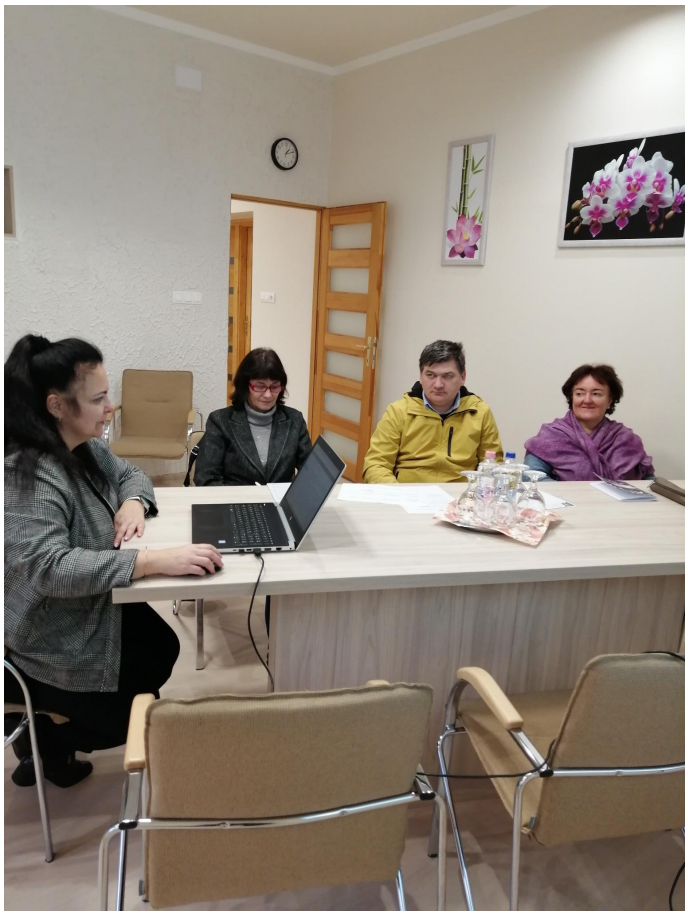
Introduction

The main objective of our Lesson Study was to develop students' reading comprehension of professional texts and their ability to recognise connections of concepts within texts. We chose this topic because we find that students often enter vocational education and training with poor reading comprehension skills, which limits their ability to master the learning content, apply it in practice and thus experience success. In selecting the text-processing techniques to be tested in the research lesson, we took into account that learning can be greatly facilitated by using pictures, diagrams and coloured graphs in classroom activities. The learning process can be facilitated by a variety of visual aids, which are more useful than teaching simply using a textbook. We aimed to facilitate the development of students' reading comprehension by teaching them the techniques of note-taking, highlighting the main points and visualising connections on a mind map.

Context

Our Lesson Study was conducted with students of the 9/A technical class of the Gyula Center of Vocational Training, János Harruckern Technicum, Vocational School and Dormitory, studying in the beauty sector (hairdresser). Our LS4VET team involved members of the school's quality management team, including the school principal, a teacher of vocational theory, a teacher of vocational practice and a developer teacher. Our work was supported by a university expert e-mentor from the project's management team.

Our team had a clear division of labour, sharing all tasks: management, liaison, writing memos, recording developed materials, and preparation of materials for the research lesson. The external expert, a developer teacher, assisted us mainly in methodological matters and in better identifying the unique characteristics and abilities of the students. Our cooperation was implemented through informal discussions and scheduled meetings. We started learning the Lesson Study method as members of the quality management team, and plan to integrate it into our school's long-term quality management process. We would like to introduce the method to as many of our colleagues as possible, promote it among them and encourage them to plan and implement research lessons at our school in the future.



Picture 6: An LS4VET team discussion meeting at the Gyulai SZC Harruckern János Technikum, Szakképző Iskola és Kollégium

Focus and Process

We defined goals at three levels:

- short-term student outcomes: development of reading comprehension and the ability to recognise connections of concepts;
- long-term student outcomes: more successful professional exams by increasing learning efficiency;
- institutional goal: to improve the methodological culture of teachers by using more effective pedagogical methods.

In the course of our work, we reviewed several pieces of literature to establish the theoretical basis of our Lesson Study, partly by reviewing methods of developing students' thinking skills (Kagan, 2004), partly by looking for methods related to text comprehension development (e.g. note-taking and mind-mapping, Parents' Journal, 2019).

Preparation

In preparation for the research lesson - which was implemented in the subject of "Beauty sector foundation class" -, we selected the group of students with whom we planned to implement the lesson and collected information to find out what was preventing them from learning effectively (data

collection, brainstorming). We analysed previous assessments of their text comprehension skills, which showed that half of the group scored a text comprehension performance below 50%. During the research lesson, we divided the students into three groups (Group A: 4 students, Group B: 4 students, Group C: 5 students).

- Group A students could read words silently or aloud with minor errors. They could read sentences almost fluently. They could understand the content they read with help. After reading a text, they could recognise logical and grammatical connections and global cohesion at a medium level and could abstract at a medium level.

- Group B students could read words correctly silently or aloud. They could read sentences fluently. They could understand the content they read without help. After reading a text, they could recognise logical and grammatical connections and global cohesion at a relatively high level and could abstract at a relatively high level.

- Group C students had difficulty reading words silently or aloud, they could read by saying the letters or syllables only. They could read sentences with difficulties. They could understand the content they read with little or no help. After reading a text, they were unable to recognise logical and grammatical connections and global cohesion and they could not abstract.

Planning

We chose the theme of the research lesson in consultation with the teacher of this vocational subject in which the lesson was conducted, using her specific suggestions: techniques for improving text comprehension and learning, note-taking and mind-mapping. During the planning phase, we discussed several variations of how to conduct the research lesson. First, we discussed the choice of professional text, and then its length. We all agreed that note-taking and a mind map template should be used and that two consecutive lessons should be devoted to testing these techniques. A further dilemma was whether to leave the mind map template completely blank or whether to include a word or two. As the students in the groups worked individually during the lesson, we decided that from their individually written notes uniform notes should be prepared at the end of the first lesson with the help of the teacher. Later, these notes were entered into the students' notebooks and used as a basis for the mind map. We were concerned that it would still be a big challenge for the students to fill in a completely blank template, so we added a few words to help them. Our ultimate aim was, of course, to enable the students to produce a mind map based on their notes or even without the notes when reading a professional text. From each group, we selected one student whose activities we observed closely during the research lesson. Our observation criteria were as follows:

- how well the observed students understood the task,
- how they participated in the tasks,
- the time taken to complete the task,
- how well they solved the task,
- how actively they participated in the introduction and concluding parts of the lesson,
- how they felt during the lesson,
- how difficult they found the task,
- how unusual they found the task.

Implementation

A teacher of vocational theory taught the research lesson. In the classroom, the tables were already set up and the students were seated in groups formed according to their abilities. There were separate tables and chairs for the observers in a secluded part of the classroom, from where it was possible to follow the events and the work and behaviour of the students being observed.

Research lesson part 1

At the beginning of the lesson, an introduction was given, the topic was introduced and the text to be worked on was distributed. The task was to read the professional text and then write notes.

- The observed student in group C started slowly with the task. She used a highlighter, marking almost every sentence. Her notes were very long, so the time was short for her and she could not finish her notes.
- The observed student in group B performed as expected. She always knew the answers to the teacher's questions and indicated this by continuously raising her hand. Her notes were concise and accurate, showing a clear understanding of the connections.
- The observed student in Group A was particularly active in the first part of the lesson when students summarised ancient hairstyles based on the teacher's questions. As she often gave good answers, the teacher often called on her. Her notes showed that she had gathered too much information and that they were not sufficiently structured. Her notes were more like a two-page university 'textbook' than notes.

Based on our prior agreement with the teacher who taught the lesson, the observed student from each of the three groups was asked to present her notes. The teacher indicated to each student if any of the points were missing or redundant. At the end of the first lesson, the students recorded uniform notes in their art and fashion history notebooks.

Research lesson part 2

At the beginning of the second lesson, the teacher handed out a mind map template and reminded the students not to use their previous notes in the notebook. The students filled in the mind map based on the text. They completed the task in a much shorter time than writing the notes in the first lesson. All three observed students achieved similar results, which they presented independently to the class on the blackboard. It is to be noted that the observed student in group C was the first in the whole class to complete the mind map. At the end of the lesson, the new learning content was summarised together, new knowledge was taken stock of, using projected learning material with pictures.

Reflection

Immediately after the research lesson, we conducted interviews with the observed students and the teachers who observed the lesson about their experiences, based on pre-defined questions.

Student feedback

- The feedback from the observed student in group C was very positive, she found note-taking a bit difficult, but in the second lesson, already knowing the text and the notes, she was able to fill in the mind map template very easily. By using these two techniques together, she understood the text very well and was able to actively participate in the recall of the content of the professional text in the summary and review at the end of the lesson. She would like to continue learning using this technique in other lessons in the future.

- During the interview, the observed student in group B said that she was familiar with the use of mind maps from her primary school studies and that she liked to use them when learning different subjects. She enjoyed the lesson throughout and highlighted the possibility of working independently as a positive aspect. The student said that this technique was a great help in understanding and processing professional texts and that she would like to use it again.

- The observed student in group A said that she did not mind using the mind map, although she preferred note-taking and highlighting main points when working on professional texts. She also said that she considered the use of the mind map useful for visual learners, but did not consider herself to be one. The lesson was very enjoyable for her and she was satisfied with the activities of the teacher, although she said she always found vocational theory lessons enjoyable.

Teacher feedback

The research lesson went as planned with the following changes:

- The groups were set up before the lesson, which saved us time.

- The groups did not prepare together a group mind map from their individual work, but the observed student presented her individual work.

- The time spent by the students in completing the mind map was significantly less than expected, leaving time for a summary of the lesson.

Response

Our most important finding was that it is definitely worth using a variety of techniques and methods to develop students' reading comprehension. In the research lesson, it was clearly seen that all three groups of students performed the assigned task constructively, so they would most likely be motivated to do so in other subjects. In addition, we concluded that improving reading comprehension can and should be developed not only in humanities classes (such as Hungarian literature or history) but also in vocational subjects. Students do not refuse to use new techniques. Teachers in the school who did not participate in the research lesson may also benefit from sharing our experiences, as many of them struggle to maintain the attention of their students, and it is therefore the task of our LS4VET team to introduce the Lesson Study process to other members of the teaching staff and to encourage colleagues to participate in this kind of teacher collaboration, in Lesson Study.

The Lesson Study journey

The teachers involved in planning and delivering the research lesson got to know each other better professionally, as this required a different kind of collaboration. The benefits of teamwork were clear, with team members working together for the benefit of the students, relying on each other and helping each other. Teachers from the vocational and the general education department became close working partners during the Lesson Study. Indeed, it was an advantage to have teachers of different subjects and thus different competences working together (literature, IT, foreign languages, economics, beautician). An external expert from the services was in constant contact with the hairdressing teacher to discuss the professional content. The research lesson in a practical subject was taught by the external expert in the school's hairdressing workshop, thus ensuring regular coordination with her and her indirect support for our work.

As teachers, we have learned to listen to each other, and to recognise, appreciate and value each other's competences. We also learned the technique of lesson planning in a team. A difficulty was that

we had to work through the LS4VET course material on our own schedule before the group tasks, so we were not always in sync with each other. The expectations of the course tasks to be done were not always clear to us. We did not have any prior expectations of the Lesson Study programme because we did not know what the outcome would be. Learning about the LS4VET programme has shown that this method can be used in vocational education and training and is worth promoting in our own institution and in the other schools of our vocational centre. We have agreed to continue to participate in projects which will help us in our own work. Our institution considers it important to prepare students to learn the techniques of the new interactive vocational examination tasks: single choice, multiple choice, grouping, completion. It would be exciting to explore this in a research lesson using the Lesson Study method.

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3.4 ATTENTION FOR ATTENTION IN A CV WRITING PROJECT USING THE METHOD OF LESSON STUDY IN THE FOUNDATION TRAINING PART OF VOCATIONAL EDUCATION AND TRAINING (HUNGARY)

Gabriella Hajdú (physical education, biology), Péter Tóth Lajos (information technology, electrical engineering, principal), Szilvia Novákné Szilas (Hungarian, German), Szilárdné Varga (English), Ilona Jágri (biology, library, IT and IT library)

Introduction

An interesting thing about our team, and also one of the main challenges of running it, was that one of our team members joined us from the other side of the country. Already the formation of the team required a lot of effort and even during the completion of the first module of the LS4VET course, the roles that each of us could or could not undertake in the implementation of the project were still taking shape. In planning our Lesson Study, we wanted to focus on a topic or problem that would be of practical value to all of us, in all the different subjects and fields of pedagogy represented in our group, that any of us could "reuse" the research lesson in our own profiles. Thus, we chose the theme of the research lesson from the field of digital competences and focused on studying methods to sustain active attention.

The main goal of our Lesson Study was to apply a method that would help to raise and sustain active student attention in the classroom. The observation and monitoring of the research lesson focused on identifying the dynamic changes and phases of students' attention. Our specific choice of topic was based on the assumption that the sustainment of students' attention can be facilitated by more-than-average student activity, asking more-than-average teacher questions (closed, open or rhetorical, "thinking together"). The validity of our hypothesis was verified by monitoring concrete measurable factors during the research lesson, which were also synchronously recorded on the spot.

The five-member of our LS4VET team consisted of teachers from two schools: the VSZC József Öveges József Technical School, Balatonfűzfő (4 teachers) and the MSZC Technical School, Mátészalka (1 teacher). The team was led by a colleague from the Öveges school. Students and teachers from the two schools were involved in the initial collection of data (opinions). In addition, the manager of Katedra Veszprém Nyelvtanoda Kft. (a private language school) was involved as an external expert. The members of our team included teachers of information technology (IT), digital culture, foreign languages, vocational foreign language and physical education, and all had experience as class teachers. The specific topic of our research lesson was writing a professional CV, both because students would need that skill for their first job market appearance and because a digital culture lesson would give them the opportunity to learn about the digital tools and online environments available for CV writing.

Context

Our Lesson Study involved two secondary education technical schools, with almost identical structures but 400 km apart, so we worked on joint planning and analysis in a mostly online collaborative format - via Webex. The research lesson took place at the Technical School in Mátészalka, where the Öveges team members travelled, and two members of the project management team also joined online. Three local teachers (the class teacher and two IT teachers) also participated as observers. The lesson was attended by a class of Year 10 students - another Year 9 class part in the preparation for the lesson - studying in the IT sector. The research lesson was implemented as part of their Digital Literacy subject, which aims to develop students' digital literacy skills needed to learn about and use online applications that are important in everyday life and essential for continuous professional development.

Focus and process

Preparations

There is a widespread perception that it is harder to capture and sustain the attention of today's school-age generation than that of the previous, less "digital" ones. There are many students with attention deficit hyperactivity disorder (ADHD) who require increased attention also in secondary school, and many teachers face the problem that students are unable to pay attention in class or can do that only for short periods of time, whereas that is the basis for successful learning. Students' lack of attention has posed a challenge for most teachers and we tried to find measurable and tangible answers to this issue in order to improve teacher and student effectiveness. Our LS4VET team focused on facilitating and sustaining learner attention through consciously designed teacher questions, and we built the design and delivery of the research lesson and its evaluation on this idea. Our work was supported by using a folder system on a shared drive.

First of all, the quantitative results from the data collection during the research lesson as well as other empirical experiences confirmed that if the teacher asks the students questions during the various phases of the lesson (be it the introduction, practice or summary part), they pay attention more actively, for a longer time and thus more effectively. As a consequence, the learning content is better retained not only in the short-term but also in the longer-term memory, since, for example, with the help of guiding questions, they themselves go through, almost step by step, the cognitive processes that facilitate the organic, logical (i.e. permanent) assimilation of new information. In addition to our own experience, we based our research on, among other things, Meixner's principles (gradualism, triple association, immediate feedback), which are most useful for helping learners with special education needs (SEN), including those with attention deficit disorder, to progress. Our hypothesis on stimulating and sustaining teacher-student cognitive contact through questions was integrated into this framework.

Research lesson

The objective of the research lesson was to familiarise students with the formal elements of a CV, to make them recognise its importance and to apply it in a job search. In addition, the lesson aimed to practise the use of a graphical interface (Canva), exploiting its potential to create a visually attractive document. All this had to be achieved by constantly maintaining students' active attention and its dynamic changes, by alternating student work forms to enhance and maintain student activity, and in particular by the assertive communication of the teacher. In the class, 11 students were observed. Three teachers observed three selected case students and one observed the whole class. The teacher asked a total of about 70 questions. The work forms alternated between frontal class work, pair work and individual tasks and exercises. The students were able to follow the teacher's instructions and each step and responded in a disciplined way. At the beginning of the lesson, there was some uncertainty regarding the formation of groups, but they managed to form the necessary work form. The lesson lasted 55-60 minutes instead of 45 minutes.

The observation of the research lesson focused on eye contact, posture, continuous work resulting from following instructions, asking questions and other motivational characteristics of the students and the quantification of these aspects. The teacher and the student were observed synchronously and our results showed that, in addition to the usual factors that facilitate student attention (e.g. audiovisual effects), the most active periods of student attention were those when the number of teacher questions was the highest. In addition, we completed our data collection by collecting online student feedback at the end of the research lesson and post-lesson student interviews. For this, we used Classroom Screen at the end of the lesson and Google Forms for feedback at a later time.

After the research lesson

Nearly everything went according to plan during the research lesson, the previously set learning objectives were almost completely achieved. Students' knowledge, skills and abilities improved, including their digital and cross-cultural skills. There was some delay in time, mainly because more time was needed to recall students' prior learning in the first lesson after the winter break. From a research point of view too, the lesson was judged to be a success, as all the planned parts were implemented and the observation of the pre-defined aspects allowed for the adequate monitoring of the course of the lesson.

Response

Research on methodology as well as our classroom experience confirms that by sustaining the attention of the receiver for as long as possible the knowledge-acquiring and learning processes are initiated and sustained, making the learning process productive and effective. Of course, attention is not static but changes along multifactorial dynamics, so we assumed that active classroom attention can be sustained if the teacher asks more questions than the average. Some of the findings from the research lesson observations are presented below.

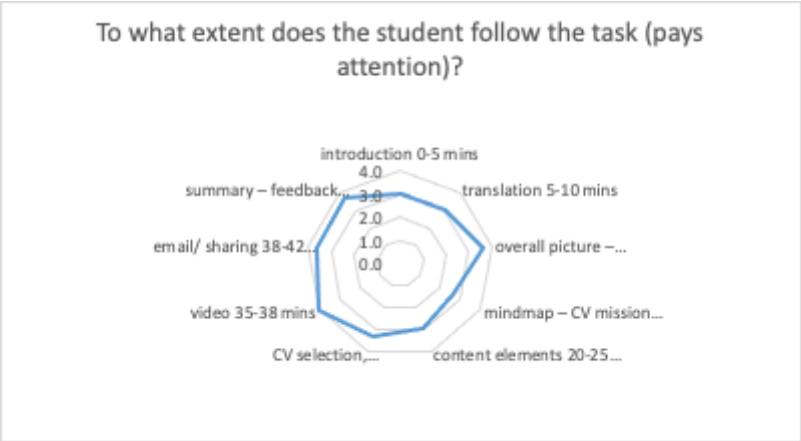


Figure 1. Attention of the 3 case students – average

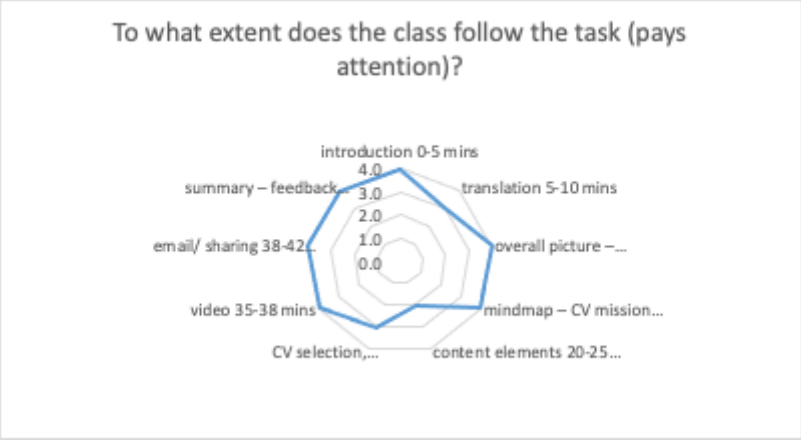


Figure 2. Attention of the class

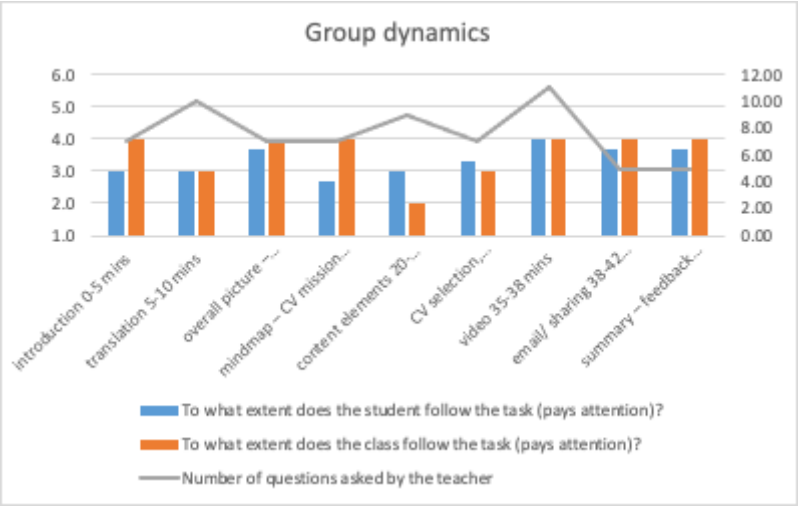


Figure 3. Change of attention and number of questions

The data show that students' attention was at its maximum (for both the class and the case students) when

- the teacher asked the most questions and when the teacher played a video;
- the students' attention was attracted and enhanced by a practical task linked to real life (students visited the website of the company that had announced a search for mentors, where they were given a comprehensive overview of the job announcement and of the company itself);
- a practical activity was implemented (editing a CV using Canva).

Feedback was also requested from the students about three weeks after the research lesson, the results of which are shown in Figure 4. This showed that students considered the practical part as the most interesting. The student interviews and feedback confirmed that the lesson had achieved its objectives. The students became fully familiar with writing a CV. They appreciated most the videos, the online feedback and the many useful questions and help they received.

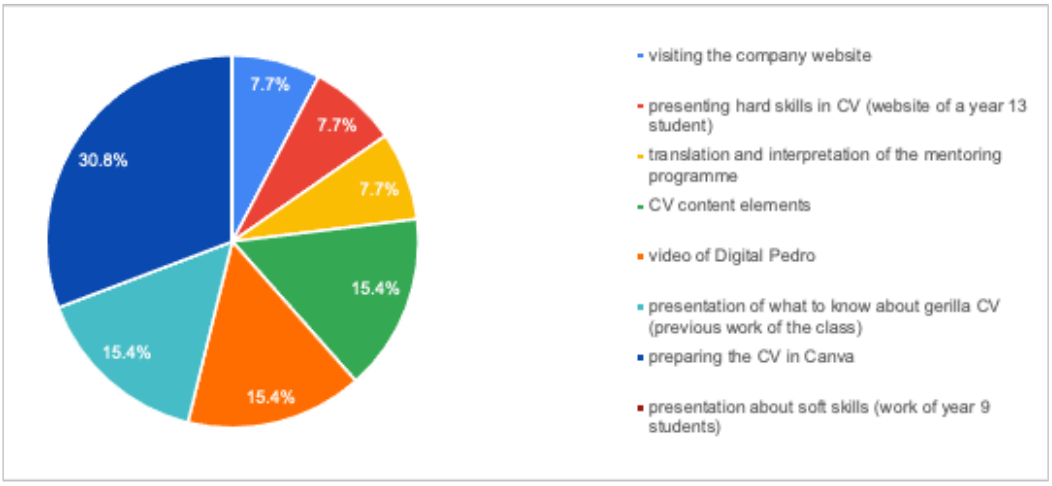


Figure 4. Which part of the lesson was the most interesting?

Based on the observation and analysis of the research lesson we can conclude that active attention is highest when the student is interested in the task (finds it useful) and is focused and active. Media content and teacher questions assist to a great extent to sustain active attention.

The Lesson Study journey

Group reflection

The research lesson went as planned. The observers followed the lesson according to a previously agreed set of criteria. There was some uncertainty in the initial group formation, and students had some difficulty answering the teacher's questions based on their prior learning (soft skills, hardskills). After the initial uncertainty, group order and steady work were established. The number of observers was large in relation to the class - 11 students and 8 teachers -, which may explain the uncertainties of the students.

Individual teacher reflections

- As a practising teacher, especially as one in a SEN-supportive school, my most important pedagogical principle is the motto "I hear-I understand, I see-I remember, I do-I understand". During the research lesson, I monitored the change of student attention and activity regarding the whole class, and in each part of the lesson, I could clearly observe the fluctuation of class activity depending on which of the above-mentioned factors the ongoing task required. It is also evident from the quantified data that the audiovisual stimuli had a higher response, and the practical tasks also almost completely fulfilled their expected role of stimulating attention and activity. Already during the post-lesson discussion, I suggested that, following this line, the structure of the research lesson could be modified in such a way that the students would reach the expected outcome almost from the beginning by means of practical tasks. This of course raises the question of whether or in what way the themes of the preceding lessons should be adapted to such a mainly practice-oriented lesson.

- For me, this project has so far provided the biggest plus in terms of awareness and planning, as I have not only had to observe with analytical precision the lesson management etc. of the colleague who was teaching the observed lesson, but it also worked as a mirror showing my own good or not so good practices. In addition, by rediscovering the theoretical background, I also gained a deeper insight into the nature of learning processes, which I will use in practice, i.e., in my teaching.

- I joined the LS4VET project and got involved in Lesson Study as a school leader. From this point of view, I see it as (another) method in which teacher collaboration is the key. This aspect is completely in line with what we think and should think about education, i.e., acting together and setting an example. Not incidentally, Lesson Study integrates into the pedagogical planning the methods, the project approach and the development of transversal skills that are at the forefront of vocational education and training. This is what I have experienced in practice, from the planning of the research lesson to the post-lesson discussion.

Recommendations for further development

Suggested changes related to the research lesson

- More preparation and less recall would have been needed because many elements aimed at recalling previous learning were added at the beginning of the lesson, which did not fit into the planned 45 minutes. Perhaps the number of tasks was more than could be done in 45 minutes,

but it would have also helped if the research lesson had not been held as the very first lesson after the long winter break (of three weeks).

- The topic of the lesson could be further generalised. Here one topic, a mentoring program was covered, which fitted well the IT sector in which the students were studying. Students' interest could be better captured if the topics were optional to choose from (e.g. applying to a football class, applying for a summer job etc.).

- Movable desks would be more suitable for this lesson, because the placement of IT equipment means that students sit with their backs to the board or the projector, which is a disadvantage when working together, as the student is either looking at the teacher or the monitor.

General conclusions, ways forward

- The learning content was strongly focused on IT but it was also related to the subjects of worker skills, financial and entrepreneurial knowledge and skills and project work in the IT sector. However, the inclusion of further general subject areas might also be considered (e.g. Hungarian and foreign languages, classroom teacher, etc.).

- In the planning step, fewer tasks should be planned in order to allow more time for the implementation phase. Other priorities should be followed. Learning attitudes should also be measured to serve as the basis of planning the sequence of tasks in the research lesson, thus increasing motivated concentration.

- We teachers also need to change our self-awareness as to why it may be important for our students to complete a particular task.

- Teachers' methods of lesson management and questioning culture should be improved.

- We also need to modernise the learning environment, we would need mobile furniture and teacher computers on which the teacher can monitor the work of individual students.

3.5 UNDERSTANDING NETWORK PROTOCOLS: AN INFORMATION TECHNOLOGY LESSON STUDY WITH YEAR 10 (14-YEAR OLD) STUDENTS (MALTA)

James Calleja (lesson study facilitator) in collaboration with the lesson study team members Ann Marie Zammit (IT Head of Department), Daniela Zerafa (IT Education Officer) and Larissa Micallef (IT Teacher).

Introduction

The lesson focused on networking protocols, a theoretical topic which students find difficult to comprehend. In this lesson, students carried out research to list a number of protocols and determine whether these are secure or not, as well as outline their use. During the lesson, different teaching approaches were used, including the use of co-teaching strategies to further engage students especially those with learning and behavioural difficulties.

Picture 7: Teacher supporting students during an individual activity.

The goal of the lesson study team was to introduce co-teaching to facilitate teaching particularly for students with different abilities, learning difficulties and behavioural issues. With the incorporation of co-teaching strategies, the lesson study team intended to support students' understanding so that they could better grasp networking protocols which is a rather theoretical concept – hence, very challenging for students.

School context and the students

St Benedict's College Secondary School has a population of over 750 students and a teaching staff of over 150 teachers and learning support educators. The school is one of thirteen, both primary and secondary, forming St Benedict's College. It acts as a receiving school for boys and girls hailing from the eight Southwest villages of Birżebbuġa, Żurrieq, Għaxaq, Gudja, Mqabba, Qrendi, Safi and Kirkop. The entire school is fully accessible for persons with special needs.

The school's vision is to create a centre of creativity and learning where all students from all backgrounds and through different educational paths, acquire and develop the skills to adapt and succeed in an ever-changing world.

The targeted class was a group of 12 students who are in Year 10. This class is in their second year of studies in Information Technology. The group is a heterogeneous one, having students with both behavioural and social issues, as well as learning difficulties. In the class, there are also a three learning support educators.

This class was selected for two main reasons:

- the chosen topic of Networking Protocols is taught in Year 10;
- the class has various difficulties which do not make it easy to teach them this theoretical topic, as it is not easy for the students to relate to such content.

The lesson study involved the following people:

- **The lesson study team**: a lesson study facilitator working with a teacher, a head of department (HoD) and an education officer (EO) of Information Technology – the HoD and EO co-taught the lesson
- **Observers**: an assistant head of school and two other teachers from the same school (both teaching a VET subject)
- **Knowledgeable other**: the lesson study facilitator

Picture 8: Observers taking note of students' engagement in the lesson

The lesson study team met online to discuss the material – there were six synchronous meetings. Besides this, work was carried out in an asynchronous manner, particularly to go through the course materials and to exchange ideas, via email, about the lesson plan. However, on one occasion, the teacher, head of department and education officer met face-to-face.

The post-lesson discussion was held just after the lesson on 22nd February 2023. The lesson was 80 minutes long and the post-lesson discussion took 35 minutes.

Lesson scope and focus

Although the teacher, HoD and EO collaborate on various initiatives, this was a first opportunity to plan a lesson together, do a lesson study and co-teach.

This lesson study, is intended to help students to learn:

- how to research for information online
- to differentiate between secure and unsecure networking protocols
- about the use of different protocols

Towards this end, the ongoing discussions held during meetings helped so that the lesson study team could unravel the issue and plan a lesson accordingly. During the lesson observation, observers were presented with an observation sheet that included the main lesson targets with a focus on student learning. The data collected by observers was then used to inform our post-lesson discussion and to identify possible areas for improvement.

Main findings

This lesson included a variety of student-centred learning activities that engaged students with different learning needs and preferences to succeed towards the lesson outcomes and learn at their own pace. For example, students were required to take an inquiry approach by conducting research to list different networking protocols and whether such protocols are secure or not. Students were also required to collaborate and discuss their findings through a group work activity, as well as evaluate their understanding through games and a given worksheet. Incorporating an applied and hands-on approach to learning, even though the chosen topic is theoretical and difficult to understand, facilitated students' learning to better engage with the content and make connections to their own experiences and prior knowledge.

This lesson study indicated that theoretical content can be simplified through meticulous planning and collaboration with colleagues. By breaking down the content into smaller, hands-on tasks and scaffolding each task to reach the set objective, even the most complex topic can be made more accessible.

In addition, there was agreement that conducting co-teaching was successful with such class that has different behavioural, social, and learning difficulties as this pedagogical approach supports and caters for all students' individual needs. In the participants' opinion, in this lesson plan, station co-teaching was very effective in providing targeted instruction about the use of networking protocols, as immediate attention and feedback on the students' work was allowed in having a smaller group. For the teacher who taught this lesson, working with another colleague with whom she used to co-teach before, enhanced the creation of an inclusive supportive learning environment that modelled collaboration and respect in complementing one another.

The most important finding was that co-teaching strategies would be beneficial to challenging classrooms, as this strategy could also be adopted between the class teacher and the LSE (Learning Support Educator) in class. It was pointed out that having the opportunity to work with an LSE, who spends more time with certain students in class, can be beneficial for providing individualised and targeted instruction to support these students with diverse learning needs. Indeed, LSEs may have a better understanding of the strengths and challenges of these students, as well as their individual learning styles and preferences, which can help the teacher to inform better instructional decisions and accommodations.

The Lesson Study journey

In the post lesson reflection educators mentioned this lesson study helped to analyse their teaching practices and to share and acquire more knowledge about different instructional practices through collaboration, principally, co-teaching. It helped educators to be more open, share their experiences and collaborate with other teachers, as well as to reflect and be more innovative on classroom practices that cater for different students' needs and motivations.

The lesson study experience facilitated a profound analysis of teaching practices through fruitful discussions amongst a group of colleagues. It provided the opportunity to explore different approaches in an attempt to transform a theoretical topic, which is commonly perceived as dull by students, into a more stimulating and engaging one, allowing students to be fully engrossed in their learning.

Collaboration and co-teaching were effective practices to learn and develop new strategies to teaching and to cater for the diverse needs of students. By working together with other educators, educators share ideas, expertise, and resources, which can help to broaden knowledge and improve instructional practices. In addition, through co-teaching, educators felt that they were able to further address the

individual needs of students, ensuring that every student has opportunities to succeed, regardless of their background, abilities, or learning style.

Educators appeared interested in working to further guide students in a group work activity. In fact, the IT teachers' aim was to better structure the group work activity and delegate each student role and responsibilities to better manage time in the group. In addition, this will also ensure that each student contributes to the group and that work is distributed evenly.

Though time was limited for the lesson study team, another goal would be that they would involve and collaborate more with the LSEs on lesson planning and curriculum adaptations to create a more inclusive and supportive class environment.

3.6 BASIC CULINARY SKILLS IN FOOD PREPARATION: LESSON STUDY WITH YEAR 11 STUDENTS AGED BETWEEN 15-16 YEARS (MALTA)

Therese Camilleri (lesson study facilitator), in collaboration with Ruben Dimech (secondary school teacher), Kevin Ellul (Chef and lecturer) and Ronald Briffa (Chef and lecturer)

Introduction

The lesson focused on cuts using knives and blades, and the correct upkeep, handling and storage of knives. Reference was also made to other food such as (a) fish, nuts, seeds, eggs, and vegetables; (b) the rework of food to minimise waste; and (3) healthy eating.

Picture 9: Students observing the chef using knives

The goal of the lesson study team was to introduce co-teaching to facilitate teaching in the Hospitality lessons. The teacher teamed up with two Chefs, who also lecture at the Institute of Tourism Studies. Together, they worked to develop a practical lesson which was to be implemented in the hospitality lab. The lesson had two central aims, that is, for students to: (1) familiarise themselves with knives, their aftercare, handling and proper storage, and (2) become aware of different vegetable cuts and their uses.

School context and the students

St Benedict's College Secondary School has a population of over 750 students and a teaching staff of over 150 teachers and learning support educators. The school acts as a receiving school for boys and girls hailing from the eight southwest villages of Malta (Safi, Mqabba, B'Bugia, Zurrieq, Kirkop, Qrendi, Ghaxaq and Gudja). The school offers a range of academic subject choices and vocational subjects (i.e. Engineering, Health and Social Care, Hospitality, Information Technology, Media, Retail and Hospitality).

The school's vision is to create a centre of creativity and learning where all students from all backgrounds and, through different educational paths, acquire and develop the skills to adapt and succeed in an ever-changing world.

The targeted class was a group of 8 students who are in Year 11. This class was in their final year of studies in Hospitality. The group was heterogeneous, having students with behavioural and social issues and learning difficulties and, therefore, targeting students with mixed-ability. Having foreign non-Maltese students in class, the language of instruction was English. However, some students required the teacher to explain in Maltese to ensure that all understood. The table below refers to the identified learning intentions for the lesson and how these fit within a range of student abilities.

Behavioural Objectives/Learning Intention: *By the end of the lesson, students will be able to:*			
Criterion	**Low ability**	**Average ability**	**High ability**
Justify the use of different cuts in food preparation.	Identify at least **TWO** different cuts of vegetables through the workshop held with the chef/poster.	Briefly outline at least **THREE** vegetable cuts through the workshop held with the chef/poster.	Describe the **SIX** vegetable cuts through the workshop held with the chef/poster.
Explain the importance of correct upkeep, handling and storing knives in food preparation.	State **ONE** important point about the correct upkeep, handling and storing of knives through the cooking workshop with the chef.	Outline **THREE** important points about the correct upkeep, handling and storing of knives through the cooking workshop with the chef.	Describe the points about the correct upkeep, handling and storing of knives through the cooking workshop with the chef.

Lesson scope and focus

Due to the fact that hospitality education typically focuses on preparing students for careers in the hospitality industry, such as hotels, restaurants, and tourism, it was challenging for the lesson study team to choose a topic – the subject covers a range of areas including customer service, food and beverage service, hotel management, and event planning. Our area of study was food and beverage, specifically food preparation and production.

There were two main reasons why this lesson was selected:

1. Knife skills are an essential component of the final year practical assessment.
2. The secondary school teacher, who assumed the role of teaching the lesson, felt that his students needed more confidence in the content material and required the support of the more experienced chefs/lecturers.

This lesson study was intended to help students to:

- Explain the importance of correct upkeep, handling and storing knives in food preparation.
- Justify the use of different cuts in food preparation.

Resources:

- Laptop, pen drive/external hard drive and projector
- Handout
- Posters (to be distributed to students)
- PowerPoint presentation
- Ingredients and equipment for the cooking workshop
- Tablet

The lesson study involved the following people:

- **The lesson study team**: the lesson study facilitator working with a teacher with six years of experience teaching Hospitality and two other chefs/lecturers from ITS who co-taught the lesson together with the teacher.

Picture 10: Students during a pair work activity using knives

Reflections and main findings

Overall, the lesson study was a successful and efficient professional development strategy that assisted the team to improve teaching techniques and support student learning. The students managed to work well and achieve good exposure to the required basic skills and asked a good number of questions meaning they were engaged in learning. The students collaborated on the given tasks.

The preparation of equipment is ideally prepared well in advance of the lesson delivery. The class structure, which had a traditional setting with students facing the teacher, should have been in a fishbone layout to ensure students are well distributed in the classroom space. The eighty-minute time slot for the lesson seemed enough to prepare two dishes at the planning stage. However, the teacher and the chefs/lecturers noticed that once the students became engaged, it was nearly impossible to do both dishes during lesson delivery. The lesson study team, then, decided that the extra ingredients could be used the following day in another lesson. This decision allowed the students to understand the concept of rework rather than discard food.

During the lesson, instructions were delivered in English. However, some students needed help with expressing themselves in English. The lesson study team agreed that to support the students and ensure standardisation, using a textbook could replace the fact that teachers must compile their notes for student handouts and worksheets. There were some instances of silence, and to overcome this matter, the class teacher started by asking pre-planned questions as a filler.

The main findings:

- Planning and reflection can improve teaching methods and teacher learning.
- Lecturers may better understand student learning needs and adapt their lesson plans by observing students during such a lesson.
- Improving student accomplishment can be accomplished by concentrating on the results of student learning and using data to inform instructional decisions.
- Planning, instruction, observation, and reflection cycles that are iterative can aid teachers in improving their techniques and enhancing outcomes for student learning through their scholastic year

Overall, lesson study provided a powerful and effective professional development approach that helped us as a team to enhance teaching practices and be in a better position to promote student learning.

The following are two conclusions from our experience that may be relevant to other teachers:

1. Successful teaching techniques: Lesson study frequently entails experimenting with new teaching techniques or altering current ones to better suit the needs of students. Learning about these techniques and thinking about using them in one's own teaching methods may be helpful for other educators.
2. A broader understanding of how students learn and the elements that influence their success can be gained by teachers through lesson study. Other teachers can benefit when observations like these are shared for future reference.

The sharing of findings with other teachers is one of the most crucial elements of lesson study. This makes it possible to promote best practices and transfer information between contexts and classrooms.

The Lesson Study journey

The lesson study team met six times to prepare the lesson: holding four online sessions to discuss the material and another two face-to-face meetings. Furthermore, the lesson study team used Facebook Messenger for quick and easy communication, facilitating the planning when the team needed to agree on dates or other matters. The 40-minute post-lesson discussion was held just after the lesson on 3rd February 2023. The lesson was 80 minutes long.

Although, during the lesson, the teacher was supported by two chef/lecturers who collaborated well on the development of the various hands-on initiatives, the team would have benefitted from a trial run. This is because this was the first time that this group was delivering a lesson together and more effective practice in collaborative teaching needed to be developed.

From a broad viewpoint, the chance for us teachers to participate in collaborative, reflective, and evidence-based professional development is the most valuable benefit of our lesson study. With this lesson study, we collaborated to develop, deliver and evaluate the selected lesson in an effort to enhance student learning outcomes. We gained fresh perspectives, improved our teaching strategies, and obtained a better grasp of how students learn by exchanging our knowledge, experiences, and viewpoints. Due to time restrictions, the workload, and the fact that we only had 3 people on our team, this was a significant challenge for us as a team.

Additionally, this lesson study promoted a culture of continual development where teachers were encouraged to work together, try new things, and come up with creative ways to enhance student learning.

This lesson evaluation also inspired us to reflect more and improve our teaching methods to better meet the changing requirements of our students. Lesson study has indeed proven to be a successful professional development strategy for raising the standard of vocational education and training.

3.7 UNDERSTANDING, ANALYSING AND REFLECTING ON COURT CASES (THE NETHERLANDS)

Tom Schurink (facilitator), Nathan Mulder, Jan Pieter Tuinman, Simon Voorberg, Jannick Jansen, Henk-Jan Wessels

Introduction

The main objective of the LS was to gain 'grip' or control over the introduction of the lesson. What stood out from a discussion on our mutual experiences is the lack of action from students after an instruction. Students responded by saying things like 'I don't get it' or 'What am I supposed to do?', or complaints like 'How is this useful?' We wondered how an introduction may be designed that motivates students to get to work immediately? How can a stimulating instruction motivate students to actively engage in their assignments at the start of a class?

We oriented ourselves on theories on differentiating in the classroom, various learning styles and strategies.

Context

The study involved a mix of students from account management, management assistant and administration. Teachers involved were six colleagues from the same section of economics and commerce, and a facilitator who is a teacher at the same educational institution. They have consulted an educational expert as a knowledgeable other.

The course was planned in seven meetings. There was online collaboration and a few short meetings in between to discuss practical, logistical matters. The KO was present during the research lesson as well and gave feedback.

Focus and process

We wanted to gain insight in the part of a lesson that, in the eyes of the teacher, influences the start of the learning process. For this lesson we made a description of the expected learning behaviour of students. We grouped them into three categories: underachiever, average achiever, above average achiever. During observations we focused on these groups and we interviewed several students afterwards.

From the lesson plan:

The research lesson we conducted falls under 'Career and Citizenship' in VET. The corresponding core task is: Developing in career and citizenship, political and legal dimension.

During this lesson, students will look at a high-profile judicial ruling by a judge in the Netherlands. Students delve (briefly) into the case, look at the ruling and give reasoned opinions on what they think

of the ruling. Then they get a short instruction by the teacher on the basis of 2 cases. In smaller groups, these cases are studied with guided questions, an opinion is formed about the case and an expected verdict is noted.

The two cases involve judicial rulings that have been controversial in the Netherlands. The first case involved the murder of a politician. The second case involved a group of (Dutch) tourists who molested and killed a Dutch man during their holidays in Mallorca.

Response

A short summary of some of our findings: Students responded well to the cases. In group work they often 'dived into their laptops' without any prior deliberation. Students who did not get answers to their questions sometimes got frustrated. They want to know if they are 'doing it right'. Feedback with each achievement is important. In general they tend to remain focused as long as their peers remain focused, and group dynamics had a great influence on their work.

We experienced both the contemplation of expected behaviour before the class, its observation during and the interviews thereafter as very valuable. We gained new insights and discovered the different ways in which students experience the same lesson (attention to personalisation / differentiation).

Our main findings of conducting a lesson study were the value of conversations on didactical topics with colleagues. Observing in a colleague's class was very informative as well. Observing and interviewing students led to new insights. Together you see and know more. We also found all steps in the LS process to be of value.

LS journey

Quotes from personal reflections by the teachers.

One:

At first, I was a bit hesitant because I didn't immediately see the added value of LS. Fortunately, I had to change my mind. Even though it was sometimes difficult to make appointments with the group, when we got together it was fun and instructive to think about the purpose and content of the lesson to be given. It was instructive to see other colleagues busy when the lesson was taught and also how the group responded to it. It amazed me that the groups to whom the lesson was given even found an intro about 15 minutes long.... It was also interesting to see how the groups engaged in the processing task and how the feedback was throughout the group. What I took away from the lessons given is that, what we as teachers often take for granted, as a teacher you should always check if the student has understood the instruction, write difficult terms on the board and/or come back to them. Another thing I took away from it is that visiting colleagues' classes with me and vice versa should be given (more) form and content again. Now lessons are often taught alone and there is almost never feedback on the lessons taught. While we as teachers may think we are doing extremely well, a colleague who is watching my lessons may see very different things in me and certainly in the group being taught. I certainly want to take that point into the future.

Two:

In the beginning I had doubts about participating, because it was unclear exactly what was expected of me and what I would get out of it. Still glad I said yes, because I found it instructive to prepare a lesson together with my colleagues. Preparing a lesson is normally something you do independently, but to watch this with several people is instructive. Your colleagues pay attention to different things that you do. You are put on edge again. On top of that, we also evaluated together on the basis of

interviews we had done with students. The main thing I take away from this is that as a teacher I perhaps think too often: 'the student can do this' or 'the student will understand this'. But there are students where this is not true. These students lack certain basic knowledge or have a so-called backpack [social or psychological problems]. For me, a wise lesson is to keep an eye on this in my own classes, so that I can guide each student in the desired way.

Furthermore, being present with each other in a class is very nice and interesting. Both for the teacher teaching the lesson and the teacher visiting. You learn from each other and on the basis of such a lesson, we as teachers can give each other feedback, if necessary, which only makes us better and thus ultimately better educating our students.

Three:

At first the content and purpose of LS was a bit vague for me, however, after the introduction that followed after committing my participation, I got more clarity on the how and why. For all participants, and the KO it was the first time LS was put into practice. This made it a bit of a endeavor to figure out how to put it into practice. In the second and third meetings we worked on the research question, the division of tasks, etc. Gradually I found that our research question could have been formulated more sharply. This shows the importance of formulating a clear and measurable research question.

After the execution of lesson 1, the subsequent adjustments and the execution of lesson 2 made it even clearer to me how important it is to examine how a lesson, made with all good intentions, comes across to students. Is the lesson appealing? Do I connect to previously acquired knowledge? Do I have a good picture of the student beforehand? By observing and later interviewing the student, useful information emerged that can be used in a subsequent lesson. In this second lesson, the adjustments made provided a better result.

For myself, the LS method has been an eye-opener in that it focuses on the student rather than the teacher. I think that a second round of LS could be more efficient and take less time because of the previous experience with a cycle of LS. It is also conceivable to apply LS in a smaller context. I found it instructive to observe and interview students. The interviews with students were open in nature and I got useful information about the lesson, what appealed and what especially did not. I also experienced the collaboration with the other LS participants as pleasant and safe. As far as I am concerned, LS can be used more widely but it is especially important to explain clearly at the front what LS entails. I found this very vague in this cycle. Otherwise, highly recommended.

Four:

I was asked to participate in a LessonStudy program, which was totally unknown to me. I was told that this would be very valuable for my own development as a trainee teacher and would be a nice contribution to my [qualification] portfolio. Beforehand, the set-up was not entirely clear and the goal was still somewhat vague. I did not know exactly what my role would be and how I could be of value in the LS program.

At the first meeting, it became clear to me that this would be about how to teach a lesson, with a subject teaching approach. For me this was a new way of working, I am used to looking at the teacher's actions and matching subject content and didactics.

During the meetings the goal became increasingly clear and I noticed that we as a working group wanted to go for it and kept each other on our toes. Under the leadership of the facilitator we were able to make great strides. By making a schedule in advance it was clear to everyone where we stood in the process and we kept each other focused on the tasks that were still open. The facilitator’s guidance in this was also very valuable.

For me, the meetings were a logical consecutive series in which we first had to get a clear idea of what we wanted to do and in what way. Through a main question we figured out how to turn this into a feasible situation, in this case a lesson.

I look back on a very valuable period. I found the collaboration with the group and guidance very pleasant and everyone had valuable input. The different levels of teaching experience allowed us to look at things from different perspectives.

For me, looking at how to teach a lesson was interesting and innovative for me. As indicated, I am only used to looking at the teacher's actions. After this course, I take away that the way you teach a lesson (and student-centered) is just as important as the teacher in front of the class. My goal for my future career is to collect feedback on lessons from students more often.

Five:

I was asked to participate in a cycle of Lesson Study. For me as a starting teacher, this is an excellent opportunity to learn with and from colleagues. In addition, participating in this cycle is an enrichment for my qualification portfolio.

Examining student behaviour around a predetermined research question is central. By focusing on the student, the cycle takes on a practical character through preparing, teaching and evaluating the lesson. What I like about this is that by conducting the interviews, among other things, we were able to get useful results fairly quickly. A good example of this is the student who indicated in the interview that he would quickly drop out of an instruction if too many difficult words were used for him. Too often in my instruction I assume that one clear explanation can or should be understood by every student. However, the interview with the student in question showed that this is definitely not the case.

I also noticed the difference in starting points (having prior knowledge) in these lessons. What was noticeable is that the students who made themselves heard in class generally also had more knowledge about the topic. Perhaps this was to be expected, but this gave me the insight that when a student shies away it may not always be due to a lack of interest. A bit of understanding explanation can already help boost motivation.

In the beginning of the cycle I found it difficult to get a clear picture of the goal. Gradually in the process this changed. I think that the well-defined time schedule (cycle of about 8 weeks in total) and the clear instruction and guidance of our facilitator had a positive influence on this. I do think that the research question could have been formulated a bit better/clearer (more SMART).

I experienced the whole process as instructive and definitely see the added value of working together with colleagues in this process. The whole process has shown me that the perfect lesson does not exist and that there are always aspects that can be used better or differently. Lesson Study, in my view, is a great tool for achieving this. I can therefore imagine wanting to participate in such a cycle at a later date. On the one hand to deepen my professional basis and on the other hand as an expert by experience to improve the cycle as a whole.

3.8 CONNECTING PRACTICE TO THEORY - TEACHING STUDENTS TO REFLECT ON THEIR QUALITIES (THE NETHERLANDS)

Maud van den Eijnden (facilitator), Jacoline Lokhorst-BOer, Job Bareman, Jenny Terspstra-Tromp, Annelies Oostra, Kirsten Hettinga, Nicole Deenen, Jeroen Reilink

Introduction

At two Landstede locations, we designed and respectively redesigned a lesson. We worked together from different courses, landscapes and backgrounds. The purpose of the study was that we worked together from different vocational schools to improve teaching practice and quality by going through a research cycle (LS4VET Model).

The main objective of our research lesson was: The student is able to name the connection between professional practice and theory during the lesson which makes the student demonstrate active learning behavior. We chose this goal because we all come from professional practice. In our teaching practice, we experience that students have very variable motivation and are easily distracted. We want to investigate the effect on active learning behavior by linking to professional practice in class.

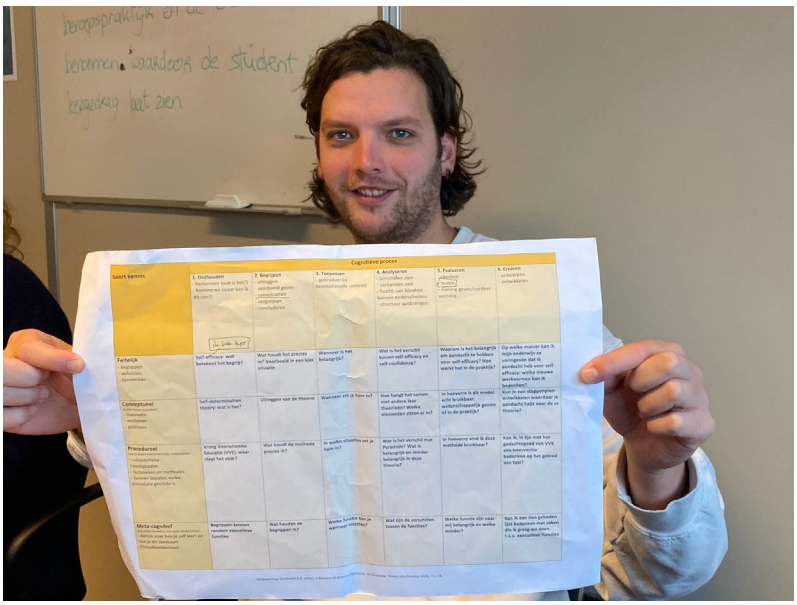
Context

The Lesson Study consisted of a number of phases and the course was planned in eight meetings.

Preparing a research lesson, observing this lesson on site and then reviewing and modifying this lesson. The improved lesson was taught to another class, with students taking a different vocational course at a higher level of education. Evaluating the Lesson Study project was the final phase. Each phase provided learning moments for us. As we prepared, we reflected on our lessons and those of colleagues which increased our frame of reference.

Focus and process

The LS team consisted of six teachers from various fields (education, nursing, agriculture, social care, hospitality, trade and commerce), a facilitator and a KO.



At the beginning of the cycle, we scheduled eight meetings, including two class visits. It was a logistical puzzle to meet bi-weekly in a three-month time frame. During our meetings, reporting took place via minutes in MS-Teams. We created a folder structure according to the LS4VET model.

A complicating factor was organizing the research lessons. We would like to explain this from the content and context. Regarding the content, we chose to design a citizenship lesson because

citizenship is taught within all vocational courses. Regarding the context, the group differed in class size, vocational training, difference in education level, age, time of the lesson.

Two people from the team were able to find space to organise a lesson at their location. Following the LS4VET model, we started by setting the goal, then we started studying, together and alone. Then we prepared and taught the lesson together. We used our observations and interviews from the first research lesson to redesign the lesson. The topic of the lesson remained the same, but the context (target audience and education) changed. Then the second research lesson was taught and we evaluated it.

For the research lesson we had as objectives that students can explain in their own words what reflection on qualities means to them. They can explain how to put their learning (qualities, reflection) into practice. Practically, they can form a top three of qualities of which they are able to explain how these are their own qualities. And students can name at least two qualities they want to develop further and connect these to personal goals. In brief: The objectives of the class were explained, students were presented with possible qualities and hand-outs, and guided with questions to reflect on those together. These were related to their field and future carreer.

We consulted an educational expert as KO. Theoretical insights gained through this so-called knowledgeable other related to:

- Insights from cognitive neuroscience articulated by neuropsychologist Harold Bekkering (Bekkering& Van der Helden, 2015). Bekkering shows how the brain learns and the importance of human autonomy and social connectedness for optimal learning. The balance between cognitive (language, math, etc.) and social learning (learning from and about others) is crucial.
- Bekkering argues that it is precisely a good mix of these parameters that optimally enriches the student. That optimally enriched student is then much better able to take his/her place in society.
- Acquiring knowledge from books (insights from others) goes hand in hand with learning by doing.
- At school, it should be about learning all kinds of canons that society considers important as well as the things that the student considers important.
- The importance of metacognitive questions to students in secondary school education.
- Speaking the language of the student, understanding his world, social context and ambitions.
- Motivation cannot be read from the behavior they show in the classroom, but the fact that students come to school to learn is a signal we definitely should not ignore. The choice to go to school was already a choice of motivation!
- Modeling has increasingly become a mindset for creative theory development that makes instruction connect to the student's world. It is important to adjust your expectations. Even if as an instructor you think students should be able to understand and complete the assignment, low self-esteem keeps many an MBO student trapped in their development.
- The importance of the Socratic method, through the six steps you can help students think critically.

- Active learning behavior has a lot to do with activating didactics; activating didactics is a collective term for all pedagogical-didactic interventions of a teacher to stimulate the (thinking) activity of his students. The idea behind this is that active students achieve greater learning gains (Geerts & Van Kralingen, 2021). A key premise of activating learning is that students are responsible for their own learning, with teachers playing a facilitating role to support this. Theoretically, activating learning stems from social constructivism, in which learning is seen as an active process where students construct knowledge and meaning from their own experiences in a social context (Educational Vision Landstede Talentvol Ontwikkelen). Within this approach, therefore, the focus is more on the student's learning process than on the specific subject or lesson.

Response

Our main research findings regarding activating learning are:

- We heard - in class and during the interviews - that a number of students struggle with low self-esteem. This hinders them in naming their own qualities, but they are good at making the link between qualities and professional practice.
- Apparently inactive learning behavior can be purposeful. We had to adjust assumptions: when we saw students busy on their cell phones or chatting, we interpreted this in advance (when drawing up observation criteria) as inactive learning behavior, but this turned out not to be the case.

- We saw that having and expressing high expectations stimulates active learning behavior, especially through the recognition and belief that students have much to offer.
- Follow-up question: how do you differentiate? What do you need to do that? In what way do you do justice to the individual student within the zone of near development but encourage learning from and with each other?
- We spontaneously shared our insights and experiences from Lesson Study in our teams, thinking that Lesson Study is an appropriate method to evaluate your teaching and redesign lessons based on observations.
- We tried different forms of work by using student input in the second lesson, then linking to professional practice and lastly to the person of the individual student. In this way of working we recognise the LS4VET model.
- To stimulate active learning, class arrangement matters! We saw the effect on class management, on student engagement and teacher-class interaction.

The Lesson Study journey

During Lesson Study and specifically with respect to LS, we discovered three important things:

1) In our work we are often alone in front of the class and therefore our work has a solitary character. As a teacher you only see a limited piece of the behavior of the student(s), extra eyes broaden your view and that broad perspective does the student much more justice. Through the interviews it became very clear that checking through formative assessments is crucial, there were large differences in interpretation of the concepts in lesson 1. To seamlessly match the student's learning needs, clarifying the initial situation is indispensable. We became aware of the ease with which we as teachers make assumptions. Those assumptions were exposed in our conversations about our observations. For making a professional and honest translation from observations to conclusions, consulting the student, what we know from research and literature and clarifying the context of the classroom is evident!

2) If you want to discover something you have to do methodical and frequent research. The LS4VET model has given us valuable tools to do this well. This has contributed to our professionalism when it comes to what conditions a VET teacher needs to be able to teach well: coordination with colleagues and experts, extra eyes in your lesson with a view to quality improvement, evaluating and reflecting.

3) We experienced the intensive collaboration and practical exchange in our LS team as learning in a professional learning community. Our conversations were deepening and reflective of knowledge, skills and attitudes. The exchange with an expert in lesson preparation offered new insights on our teaching practice. Lesson Study contributed to our inquisitive attitude. We worked systematically during these weeks. We adjusted our goals, looked back on the lesson together, and looked ahead by adjusting the lesson. We share our experience in our teams as well as the insights on what contributes to active student learning in VET.

Quotes from individual reflections by the teachers:

One:

I expected to learn a lot through collaboration with my fellow colleagues, and have also experienced this as such. Exchanging thoughts, asking questions makes me look more broadly at education with

which I fill my backpack with new ideas, knowledge and experiences that I can then put into practice. The objective of our LS research also aligned with my learning needs; how can I get students to engage in active learning behaviour? We quickly came to the conclusion that experiencing (professional) practice plays an important role in this. It was nice that each colleague took responsibility in the process. I did sometimes experience the meetings as chaotic, in this I could notice that we are a pilot group regarding LS, I sometimes missed in this the consultation structure and the goals we wanted to achieve at that moment, often we also just needed more time to design and complete the tasks such as the lesson or observation form. In the end, we were able to teach two lessons. I got to teach the second lesson. I found this exciting, also because I find it exciting anyway when someone is watching me in class. LS made me realise that it is not about my actions but how the student reacts to the lesson we designed.

When I look back at working cyclically through LS, the process has been especially instructive for me rather than the end result. As described above, I learned a lot from my fellow students but also from the KO, through which I came to new insights: the student is always motivated, but the question is how do I connect to that motivation of the student so that the active learning behaviour becomes visible in the lesson. He also mentioned Feuerstein's method, which I know from my work in disability care. Indeed, Feuerstein looks at people's potential, the development of thinking and learning skills, and there is no ceiling or limit to the student. Every person learns in their own way, and every small step is one. The art for me is to observe how I can connect to those possibilities of the student. During LS, one of the experiences I have had is that observing in the classroom, by the way, is not always easy because there are many students involved in the lesson, and there are various group dynamics at play that make me as a teacher easily distracted. For example, sometimes it seems that a student is not paying attention but turns out to be actively participating, and also vice versa, the student who seems to be actively participating but is secretly shopping on her laptop. Through LS, and the specific observations, these details emerge.

Through LS, I began to look differently at the student's active learning behaviour and learning needs. Every student is different and has different learning needs in this. In teaching, as a teacher you have to be able to differentiate in this, and then I wonder to what extent it is possible to tailor teaching to the different learning needs of the students in the class. In some subjects, I think that would be fine, such as math or English (the generic subjects), but how do you do that, for example, if you give a lesson on 'healthy lifestyle' or 'quality reflection'? How do you adapt the forms of work, assignments and how do you determine who gets to do what. Differences in the class may and should be there, but how do you make sure that every student feels treated equally and seriously, without someone feeling backwards because he is not yet on the same level as his fellow student. Differentiating is therefore definitely a topic I would like to delve further into and in this I think LS can be a great research tool.

Two:

After explaining Lesson Study (LS), I was curious as an VET teacher because I saw this as a great opportunity for collaborative learning. This research has contributed for me as a beginning teacher to my work as an VET teacher. The LS4VET touches on proficiency requirements for VET teachers, and you go through them with the group. Of the proficiency requirements, one or more points came up because you went through a cyclical process. Think Professionalism: we had to organise, plan, communicate, research, work together and learn. Professional competence: relationship to the professional context, reflected in our goal. Didactic competence because we were going to design, implement and evaluate education. Pedagogical competence Development of students social-emotional, moral and (professional) identity. This is reflected in the lesson objectives.

I wanted to experience for myself what it is like to go through an LS4VET cycle and pay attention to input from colleagues and how I myself view this. In order to learn from each other. By seeing where I am confirmed in what I already do and can apply colleagues' best practices in my own teaching.

We went through the LS4VET model in the group. This was something I wanted to participate in and provide input where I could. Attended all the meetings, did the homework and actively participated in the appointments and meetings. I did this by asking questions and answering questions where I could. In the beginning I thought: what have I started with, because it was quite unclear to me. I did not know what was expected of me. As the meetings progressed there was more and more clarity which made it easier for me to participate in the meetings. I myself expected that there would be more guidance from someone who could support me more specifically because, especially in the beginning, I had the feeling that I was drowning. Where I could I tried to provide structure by asking or summarising questions, and asking if what I heard was correct.

In retrospect, I am glad I participated, it enriches your knowledge and experience in teaching in order to professionalise as a VET teacher. Why do you do what you do? For what purpose do you use a form of work? What form of work do you use? Classroom management? This gives a good feeling and sense that you are on the right track in teaching.

Lesson Study is a whole that you must go/are going through as a group. Now that we have fully gone through the LS4Vet cycle it is easier to say it makes sense than if you had asked me this in meeting 2. You want to give the best lesson and this requires time, sparring with each other and you are constantly polishing to make the lesson even better. Everyone takes input into the lesson from their own experience. It was useful that we agreed on the meetings in advance because it takes quite a lot of time and in addition to all the other work it is sometimes quite puzzling.

It is very valuable to do this together in a group. We are dealing in our Lesson Study with colleagues who are entry-level, teach at different courses, year groups and sites. This brought a lot of expertise and input from different points of view. It gave me experience and knowledge to apply in lessons. What stuck with me most of all as an observer of the lessons given. As a teacher, there is more you don’t see happening than what is happening. You don't hear everything that is said, you are short of eyes and ears. Furthermore, it contributed to how I approach my teaching, confirmed in the way that it is valuable to make the link from practice to teaching. Consciously seeing if I can speak in the language of the students. So that you keep testing/ keep asking if you have the same frame of reference/expectations. It helps that you have prepared the lesson well because then you know what you are doing and why you are doing it. What is also important is to evaluate with your students what they thought of the lesson/work format. Because ultimately you want to encourage the student to engage in active learning behavior. I do believe that the link to practice is essential in that based on your own experiences and based on LS.

Alternatives that can be applied next time are a baseline measurement so that you also have the initial situation of a class, which allows you to draw a more concrete conclusion as to whether it is also due to what you have devised in terms of, for example, working methods. We had the following goal: The MBO student can name the connection between the professional practice and the theory during the lesson so that the student shows active learning behavior. We gave the lesson to two different classes (courses) of different levels and years. An alternative next time could be to run this within the team with an LWP writers group or teaching teachers of an LWP. With this you improve the quality of the lesson, cooperation with colleagues is also better in my opinion because you prepare the lesson together. In addition, it can also help with the development of LWPs. It is important that you listen to the student, evaluate work form/lesson. It is important that you do not make assumptions but keep checking with the student. I also found that group dynamics are important. After our last lesson, I had an interview with some students where the group had only just switched and the students indicated

that the way this happened was not nice which prevented the students from doing anything else. Like evaluating the lesson we actually came for. Possible disadvantages are that it takes a lot of time especially if you haven't gone through the LS4Vet model yet, scheduling meetings, scheduling classes. This comes down to a lot of replacing each other in a team. It does add up and this can also create resistance from colleagues. You need a facilitator from LS to help the group progress through the different steps.

As far as I am concerned, it would contribute if this were used more widely within Landstede and e.g. within the team. As a teacher you are always trying to improve education. A team often has different goals and wishes e.g. watching each other in class, aligning education and I think if you look further into formative action you can pack a lot together if you do LS within your team with a number of colleagues because you also improve the quality of education and professionalise yourself as a teacher.

As a starting teacher within the PDG, the way we have done this is precisely instructive because you work in different teams, courses, year groups and branches. This gives a lot of input and that broadens your horizon. I will definitely take this input to my own team and will give feedback on this during a team meeting. Furthermore, I myself also took a large part of the LS lesson and gave it to my own coaching students, they had a positive reaction to this.

Three:

During the first meeting, the content of the project was explained and what steps we would take towards the final result. This appealed to me immediately and it seemed very interesting to use this way of research within the mbo[8]. In addition, I realised fairly quickly that the research would fit in very well with the portfolio I will submit for my qualification. In addition, I think that this research will enrich my portfolio and in this way I can demonstrate the competences of an VET teacher. Beforehand, I was very much looking forward to collaborating with colleagues from other subject areas. I was very curious about their experiences and perspective on education. During the second meeting, we searched as a project group for a common goal. The goal emerged very quickly and I found it quite striking that each of us immediately agreed on the common goal. My colleagues' experiences matched mine and was in the area of student motivation. Where did it come from that the student had low motivation and engagement in class, and how could we encourage the student to engage in active learning behaviors? In addition, we unanimously agreed that perhaps engaging the field could increase student engagement and motivation. This was easily employable for us since we all have a lot of experience from the field as lateral entrants. In the subsequent meetings, we started to investigate which professionals matched our goal and could perhaps add value.

I sometimes found the structure of the meetings a bit messy. It was not always clear beforehand what was expected of us during the meetings. It was clearly visible that we were working from a pilot. A point of attention here was perhaps that the mutual coordination of the guidance could be a bit more attuned. During the lessons (given by Job and Jacoline) I found it great to look at the lesson from a different point of view. There is so much going on in the classroom that you can't see when you are in front of the group. This is something I am now aware of during my own lessons. It was also great to attend a lesson of colleagues and this was very instructive. During the process, I noticed that it was sometimes a bit difficult to get together with our LS group. The mutual distance and agendas did sometimes cause a barrier here.

Looking back on the LS project, there is one thing that stood out for me. I myself sometimes saw it in a somewhat negative light when a student was not actively participating in class, but I am coming back

[8] middelbaar beroepsonderwijs, that is, secondary vocational education

to this. This is because I have gained insight that a student comes to class with a purpose. Simply by being present in class, the student shows that there is a certain motivation. To follow up on this, I have become even more aware of the need to respond to the student's needs during the lesson. What does the student want to learn during the lesson and let the student form the learning objectives here. The conversation with the KO really changed this for me and I found this very interesting. Through this experience we might have been able to use these professionals even more. After all, this would have been the perfect opportunity for it. Looking back on my observations, this is very valuable. I will have to do this more often in my classes. However, it is difficult when the group is so large. Perhaps the student could be used for observation here as well.

After LS, my conclusion is that involving the field does add value on student engagement. In some cases a student did participate in the lesson while perhaps as a teacher this was not always perceived that way. My conclusion from this project is that it is very difficult to have different levels of education in the same class. The needs of the students are very far apart and differentiation will have to be used. The use of differentiation is something I want to work on more for myself. So at times students will have to engage in a form of work, where other students may still be actively participating in instruction from me, as a teacher.

Four:

With this research we wanted to investigate whether you can positively influence students' active learning behavior by very emphatically starting from practice, and then linking theory to it. Very interesting for me because I just started teaching in VET. I noticed from the very beginning that students at the VET emphatically learn differently than children at an elementary school. So I really wanted to participate in this study. I was also very curious about how LS works together and expected it to be very instructive. Learning with and from each other. I especially wanted to pay attention to the process during this research.

We conducted the research by preparing 2 times a lesson together, teaching this lesson, and observing the students' learning behavior. During the process, we also looked at the theory already written on our topic and heard an expert on motivation and its factors. My own goal was also to expand my own knowledge about and experience with the pedagogical and didactic challenges I face, now that I teach in VET. I think it would be great to start doing this in conversations with others.

At the very beginning, I was very motivated to participate in Lesson Study. Since I had no experience at all in working out a study, I thought it would be really nice to do this in a group. So that we could start learning with and from each other. Because: alone you are faster but together you go further! By working together to design a lesson, observe it, discuss it afterwards and redesign it, we could also go through the research cycle together twice.

Periodically, I had to remind myself that the outcome of this research is not the most important thing, although I wanted an answer to our question. I made many other discoveries throughout the process. Together you see much more: things that you don't notice as a teacher simply because you can't see everything that happens while you are teaching, do become visible when you watch with several people. If you observe the behavior of students in a focused way, you can really focus on that. It became very clear to me that you run the risk of interpreting certain behavior as inactive, while it turns out not to be! Also during the preparations I found it very rich to get input from different angles, each participant looking at it from his or her own perspective and/or experiences. By discussing and redesigning the lesson with each other, I learned more about the application of different working methods appropriate for the target group. As probably with any form of collaboration, I ran into a number of issues: How do you work together to ensure that everyone feels involved in the research?

Also, the form in which things had to be done was not always the most appropriate for us, and were also often unclear. In this we had to look for alternatives ourselves.

It was an important discovery for me that the motivation in students is there even though sometimes it doesn't seem so: after all, they came into the class! It was up to me to connect with them. By choosing activating work forms but also by addressing the students each at their own level or learning preference. This demands quite a lot from me as a teacher. As a teacher, you have to connect to their abilities. Going through this together has given me many new ideas and has expanded and enriched my repertoire. My own lessons become didactically stronger from this.

Surely the most important discovery for myself was that working together is very effective for me. I enjoy tackling things together and improving each other's skills in pedagogy and didactics in this way. Sometimes I got really confused by the lack of clarity about what exactly was asked of us. Then I lost the overview, and especially the framework within which we could work. I then feel myself becoming more passive, while that is the last thing I want. I was able to make this clear a number of times, and by asking about it I was able to pick up the thread with the others. A very instructive experience for me.

I really started to look differently at student motivation as I described above. I want to start looking critically at the assumptions I sometimes have about students. Because of the mostly low self-esteem that students have in college, they really need different things from me. They are entitled to an open mind from me.

I am fortunate to be in another coaching group, so we are in the classroom together on a regular basis. I want to scrutinise my students' behaviour more often by making targeted observations during lessons and having conversations with them about their learning behaviour. This can give me more insight into what they need in it. The deepening of differentiation is for me a logical sequel to this. This could very nicely be shaped via an LS round, together with my colleagues from Education.

Five:

Last semester I participated with my fellow students in the pilot of Lesson Study in VET. During Lesson Study research, teachers gain didactic and pedagogical insights by sharing experiences. In this Lesson Study study, our goal was to see if we could increase active learning behaviours in students by linking to their own practice. We chose this because every teacher on the research team noticed that motivation grew when the teacher made a connection to professional practice in their lesson.

We made a lesson about qualities and how to use them on an internship or later in the work field. I gave this lesson to my class. We evaluated the lesson based on observations and feedback from the students. Then we modified and improved the lesson and a fellow student taught the lesson. After the second lesson, we evaluated the lesson again. We went through this cycle twice to improve the lesson.

Even though I and the group started enthusiastically, it has been a chaotic process. The first few meetings we struggled with a research question. That took longer than we had hoped. But that we were going to talk about "using qualities in practice" was clear. Once we had a research question we prepared a lesson. We decided that I should teach the lesson. Because the lesson was going to be observed by my fellow students/colleagues this gave me excitement. Since the lesson is an essential part of the research, I felt the responsibility as a pressure. On the other hand, I liked the idea that I could take charge of an important part of the research.

The research lesson was observed by six colleagues. That way, all students could be watched closely. After discussing the observations, it struck me enormously how many important signals and information you actually miss. As soon as you are the only teacher in front of the class, you cannot

distribute your attention properly to the whole group. Certain behaviours or signals from students are often overlooked. While these can be of great importance for the student's learning. For example, it happened to me that I characterised two chatting students as disruptive and called them on it. While they were talking substantively about the material. They were helping each other, thus both were learning. Discussing observations with colleagues makes you look at your actions and lessons with different eyes. Besides trying to answer a research question, I found that observing a colleague's lesson and evaluating it makes you develop as a teacher because you are made aware of shortcomings, and confirmed in what you do well.

Through this research I have become immensely aware that as a teacher you miss many signals. The more signals you catch, the better the student can learn. One teacher can never catch all the signals and give every student equal attention. It also fails to offer every student what he needs at that moment. But I always remain aware after this research that I need to ask more of the student. Just because I may not have seen or noticed something. Example questions are: "Were you able to follow along?" "Did you understand the assignment?" "How are you sitting? I want to try to ask these questions to everyone. Not just to the students who stand out. Without this Lesson Study process, I was never so aware of them. I have learned the importance of being mindful of the whole class. When you have an eye for the whole class, the whole class can learn.

In the future, I am going to ask more about student experiences in my classes. I want to know how they experience my lessons and if they can follow the material. I tend to focus on the students who demand more attention. The inconspicuous students don't always get enough space. While they deserve the same attention as the students who stand out.

When I ask students about their experiences about the material and the lesson, I can improve my lessons. In addition, differentiating within my lessons is easier. By doing this, my lessons are more in line with the student's learning needs. It may mean that the student needs more of a link to practise, but it doesn't have to. By being more attentive to the student's needs, I am going to improve my lessons.

4. LESSON STUDY IN VOCATIONAL EDUCATION AND TRAINING

In this chapter, we first present the experiences of the implementation (piloting) of the LS4VET Model by VET teachers who carried out Lesson Studies as part of their learning in the LS4VET course in the four partner countries. This is followed by a brief discussion of the similarities and differences of these experiences across the countries.

Each country description begins with a short description of its VET system that provides the context for the following analyses of the pilots as well as the country-specific policy recommendations in Chapter 5. The country experiences of doing Lesson Studies in VET are discussed structured around the three goals of the LS4VET Model:

1. **Developing adaptive teachers through inquiry**: an analysis of the nature of the research goals adopted st by the LS4VET teams, the prompts and rationales behind choosing these goals, and the type of student and teacher competences they wanted to develop;
2. **Cross-boundary collaboration and learning**: an analysis of the teams' composition, the nature of collaboration within the teams and with knowledgable others, and of the learning processes and outcomes resulting from boundary crossings;
3. **Sustainability**: an analysis of intentions and measures towards continuing to do Lesson Studies by theparticipant VET teachers and their schools.

From the following country descriptions, in addition to the common features, the local differences, which arise from the differences in system elements, goals and opportunities, are again clearly visible. The reader should pay special attention to the characteristics of the heterogeneity and boundray crossings of the teams participating in our project, as we believe that this is one of the most challenging, but at the same time also the most promising unique feature of our adaptation of Lesson Study to VET.

4.1 LS4VET IN AUSTRIA

4.1.1 VET IN AUSTRIA

1. The dual vocational education and training (VET) system in Austria

The dual vocational education and training (VET) system in Austria is a model of vocational education that combines practical training in companies with theoretical education in vocational schools. This system is known as "dual" because it involves two complementary and interdependent learning locations: the company and the vocational school.

In Austria, the dual VET system is a key part of the education system, and it is widely recognised for its effectiveness in preparing young people for the world of work. The system is designed to meet the needs of both the labour market and young people, providing a pathway to a career and ensuring a supply of skilled workers for the economy.

The dual VET system in Austria is structured as follows:

- Basic education: Students typically begin their vocational education at the age of 15 or 16 after completing their compulsory education. They can choose between more than 200 different apprenticeships in various sectors of the economy.

- Training in companies: The practical training in companies lasts three to four years, during which apprentices work and learn under the guidance of skilled professionals.
- Vocational school education: Apprentices attend vocational schools for one to two days a week, where they receive theoretical education in their chosen field of study.
- Final examination: Apprentices take a final examination, which is a combination of a practical and a theoretical exam.

The dual VET system in Austria has several advantages:

- Close collaboration between companies and vocational schools ensures that the skills taught in schools are aligned with the needs of the labour market.
- Practical training in companies provides hands-on experience and allows apprentices to develop the skills needed for a particular job.
- Apprentices earn a salary during their training, which makes the system attractive to young people who want to start their careers early.
- The final examination ensures that apprentices have acquired the necessary skills and knowledge to be successful in their chosen field.

Overall, the dual VET system in Austria is an effective way to train young people for the world of work and to provide skilled workers for the economy. It has been successful in reducing youth unemployment and ensuring that young people have the skills needed for a successful career.

2. Colleges for higher vocational education in Austria

Colleges for higher vocational education provide five-year courses which provide the pupils with an in-depth general education and professional training at the same time. On successful completion of the standardised school-leaving examination called the Reifeprüfung and a Diploma Examination, a graduate from a higher vocational education college is entitled to undertake a course of study at a University, a University of Applied Sciences or a University College of Teacher Education. The Diploma Examination provides access to legally regulated professions in accordance with the Trade and Industry Code. These colleges provide advanced training for specific professions, such as business, engineering, or healthcare. The programs combine theoretical learning with practical training and internships, and the goal is to prepare students for high-level technical and managerial positions in their chosen fields.

4.1.2 RESEARCH GOALS ADOPTED BY VET TEACHERS IN AUSTRIA

The following overview of research goals and starting points have been allocated from the Padlet group work during the ME (see Picture 2). Moreover, the research questions as shown in Table 4 were brainstormed and refined in the phase of collaborative planning. During the ME, the teams also discussed topics they considered hard to teach in group work. Their discussions created the typical starting points and reasoning behind choosing the research goals and or LS-RL topics.

Table 4: *Starting points, research questions and focus areas*

Team	Subject	Starting point	Research questions	Focus
1	Maths	Computational joinery of uneven slopes and hem heights	How can we reactivate the previous knowledge of the angle function from secondary school? What is the simplest way to introduce spatial awareness to the pupils?	subject-specific
2	Tree nursery: specialist theory	Learning technical terms	How can teachers develop innovative methods to consolidate technical terms sustainably, i.e., not to learn them by heart, but to apply them in professional practice? How can we best support our students to find/use appropriate and personalised learning strategies?	general and subject-specific
3	Maths	Percentage calculations (final calculations, specialised calculations)	How can we ensure that in abstract arithmetic each student can find and use their own way of calculating and solving problems? How can students find their own approaches to solving abstract and computational tasks for themselves in a practical and logical way? How can teachers reduce the fear, or barrier, of numeracy and number-related tasks pro-actively?	subject-specific

4	Maths	Basic mathematical knowledge Spatial imagination	How can we sustainably and efficiently revise missing basic knowledge in mathematics (basic knowledge) so that the development of new learning content can succeed? How can we present theoretical input using practical examples or combine theory and practice in the classroom?	subject-specific and general
5	Technical drawing	Technical drawing, political education, tolerances, fits	How can we promote the spatial imagination of the pupils with the help of a 3D print? How can we incorporate the idea of sustainability in relation to technical drawings?	subject-specific and general
6	Construction practice and production technology	RJ 45 plug, technical terms in electrical engineering, brick bond	How can we efficiently delegate the individual roles in group work? How can we analyse and understand the relationship between attention span and motivation?	general
7	Workshop	Craftsmanship	How do I choose the right file for my needs? What techniques and tips are there for working effectively and precisely with files?	subject-specific

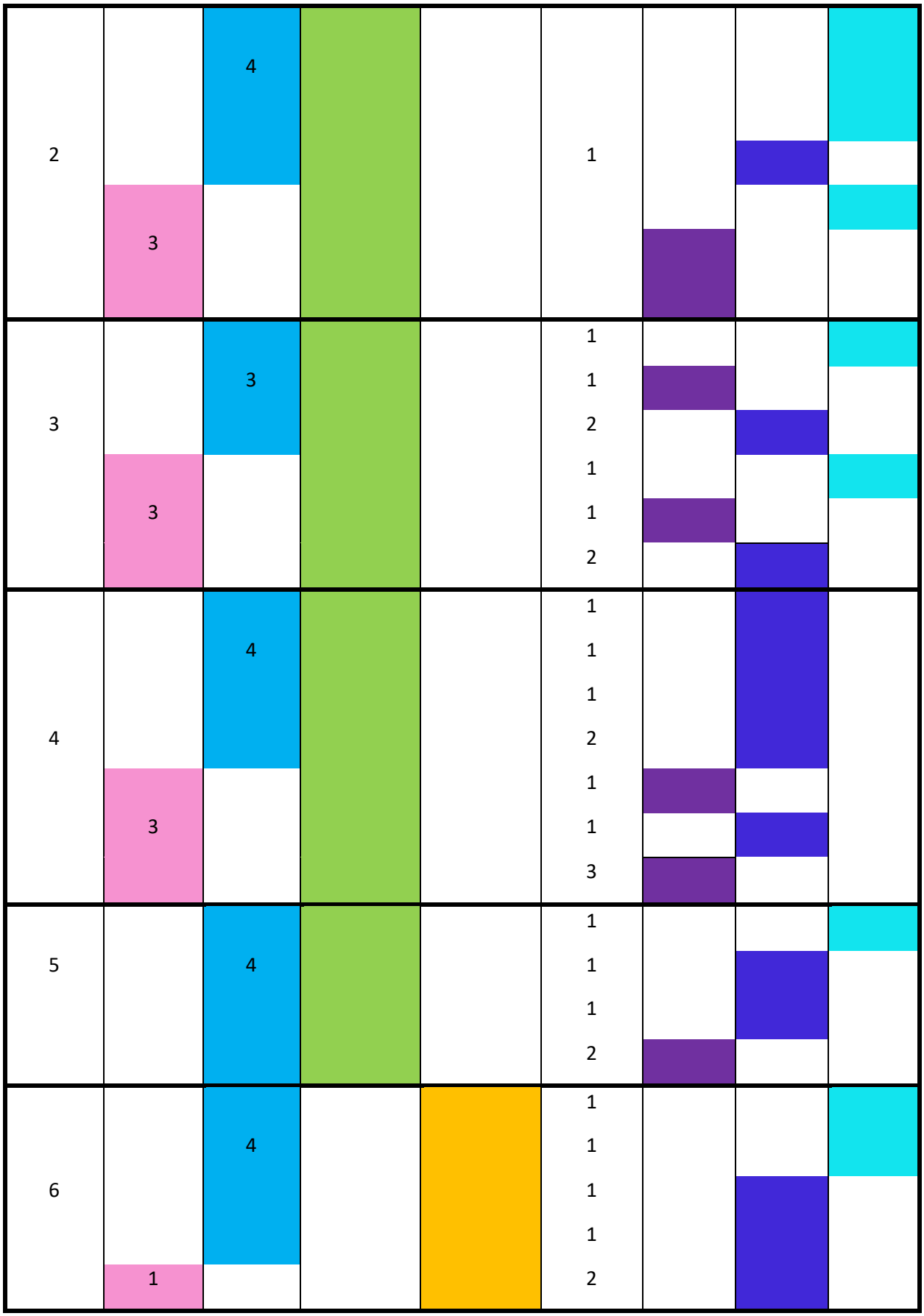
8	Workshop	Safety briefings Technical language	How can I better convey the technical language/technical terms so that it becomes tangible for the students? How can the pupils better memorise and implement safety instructions? How can technical plans be made visible and comprehensible for the students?	subject-specific and general

4.1.3 LS4VET TEAMS AND BOUNDARY CROSSING IN AUSTRIA

Five out of eight LS4VET-teams were heterogeneous in terms of gender. Seven groups consisted of members from 2-3 different schools but all teams were homogeneous in terms of school types. This was a result of the systematic group formation for teaching practice in the DATG programme. Within Austrian LS4VET-teams all three subject bundles were presented in six of the eight piloting teams (see Table 5).

Table 5. *Composition of the Austrian LS4VET teams*

Team	female	male	Vocational School	College of Higher Vocational Education	Number of schools	Subject bundles GB ST SP
1	1	4			1 1 2 2 3	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4
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1
1
1
2

7		5			1 1 2 2 3			
8		6			1 1 1 1 2 3			

The team members collaborated with each other and with the knowledgeable others online and where teams came from one or from geographically very close schools, face-to-face meetings were also common. The main challenges for the participants of the second pilot was time management. Time had also been mentioned as a main challenge by the first piloting team and in the surveys carried out at the beginning of the study (Mewald et al., 2021).

In both Austrian pilots, teachers of different and similar profiles worked effectively on designing the same LS-RL. However, in very diverse teams, the teachers whose classes would participate in the process and the experts for the actual LS-RL usually took lead in planning.

The following quote from the first pilot describes the importance of team-dynamics:

"A.W.: We need a team that is really willing to work together. In our case, fortunately, we had three teachers, three this year, each of whom taught this topic in a second class, and we agreed on when we would do this block and this part, so that everyone could start at the same time, so to speak. And of course, it would also be good if the respective colleagues who participate are willing to try something new and not just implement their familiar patterns. Because there was, so to speak, one lesson that I basically prepared, then came the iteration and then came the "improved" lesson. And you have to be able to accept that the second colleague already has the feedback and has the opportunity to make the lesson even better and then the feedback comes again, and the next colleague says, okay, the colleague then has the opportunity to make the lesson even better. You have to be able to take that. I think it's extremely important to have someone who knows about lesson studies." (Wöhrer & Krebs, 2023b)

None of the Austrian pilots really involved industry experts. However, in the second pilot, one team collaborated with an expert in their focus area, still a colleague from their school. Their collaboration was easy to organise, because of the benefit of being colleagues. However, we cannot take any conclusions from this on any collaboration with a knowledgeable other from the industry outside the school.

As far as boundary crossing is concerned, the Austrian pilots did not show any transgressive learning (Lotz-Sisitka, Wals, Kronlid, & Mcgarry, 2015). On the contrary, all LS-projects were subject-focussed or oriented on general educational goals. The reason for this may lie in the fact that the LS-teams were busy engaging with the LS4VET e-learning course and content and that implementing LS within their comfort zones was more natural than embarking on various new terrains at the same time. However, the course feedback suggests that the collaboration in mixed teams broadened the teachers' horizon, provided different perspectives, helped finding ideas, increased diversity, and provided interesting insight into each other's ways of working and thinking (response to question "In your experience, what impact has the involvement of teachers from other subjects had?").

4.1.4 SUSTAINABILITY OF LS4VET IN AUSTRIA

All participants in pilot 1 reported they would definitely carry on using Lesson Study in their school:

"The LS at our school, as a departmental initiative limited to one subject area, is quite suitable for bringing the culture of lesson observation within the school or within the subject area to a higher level. Instead of mere, rather passive observation programmes, LS offers an active, reflected form of lesson development. It not only serves as a concrete source for suitable lesson models, but also for the professional development of the teaching staff.

We will not only recommend LS, but definitely establish it as a measure for professional development through the department at the school, or school-wide continuous professional development." (Wöhrer & Krebs, 2023a, p. 3)

Although the participants in pilot 1 did not do Module 4 because of time constraints, they report the following about outcomes and school-level structures and procedures to promote sustainability:

"M.K.: I think as a final question it would be quite interesting to ask, was it worth it? I have the impression it was.

A.W.: From my point of view, definitely! Yes, it was absolutely worth the effort because you get a student interaction quality and a perspective on your own teaching that I hadn't discovered for myself until now. So interesting things became visible, and I also think it improved everyone's teaching a little bit.

M.K.: Yes. As part of the training [pre-service and continuous professional development], it will certainly be possible to create space for Lesson Study, since some things are simply taken for granted in the training curriculum. It will be interesting for me: I am a member of the quality assurance team at this school, whether we can also incorporate it into everyday school life, so to speak, via quality assurance. Let's put it this way, a commitment to one case story per year would be a good goal, wouldn't it?

A.W.: Yes, I think so, and it would be valuable for every colleague to experience it." (Wöhrer & Krebs, 2023b)

To date, we do not have any information about future Lesson Study plans in the schools of the second pilot. The most probable reason for this is the fact that the academic year is nearly finished and that the participants of the pilot are currently busy finishing their assignments in their BA programme and thus very busy.

Literature

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4.2 LS4VET IN HUNGARY

4.2.1 VET IN HUNGARY

VET in Hungary is available to students from age 14 at upper- and post-secondary levels in vocational schools (3 years + optional 2 years of general education to obtain the secondary school leaving exam) and in technical schools (5 years), and therefore it partly overlaps with mandatory schooling. General education is thus part of all initial VET curricula (its share depends on the level of the programme but is at least 33%) and general education teachers work alongside vocational teachers and trainers in Hungarian VET schools[9]. However, due partly to high workload, lack of time and scheduling problems as well as frequent physical separation, deep collaboration, co-planning and co-teaching are relatively rare between teachers of general and vocational subjects, and often even between teachers of vocational theory and trainers of practice (Bükki & Győri, 2021, Bükki, 2022). Collaboration might be influenced by school size and purity of profile (the wider or narrower range of VET programmes provided) as well. VET teachers are required by the law to participate in professional development programmes but typically these are one-off in-service teacher training courses that have been accredited by the relevant national agency. Lesson Study is not widely known and practised in Hungary; our non-representative VET teacher survey in 2021 carried out in the LS4VET project (N=257) showed that half of the respondents have never heard about LS and only 3 teachers have ever participated in one.

The analysis of the implementation of the LS4VET model in Hungary presented below is based on the the case stories and institutional LS4VET strategies prepared by the Hungarian LS4VET teams as part of their completion of Module 3 and 4 of the LS4VET course, as well as the e-tutoring/facilitator experiences of the ELTE-ITStudy experts.

[9] According to the latest publicly available data from 2018/19, 65% of VET teachers taught general education subjects and 35% vocational subjects (*Köznevelési Statisztikai Évkönyv* 2018/2019).

4.2.2 RESEARCH GOALS ADOPTED BY VET TEACHERS IN HUNGARY

As part of the LS4VET course in Hungary (including the pilot), altogether eight LS4VET teams carried out at least one full Lesson Study cycle. We believe that the fact that all the Hungarian teams were heterogeneous - as encouraged by our LS4VET model - influenced the type of research topic and goal the teams chose. One of the teams explicitly noted in their case story that they wanted to work on a topic and towards a common goal that would be relevant to all team members and the outcome of which could later be used in teaching any type of subject. The starting points and reasoning behind choosing the research goal, topic and problem were based on diverse questions:

- What do students usually struggle with in learning? (e.g. applying theoretical knowledge in practice, understanding written texts)
- What do teachers struggle with in their teaching? (e.g. making group work - an expected teaching method - effective, teaching students with special education needs, developing students for a new exam task, maintaining student attention)
- What competences will students need when entering the labour market and are not adequately addressed in their current curriculum and education? (assertive communication)

The slight majority of the Hungarian teams chose a research goal for their LS that was not vocation-specific but rather general, related to developing students' basic or key competences (e.g. reading comprehension or assertive communications skills) or general pedagogical issues that might be relevant in the teaching of any subjects (e.g. increasing and maintaining student attention, avoiding "stowaway" in group work). Table 6 below provides more details about the subject and content focus of the Lesson Studies of the Hungarian teams.

Three of the eight Hungarian teams, nevertheless, did choose more or less vocational-specific goals. One team aimed to find a method to assist students to prepare for a new type of vocational exam task that required new types of learning outcomes (competences), while the other two teams aimed to tackle the issue of bridging theory and practice: either because students could not apply the theory they have learnt in their practical assignments or because they were not sufficiently motivated to learn and struggled with understanding the theory. However, teachers in these teams whose subject was different from the subject of the research lesson still believed that LS was useful for them and they had learnt skills and methods they could apply in their own lessons.

Table 6. *Research goals chosen by the Hungarian LS4VET teams*

Subject	**Content focus**	**Research topic**
Electrical circuits practice	Building electrical circuits	Applying theoretical knowledge in practice
English		Effective group composition to develop attitudes and soft skills required for group work
IT Project work	Planning a class trip programme and designing a related website	Observation and development of students with special education needs in group work

Digital culture	Writing a professional CV to apply for a job announcement	Maintaining students' attention
Chef practice (in-school)	Cooking a menu from a basket of ingredients	How to prepare students for this new practical exam task
Beautician practice (in-school)	Communication at a job interview	Developing students' assertive communication skills required at a job interview
Beauty sector foundation	Hairstyles in Ancient times	Improving students' reading comprehension
Micropropagation (Gardener)	Calculation of nutrient dissolution	Improving students' motivation to learn and understanding of professional calculations

4.2.3 LS4VET TEAMS AND BOUNDARY CROSSING IN HUNGARY

As already mentioned, all eight Hungarian teams were heterogeneous and all involved at least one general subject teacher and one vocational subject teacher. All teams had at least 3 members, and some had 5 or 6. There were teams with teachers teaching the theory or the practice of the same vocation, and also teams with two or more vocational teachers of different vocations. There was even one cross-school team that offered to accommodate a teacher who applied alone from her school, located 400 km away. The distance was obviously a big challenge for this team but they succeeded in maintaining effective collaboration online in the after-school (evening) hours (using Webex, emails and shared Google folders and files) and all members attended the research lesson and the post-lesson discussion offline. Several teams were formed of teachers of different subjects who nevertheless had one thing in common: they all taught the same class/group of students whom they chose to work with in their Lesson Study. One of the participating schools considered this a vital element of forming effective LS4VET teams.

Lack of time (due to high workload, teaching as substitutes for missing colleagues or participating in Erasmus+ mobility projects), and scheduling problems (finding a time slot that suits all team members) were mentioned as big challenges by several teams. Some also had difficulties in finding a knowledgeable other to collaborate with or problems in their own group work (e.g. workload was not taken evenly by each member). Most teams nevertheless reported effective collaboration within their own group, especially when tasks were clearly and evenly distributed among team members at the very beginning (indeed, it led to some conflicts, uneven workload and ineffective teamwork in some teams where this was missing). They also managed to have regular personal (online or offline) meetings and discussions, however, there was one team for whom synchronous collaboration was hardly possible due to a lack of time and scheduling problems.

It appears that the support of the school leadership was vital to the team's collaboration's effectiveness. It was especially conducive when a school leader participated in the LS as a team member. In fact, half of the Hungarian teams were such, involving the principal or a vice principal of their school. In one such case, a dedicated 2-hour weekly time slot was secured for LS.

The heterogeneity of the teams had many benefits but challenges as well. The influence on the selection of research topics and goals - that teams tended to choose general rather than vocation-specific goals so that each team member could equally benefit from the outcome of the Lesson Study - was already mentioned. Some teams noted in their case story the difficulty of finding such a common goal, and some teachers felt that the researched teaching method was not really applicable to the context of their own lessons. One school also emphasised in their institutional LS4VET strategy that the team composition should be different when the LS focuses on a methodological or a general pedagogical issue.

However, many saw the added value of collaborating with teachers who teach subjects different from theirs as well. They thought that their diverse skills and competences complemented each other very well and were beneficial in their joint planning, and also that discussing with them and seeing their lessons gave them new perspectives and the opportunity to transfer the good practices of teaching a subject to the teaching of another. They appreciated the fact that vocational and general subject teachers got to know each other's work better and could collaborate in a deep, professional way. As one teacher remarked: "*My personal impression was that it was very useful to get a glimpse of a completely different approach to teaching, where, compared to "traditional" lessons, the teaching work has to be done in completely new circumstances, where students have to solve completely different tasks*." Two teams also noted the positive impact for them of getting to see their students in other types of lessons, in other environments, thus from a new "perspective". Many teachers expressed the view that in addition to their learning about new theories and teaching methods, a very important benefit or outcome of their Lesson Study was their collaboration with colleagues, their brainstorming and working together towards a common goal, which led to a change of attitudes towards each other and the other's subject and the increase of their group's cohesion, possibly even the formation of a learning community where knowledge is shared. For most (if not all) of them, this was the very first time when they collaboratively planned, taught and evaluated a lesson. Some also noted, however, how they had to learn and develop their skills needed to collaborate with each other and reflect jointly on their own teaching.

Involving knowledgeable others (KOs) from the industry or the educational field was often a challenge for the Hungarian teams and most involved in their LS internal KOs, such as teacher colleagues who also worked in the industry (KO from industry) and the school psychologist or special education teacher (KO from the educational field). A few teams did have KOs from academia, either from education or the vocational field. One KO who provided input in educational matters was the manager of a private language school. In two cases it was the KO (the industry expert who taught in the school and the school psychologist) who actually taught the research lesson developed by the LS4VET team.

4.2.4 SUSTAINABILITY OF LS4VET IN HUNGARY

Three of the eight Hungarian teams explicitly announced that they are deeply devoted to do Lesson Study again. One LS4VET team was formed from members of the quality management team in their school and they intend to integrate Lesson Study into their quality management system. Five of the eight teams from four schools completed Module 4 of the LS4VET course and prepared a sustainability plan for LS4VET in their school. The vision they defined emphasised LS as an excellent tool to support teachers' methodological renewal and improve collaboration and knowledge sharing within the school. They listed several, mostly non-financial tools for encouraging and supporting teachers to do Lesson Study, such as reduced non-teaching (e.g. supervision) and administrative task requirements, reduction of teaching hours, priority for involvement in projects (e.g. mobility projects), recognition in teacher evaluation as part of the school quality management system, individual preferences taken into account during the allocation of subjects and preparing the school timetable. However, one school believes that financial incentives should also be provided, and that the accreditation of the LS4VET

course would also be necessary as an external incentive (participants of the course would thus get credits that can be recognised as part of the mandatory in-service teacher training). This school also mentioned that they think the documentation required during the Lesson Study by the LS4VET course should be reduced.

4.3 LS4VET IN MALTA

4.3.1 VET IN MALTA

2015-2016 witnessed the launch of the first five vocational subjects at EQF Level 3 within mainstream secondary school curriculum, with the target of eventually offering a total of nine vocational subjects by 2019. Five vocational subject areas that were piloted during the two previous academic years were Agribusiness, Engineering, Hospitality, Information Technology, and Health and Social Care. At a time when more than 50% of school leavers who continue post-secondary education opt for vocational institutions, the stakeholders worked towards increasing further the number of vocational subjects as an option to Year 9 (13-year-old) students in mainstream secondary schools alongside the other option subjects. As a result, by the academic year 2018-2019 a total of 9 vocational subjects were launched across secondary schools in the state and non-state sectors.

VET is currently offered in all state schools from the age of 13 years as an option choice. Students can opt to follow one of the nine vocational subjects on offer. Non-state schools also offer VET subjects; however not all nine subjects are available as this is dependent on the resources and size of the school. Those students who wish to specialise within a given VET area can then progress to continue their studies either at the Malta College of Arts, Science and Technology (MCAST) or at the Institute of Tourism Studies (ITS).

The introduction of vocational subjects within the secondary school mainstream curriculum created a vacuum for teachers' professional development within the field of vocational education. The increasing number of secondary schools offering vocational subjects together with the increasing number of students opting for vocational options further heightened the necessity for professional teacher education in the field of vocational education. In light of these emerging realities, higher education institutions started offering courses to address the current VET teacher education needs. For example, the Faculty of Education at the University of Malta launched two Master's programmes (EQF Level 7) to address the professional learning needs of teachers in vocational subjects – the Master in Teaching and Learning (MTL) and the Master of Arts (MA) in Vocational Education. The MTL course ensures a combination of subject content knowledge with industry experience through a combination of pedagogy and practical study units. The MA course, which is offered to in-service teachers of traditional academic subjects seeking to transition into teaching VET subjects in secondary schools, is designed to facilitate this transition and equip teachers with vocational pedagogy.

4.3.2 RESEARCH GOALS ADOPTED BY VET TEACHERS IN MALTA

In the LS4VET course, 17 participants, divided into six groups, took part. Of these, 14 were VET teachers working in either a secondary or a post-secondary school, one was a head of department in a secondary state school and two were education officers of VET subjects. The research goals chosen by the six Lesson Study teams were all VET-specific. The subjects and content chosen by teachers are shown in Table 7 below.

Table 7. *Research goals chosen by the Maltese LS4VET teams*

Subject	**Content focus**
Information Technology	Networking protocols
Hospitality	Cuts using knives and blades
Food Preparation	Mediterranean food
Beverages and Services	Glassware types and their use
Hair and Beauty	Hair care
Applied Sciences	Climate change

Across all group compositions of VET educators, the main issue was bridging theory and practice. Hence, in selecting a problem to study, Lesson Study teams selected content that was quite theoretical and they attempted to design a lesson that offered students a more practice-based approach to learning the content.

The starting points and reasoning behind choosing the research goal, topic and problem were based on the following questions:

- Can you identify issues with teaching your specific subject/s?
- What do students usually struggle with in learning?

4.3.3 LS4VET TEAMS AND BOUNDARY CROSSING IN MALTA

Initially, some groups had heterogeneous compositions, as these were made up of teachers teaching different subjects within the same or different schools. However, this did not seem to work out and we had a number of dropouts, partly because of this issue.

In general, the teams were homogeneous and made up of teachers of the same subject area and teaching within the same school. In two cases, groups were made up of different educators – one including an education officer and another a head of department and an education officer.

In general, the teams worked really well and although their main issue was finding a common time-slot to meet, they still managed to even if in most cases this was done after school hours. It was evident to the Lesson Study facilitators that the educators involved in each Lesson Study team enjoyed the collaboration and the opportunity to share teaching ideas, insights and classroom experiences. For all teams, this was their first opportunity where they were engaged in collaboratively planning, teaching and evaluating a lesson.

Five of the six Lesson Study teams did not involve an external knowledgeable other from the industry. The reasons for this being: (1) one of the teachers in the team had experience and worked in the industry; and (2) within the lesson study timeframe, the team did not manage to identify one. In the case of the 'Food Preparation' lesson study team, a professional chef who runs his own restaurant was involved.

4.3.4 SUSTAINABILITY OF LS4VET IN MALTA

For two of the six lesson studies, it seems that there are possibilities that lesson study is continued beyond the project. For example, at ITS there are currently talks and plans to continue on the work done (i.e. two lesson studies, including one during the piloting stage) to offer lesson study to other educators. One idea is to use lesson study with new teachers as a way to help them understand better the context of teaching in the tourism industry. At ITS, we have been working closely with the Chief Operating Officer on how lesson study can become sustainable.

4.4 LS4VET IN THE NETHERLANDS

4.4.1 VET IN THE NETHERLANDS

Upper secondary vocational training on EQF levels 2, 3 and 4 is offered through VET colleges or so called 'regional training centres' (ROC in Dutch). These offer a wide range of vocational training programs typically lasting between two and four years to students 16 years and older, as well as (part time) adult education. Vocational training on levels 5 and 6 (and above) are offered through Universities of Applied Science (HBO, higher vocational training) offering both associate degrees and bachelor degrees to full time and part time students.

Both these types of institutions have close collaboration with partners from their vocational fields. They also have autonomy in developing curricula at institutional levels, but these are validated on a national level.

For the most part these institutions are state funded. Students pay a maximum yearly fee which is set by the state. For full time students in 2022-2023 this is 1239 euros for VET colleges and 2209 euros for UAS. Additionally there may be private funding through various contracting activities. Private institutions offering training with the same accreditations exist as well.

VET teachers are often experienced in their respective occupational fields. To work as a teacher in VET they will need either Bachelor or Master degrees in education, or additional certificates to their (at least Bachelor) degree. As noted in an earlier chapter, several teachers who elected to join the pilots of this project were working on such a certificate.

4.4.2 RESEARCH GOALS ADOPTED BY VET TEACHERS IN THE NETHERLANDS

The groups picked research questions that were not mainly focused on didactical challenges. They conducted their research lessons on topics that could be generalised across vocational training programs:

1. How can a stimulating instruction motivate students to actively engage in their assignments at the start of a class?
2. How can we establish students' insight in the relation between theory and vocational practice, thus inducing active learning behaviour?

The research lessons' topics are not evident from these didactical goals. It is worth noting that all VET programs in the Netherlands involve mandatory subjects on language, math and topics that may be summarised under the heading 'citizenship' (which ranges from personal finances, health to knowledge of the political system).

The group that worked with the first question chose a lesson from the topics of 'citizenship and career'. The objectives of the lesson were:

- Students form an opinion on a court decision and can sustain these with arguments.
- Students are able to analyse a judicial case and form an opinion on the possible outcomes.

The group that worked with the second question chose a class on 'career development' which had as objectives:

- Students can form a top three of qualities of which they are able to explain how these are their own qualities.
- Students can name at least two qualities they want to develop further and connect these to personal goals.

The participating teachers found the process both challenging and stimulating. They spoke to knowledgeable others from the academic field of education. Besides that they read and collected a lot of theory on motivation, learning and didactical models.

4.4.3 LS4VET TEAMS AND BOUNDARY CROSSING IN THE NETHERLANDS

The teams were heterogeneous in terms of the teachers' own discipline. Perhaps to overcome the challenge that this brings they chose general didactical questions as well as topics that are part of the general curriculum of all vocational training curricula. This did make it a rather large gap to bridge between theory for them to explore and the lesson they chose to implement it in practically.

Several teachers reported they found the tasks of LS4VET challenging and sometimes confusing. We know this from the reflections on their experience we asked them to write as part of the case stories in the former chapter. We also observed them during some of the in-person meetings they had, and talked to them afterwards. Given the depth of their research, the novelty of LS4VET for them and the still experimental nature of the implementation it is hardly unsurprising they reported they were sometimes confused by the LS4VET process.

As far as collaboration and boundary crossing goes, participants were very enthusiastic. One of the participants titled his reflections accordingly: 'Learning from and with each other'. Quotes from others illustrate this experience:

> [T]eachers were working in different locations and institutions. Although this diversity was challenging at times … I found the process to be rich and inspiring.
>
> I was looking forward to doing this together so we could learn together and from each other.
>
> I was very much looking forward to working with colleagues from different disciplines, I was curious about their experiences and views on education.
>
> As a starting teacher the way we worked was especially illuminating because we all worked in different teams, vocations and institutions. This gave a lot of input and broadened my horizon. I will definitely share these insights with my team.

Although institutions in vocational education and training in the Netherlands typically have close ties with their occupational fields, our groups did not involve a knowledgeable other from one of their fields.

4.4.4 SUSTAINABILITY OF LS4VET IN THE NETHERLANDS

At Utrecht UAS Lesson Study is taught as part of student teacher training for primary and secondary education, but not yet as part of the training programme for VET teachers specifically, although these are part of the same faculty. Based on the outcome of this project they may elect to do so and they have shown an interest. But given the autonomy of institutions there will be no national implementation of any kind. There are also two research groups at Utrecht UAS with themes that may qualify to secure and develop expertise on LS: 'Working in Education' and 'Vocational Education', but they have not committed to this and there are no specific plans for this yet.

Landstede in collaboration with Windesheim (UAS in Zwolle) planned to integrate LS4VET as part of the (mandatory) didactical certification for new VET teachers. Two teachers who facilitated our pilots for this project will facilitate LS4VET courses starting next year (2023-2024). The (other) teachers from Landstede who participated in the LS4VET course were enthusiastic about continuing to work with the method. They have also become a kind of ambassadors within their respective teams. The chances of their repeating lesson study cycles depends on other factors as well. Mostly they will need time for PD, and when there is budget for that, it should be allocated to LS specifically. This may very well happen since the research group on professional development at Landstede, VET college and partner in this project, is enthusiastic about it as well and looking for further opportunities at both research into and implementation of LS4VET.

4.5 SIMILARITIES AND DIFFERENCES IN THE FOUR PARTNER COUNTRIES

In this chapter we briefly compare the country experiences to identify the similarities and differences in Lesson Study for VET in the four partner countries.

Research goals adopted by VET teachers

The starting point of choosing a research goal for LS in all four countries was – as typical in LS in general – an issue the teachers or their students were struggling with in their teaching and learning. The most frequent main issues were linking vocation-specific cognitive skills to practical skills (bridging theory and practice), effective group work and maintaining student attention/active learning.

One of the main challenges for all LS4VET teams in the four collaborating countries was to choose a focus for their Lesson Study that is relevant, important and useful for all team members who often taught very different subjects. The decisions made by the teams were different in the four countries. There seems to be some kind of relation between the heterogeneity of the teams and whether the chosen topic/research goals were more subject-specific or had a general or at least transferable pedagogical focus. However, this relationship was not direct.

In Austria, seven of the eight teams – all of which were heterogeneous in terms of teachers' discipline, though three involved teachers from only two and not three "subject bundles" – at the ME discussed topics of a rather subject-specific focus, and only one team (with teachers from two subject bundles) chose a general topic (effective group work). Three teams chose goals that are directly related to a specific subject but the research question is more easily interpretable in/transferable to the teaching of other subjects (e.g. how to better convey technical language). Of the seven subject-specific goals, four was VET-focused, the others related to a general subject (maths).

In Hungary, despite the fact that all of the eight teams were heterogeneous, five decided to study general topics, while the others chose more or less VET subject-specific goals.

In Malta, all six teams – which were all homogeneous involving teachers of the same subject area – were focusing on the same main issue: how to brige theory and practice in vocation-specific topics.

In the Netherlands, the teams – which were all heterogeneous in terms of the teachers' discipline – conducted their research lessons on topics that could be generalised across vocational training programmes and not focused on didactical challenges in specific subjects. Their research goals were related to active learning and bridging vocational theory and practice.

Although the LS4VET teams did not articulate this directly or analyzed in details in their case stories, we believe the heterogeneity of the teams - which is a fundamental feature of our adaptation of LS to VET, although might be differently manifested in the four countries, depending on the local VET teacher "profiles" (that is, types of teachers based on the subject they can teach and the required qualifications) - raises the following dilemmas:

- How much heterogeneity within the team would be optimal? Should the LS4VET teams involve teachers of very different subjects, or of subjects that are somewhat related to each other (for example, related theoretical and practical VET subjects, or a general and a vocational subject such as mathematics and IT)?
- What kind of boundary crossings are encouraged and/or permitted by the different manifestations of team heterogeneity?
- How to choose a research topic/goal in a heterogeneous team that can be useful for the practice of all team members (who teach more or less "distant" subjects)?
- How to transfer the new knowledge that the LS4VET teams develop to the teaching of other subjects in the school?

LS4VET teams and boundary crossing

As already seen with respect to choosing a research goal, the heterogeneity of the LS4VET teams was one of the most challenging but – just as it was intended by our LS4VET Model – also the most fruitful and promising aspect of Lesson Study for VET for the teams in our project. The LS4VET teams were all heterogeneous in terms of teachers' discipline in Austria, Hungary and the Netherlands, but homogenous in Malta where the initial heterogeneous composition of some teams did not seem to work. Since the LS4VET course was implemented as part of a master programme in Austria, most Austrian teams involved teachers from two or three schools, and there was one cross-school team also in Hungary (as one teacher joined another school's team for lack of volunteering colleagues in her school). The Hungarian teams all involved teachers of different profiles, and the principal or a vice principal was a team member in half the teams. Education officers and a head of department were members in two Maltese teams.

Although heterogeneity of the teams was challenging in many aspects, most VET teachers found their boundary crossings inspiring and rewarding, and they really appreciated the opportunity to work together with colleagues they have never before collaborated professionally. This gave them new perspectives, made them reflect on their own teaching, and it also improved their own collaboration skills and increased group cohesion. Most VET teams reported that their Lesson Study process was successful in spite of the differences in their professional background, they thought they could work together effectively on designing a research lesson even if it was not in their own subject. This was, however, a problem for some Maltese teachers who dropped out for this reason, and in Austria, the collaborative planning tended to be led by those teachers who taught the subject of the research lesson. In all four partner countries, VET teachers named scheduling problems and finding the time for

collaboration as the biggest barriers in their LS. While the Dutch teams mostly met offline, Austrian and Hungarian teams often (and the cross-school team mostly) collaborated online.

Involving knowledgeable others (KOs) was a challenge for many teams, especially KOs from industry, and the few teams who had them typically collaborated with colleagues who both teach in their school and work in the vocation taught. Most teams, however, consulted KOs from the academic field of education.

Sustainability of LS4VET

As regards the sustainability of Lesson Study for VET in the four partner countries, we have to distinguish several aspects:

- whether the teachers involved in our project will continue to do LS by themselves in their schools, or
- whether LS will be systematically introduced in their school for other teachers as well, becoming embedded into their school culture and school practice in the long term or
- whether there is an opportunity for LS4VET to be promoted at the system level, by national policy-makers.

Our experiences in the four partner countries are also mixed in this respect.

In Austria, all participants in pilot 1 (from the Austrian partner school) reported they would definitely carry on using Lesson Study in their school. We do not have any information about future Lesson Study plans in the schools of the second pilot.

In Hungary, three of the eight teams explicitly announced that they want to continue and do LS by themselves in the future, and four schools prepared a sustainability strategy for LS4VET in their institutions as part of their work in Module 4 of the LS4VET course. While there are some opportunities for school and vocational centre leaders to encourage and support VET teachers to do Lesson Study, its wider spread is still limited by the fact that only formal, accredited trainings are recognised and counted towards the completion of mandatory professional development by national regulations.

In Malta, two of the six LS4VET teams were thinking about continuing LS in the future as well, and our partner VET school intends to use LS with new teachers and have plans to make LS4VET sustainable.

In the Netherlands, the LS4VET teams were very enthusiastic about continuing to do Lesson Study and they also encourage their colleagues to join. Two teachers from the first pilot of the LS4VET course already worked as facilitator in the main course and they will facilitate new LS4VET courses next academic year, as part of VET teacher mandatory didactical training, in collaboration with another higher education institution. The research group on professional development at our partner school was also enthusiastic and looking for opportunities to continue with LS4VET.

5. POLICY RECOMMENDATIONS

Lesson Study provides excellent opportunities for teacher collaborative professional development. As teachers typically work in institutions (schools), the way, content and quality of their professional development is both dependent on and influences the structural and cultural conditions of their school, and collaborative learning forms such as Lesson Study open up new opportunities for organisational development as well. Furthermore, schools are part of larger regional and national systems, governed by policy makers who also define the regulative framework and support measures for teacher professional development. The success of our work in the LS4VET project and the future of Lesson Study in VET therefore depends to a large extent on leadership and educational policy at all these levels of the education system (school, region, nation). In this final chapter we assessed the national conditions of doing and maintaining Lesson Study for VET and formulated recommendations for leaders and policy makers on how they could promote and support it. Since these conditions vary largely among the four partner countries (Austria, Hungary, Malta and the Netherlands), the policy recommendations are formulated in separate sub-chapters for each country.

5.1 POLICY RECOMMENDATIONS FOR AUSTRIA

Significant opportunities and major obstacles to doing LS in VET schools in Austria

The piloting LS4VET-teams report about immediate changes in teacher performance which could be directly noticed by their classes. The most visible impact of LS on students was their strong positive reaction to LS-RLs, the feedback they received and could give, as well as the perceived effectiveness of their learning. Pupils expressed their satisfaction with the methods used in feedback interviews where they also showed that they were more reflective about their own learning experience than teachers would have expected. Pupils were able to give clear information about what facilitated their learning and where they still required support.

Moreover, teaching staff and observing teachers benefited from the thorough post-lesson reflection where general, methodological-didactical, and subject-didactical questions were discussed and reflected upon.

Therefore, the increase in teachers' professional proficiency and pupils' successful and conscious learning efforts can be considered the most significant opportunities in doing LS in VET schools in Austria. In order to make this beneficial effect available for a wide range of VET schools, several measures could be considered.

System

At system level, it would seem meaningful to set up teams of knowledgeable others at universities and colleges of teacher education with expertise and/or experience in facilitating LS in VET schools. These teams should be made familiar with new developments and publications about LS in VET and in general. This could be achieved through a special-interest group for LS in Austria, in all German-speaking countries, or in Europe. The support these knowledgeable others could provide for VET schools should be made public and shared through institutional channels regularly.

School

At school level, a stable structure should be established which guarantees that teachers are provided with the necessary resources to carry LS on a regular basis. This could be achieved through establishing

fixed timeslots for pre-LS design and research, planning LS-RLs, implementation including time for LS-team members to observe lessons, and post-lesson interviews and reflections.

Teachers

Teachers should be encouraged to engage in LS regularly and to use LS-projects to transgress between subjects and domains (school, industry, and the wider professional field) within the secure framework of LS.

Best tools and measures to promote and support LS in VET schools in Austria

Taking into consideration the feedback from teachers and students, the collaboration of LS-teams with knowledgeable others is indispensable.

> In any case, the support of a proven expert in the field of LS contributed significantly to the success of the project. For further LS projects, it is highly recommended to bring a competent person into the team who is familiar with the processes, requirements, and potential of a LS. (Wöhrer & Krebs, 2023a, p.3)

This quote from a LS-case story summarises the absolute need to add personal expertise to the e-learning opportunities the LS4VET course offers.

5.2 POLICY RECOMMENDATIONS FOR HUNGARY

Considering the current low level of deep professional collaboration among teachers in general and especially among the different teacher profiles in Hungarian VET schools, we believe that the encouragement of such collaboration - which results from the heterogeneous composition of LS4VET teams - is indeed one of the greatest benefits of applying the LS4VET model in Hungary.

Some recent policy-regulatory changes seem conducive to introducing and promoting Lesson Study in Hungarian VET:

- the promotion of project work as the preferred and encouraged teaching-learning method in VET schools, which necessitates the collaboration of teachers teaching the same and different subjects;
- the introduction of mandatory school-level quality management and evaluation, which could integrate Lesson Study as an important element and recognised form of professional development.

However, there is a need for policy change in the latter aspect, to make doing a Lesson Study, a non-formal learning activity an officially recognised and credited form of VET teacher professional development (PD). This could be supported by dissemination activities and we also initiated professional discussions about this matter with policy-makers.

We also plan to apply for the accreditation of our LS4VET course so that more VET teachers could learn how to do LS and get credits that are recognised towards the completion of their mandatory PD.

Some important structural factors - high workload and lack of time, scheduling problems and the physical separation of teachers within a school building or in separate buildings - remain important obstacles to doing LS in Hungarian VET schools. However, our experiences confirm the vital role of school leaders in encouraging and supporting teachers to do a Lesson Study, for example, by securing

dedicated joint time for the team members and reducing their workload by, for example, exempting them from other non-teaching activities.

Therefore, a very important tool to promote LS4VET would be to disseminate the LS4VET project results among a wide circle of school and vocational centre leaders and inform them about this special form of teacher professional development and its benefits, as well as the conditions it requires to succeed. The final conference of the LS4VET Erasmus+ project (June/2023) was organised to include a workshop with such an objective. The ELTE-ITStudy team is also considering the opportunities of building an LS4VET national network with the participation and leadership of the schools who participated in the LS4VET course.

5.3 POLICY RECOMMENDATIONS FOR MALTA

Doing Lesson Study in VET Schools in Malta: Opportunities and Constraints

Within the Maltese educational context, one has to distinguish between two main types of teaching scenarios for VET subjects. At secondary level education (i.e. students aged 11 to 16), during which school attendance is compulsory, there are no specialised VET schools as such. What we have, instead, are mainstream schools that, in addition to their 'normal' academic school subjects, offer the option of VET subjects to their students. On the other hand, at post-secondary level (i.e. students aged 16 to 18), during which school attendance is not compulsory, there are specialised VET schools that offer an exclusive VET curriculum to their students. These two contrasting educational scenarios offer both opportunities and constrains for the implementation of Lesson Study in relation to VET subjects.

Starting with secondary level, VET teachers work in schools that offer a variety of both academic and vocational subjects. In Malta, secondary school VET teachers might also be teaching an academic subject. This reality, as our experience suggests, makes it possible for VET teachers to participate in Lesson Study experiences with teachers of academic subjects. This gives rise to a process which may: (i) raise the profile of VET subjects, which are relatively new in Malta, in their school; (ii) gain and share pedagogical insights from across both academic and VET subjects; (iii) support students' learning of VET subjects through judicious links with the academic subjects; (iv) make VET teachers, who tend to be quite small in number, more visible and influential within the lager school community; and (v) help students bridge the divide between the learning of VET and academic subjects. On the other hand, there is also the possibility that when a lesson study is implemented in a context that incorporates teachers of both VET and academic subjects, the VET pedagogy might be negatively impinged by a pedagogy that works better for the academic subjects than for VET subjects. Having said this, a number of local project participants expressed the opinion that they do not actually see any difference between a pedagogy for VET subjects and a pedagogy for academic subjects. Indeed, some of them who teach both VET and academic subjects claimed that they use a similar pedagogy for both.

Moving to the VET schools at post-secondary level, our experience suggests that teachers at this level might be less likely to have a background in teacher education. However, these schools, on the other hand, are more likely to offer in-house training for their teaching staff. The availability of this in-house training opens the possibility, always depending on the disposition of their school leaders, to consider Lesson Study as a possible route that can be used by them to develop their staff professionally. On the other hand, the dependence at this level on in-house continuing development programmes might also mean that should the school leaders, for whatever reasons, not look favourable on Lesson Study, it would be less likely for Lesson Study to be implemented within the school. Ultimately, however, as our experience once again suggests, it is the individual teachers who make or break the implementation of Lesson Study within their school, as they might even decide to go for Lesson Study without the

support of their school leaders. Seeing the high level of implementation reached when this happened, one might argue that Lesson Study can also be implemented without the support of school leaders. However, one might also question how sustainable is Lesson Study when teachers, for some reason or other, operate on their own without any support from the school leaders.

Promoting and Supporting Lesson Study in VET Schools in Malta

We offer here some insights based on the implementation of Module 1 and Module 2 of the project's PD programme in local VET schools. These insights are offered in relation to the promotion of Lesson Study in VET schools and the support that is needed for the successful implementation of Lesson Study in VET schools.

(i) Promotion:

- While it is important for Lesson Study to be promoted through official channels (e.g. letter circulars, emails and posts on social media), it might still be more effective when personal contacts and face-to-face meetings are used to reach potential participants.
- Lack of enthusiasm by school leaders for the implementation of Lesson Study in their schools should not preclude the promotion of Lesson Study among their teachers through less formal channels.
- The promotion of Lesson Study should provide potential participants with detailed information about what Lesson Study is and what their eventual participation would entail. It should also offer ample space for potential participants to discuss and air their queries.

(ii) Support:

- Support needs to be ongoing and available from the different levels of participation (e.g. other team members, facilitator and knowledgeable others).
- The support by school leaders contributes to the continued implementation of a Lesson Study experience, especially in terms of better alignment between the aims of Lesson Study and the school's vision and policies; official recognition of teachers' endeavours to grow professionally; and solution finding of logistical problems.
- All measures of support, irrespective of their provenance, should never undermine the ownership of the Lesson Study process by the team members.

5.4 POLICY RECOMMENDATIONS FOR THE NETHERLANDS

Grass roots, but facilitated

We have recommendations with regard to continued development knowledge on and experience with LS4VET, on practical considerations for implementation, and a warning for possible managerial pitfalls.

Any adoption at a national level is very unlikely due to the autonomy of educational institutions, this fact gives a lot of opportunity as well. There can be ample leeway for experiments by interested teachers, even within teams of teachers. In a way, the current partners involved can merely continue their effort to 'spread the word', given the means and opportunity to do so.

- We recommend forming a team of experts (researchers) on the topic of LS4VET. This may be embedded in already existing research groups or centres for expertise. This gives a basis to

continue dissemination of results, gather experiences with implementation of LS4VET and continue its development.

As already mentioned, there are several opportunities to sustain LS4VET in the Netherlands. A major opportunity comes from the enthusiasm of those who participated in it. The current teachers were found through multiplier events in this project.

- We recommend continuing with similar events as means to both disseminate successful Lesson Studies, and recruit new teachers.

What stood out from the experiences of teachers involved is that they found the LS4VET program enriching and enjoyed working with their colleagues and learning from each others' perspectives. They also reported the process to be challenging, especially because they went through it for the first time. We saw them amassing a lot of theory, or unconsciously shifting the object of their LS. Therefore, when new teams of VET teachers embark on their LS journey it will be very helpful when someone experienced in facilitating the LS4VET cycle helps them to avoid such pitfalls.

- We recommend training and appointing facilitators in LS4VET. These can be part of, or in close contact with the team mentioned in the first recommendation.

While the intellectual challenge of LS was rewarding for teachers, the logistical challenge was not. The main obstacles, especially with team members from different faculties (often working at different locations) are time and planning. LS4VET is a rewarding form of PD, and should be facilitated as such.

- We recommend ensuring members who start a LS cycle are all able to meet at a pre-set schedule during which times they will not be obligated to teach or have any other obligations. Departments responsible for scheduling / rostering should be aware of this. Also the overall workload should be manageable during the LS.

LS4VET is a form of professional development that gives great autonomy to teachers to direct their own learning and further their interest. Especially in the short run this may appear as a 'black box' to managers. There may be a managerial wish for transparency through reporting and even quantifying outcomes. One may conceive to prioritise topics for research questions in LS on an institutional level (for example based on student evaluations). Or to use LS as an instrument for team building or other aims. This urge should be resisted.

Teachers in our pilots were interested in each other professionally, and found both their different perspectives and similar classroom experiences worthwhile and inspiring. Besides the topic of their LS they had elaborate conversations on educational theory, their learning went well beyond the answer to their research question and the design of their (one) lesson. Both autonomy and the connection with peers are known to be great motivators for deep learning (see for example Ryan and Deci's Self-Determination Theory), while external goals are demotivators.

- We recommend using LS4VET solely as a safe way for professional peers to learn together. Do not assess a teacher's competence based on their participation in LS4VET.

6. ANNEX - THE LS4VET ERASMUS+ PROJECT (PROJECT FLYER)

PROJECT BACKGROUND

Teacher collaboration plays a vital role in various elements of teachers' work and was found to have a positive impact on teaching quality and student performance. Lesson Study is a particularly promising model of teachers' professional development based on professional teacher collaboration and focusing on the improvement of student learning through improving teachers' methodological skills. The method, however has only sporadically and not systematically been applied in VET before. In this project, Lesson Study will be systematically applied in VET contexts, which is expected to bring about innovative development in both domains.

Co-funded by the Erasmus+ Programme of the European Union

LS4VET

Lesson Study for VET

Teachers' collaboration for Improving the Quality of Vocational Education and Training

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AIMS

The LS4VET project aims to adapt the Lesson Study methodology for the sector of VET in order to achieve deep and sustainable impact – that is, improvement of the quality of education – in VET schools that will apply the method. Lesson Study has been found to be particularly effective because:

- it is a bottom-up approach of development, where professional development is done not "to" but "by and with" the teachers,
- it is job-embedded and focuses on teachers' real educational contexts in order to improve student learning through teachers' learning of new teaching methods and changing their teaching practice,
- it involves deep teacher collaboration when teachers actively learn through designing, teaching, evaluating and researching lessons together over an extended period of time.

The adaptation of the Lesson Study methodology to VET will be carried out in a close collaboration of expert partners (teacher educators) and VET school teachers and students. This process will be supported by formal training (an e-learning course) and mentoring for VET teachers and trainers to learn, adapt and pilot the method of Lesson Study in their own schools.

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OUTCOMES

A Model for LS4VET - a theoretical model providing 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

Training course - an online course that supports participants to implement Lesson Study in their own schools as well as to apply 21st century teaching methods and digital pedagogy

Storyboard and Toolkit - a comprehensive guide and hands-on tools for planning and implementing a Lesson Study adapted for VET schools

eBook - a handbook for teachers and VET school leaders, presenting the LS4VET model, case studies of the pilots as well as recommendations for policy makers.

PROJECT DATA

Title: Teachers' Collaboration through Lesson Study for Improving the Quality of Vocational Education and Training

Acronym: LS4VET

Project ID: 2020-1-HU01-KA202-078848

Program: Erasmus+ KA2

Project type: Strategic Partnership

Target group: teachers and trainers working in VET schools

Secondary target group: teacher educators and student teachers

Beneficiaries: VET students

Participant countries: Austria, Hungary, Malta, Netherlands

Project start: 1 September 2020

Project end: 31 August 2023

IMPACT

The immediate result of the project will be a methodology, supported by a handbook for teachers and trainers, on an effective VET Lesson Study model that enhances the continuing professional development of teachers.

PROJECT PARTNERS

- ELTE Eötvös Loránd University Institute of Intercultural Psychology and Education (Hungary) – project coordinator
- iTStudy Hungary Educational and Research Centre Ltd. (Hungary)
- Neumann János Computer Science Technical School (Hungary)
- Pädagogische Hochschule Niederösterreich (Austria)
- *Associated partner to the project:* HTL Wiener Neustadt (Austria)
- Università ta' Malta (Malta)
- Institute of Tourism Studies (Malta)
- University of Applied Sciences Utrecht (The Netherlands)
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