



Investigative research report (IO1)

Comparison of online learning methods used in partner countries and teachers' and students' opinions about good online learning

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1 Introduction

Despite the digital leap caused by COVID-19 and the rapid shift to distant and online learning spring 2020 the digital skills of vocational teachers and students are still at very different levels. This impairs learning outcomes and creates inequality between students. The training programme now being developed through the Genuine Digi project will increase VET-teacher's possibilities to familiarise themselves with digital pedagogy and adopt new ways of using technology in a pedagogically meaningful way, thus evening out the differences in teachers' skills. Long-term impact of the project is to increase the equality of VET-education with reference to the use of digital learning environments and digital tools.

In the project Genuine Digi the objective is to increase VET-teachers' pedagogical online teaching skills and thereby increase the digital competences of both teachers and students. It would be important that VET-teachers have the skills needed to deliver quality and inclusive education through online, virtual means. Improving VET-teachers' pedagogical online teaching skills have the impact that VET-teachers would understand how to best incorporate digital online technology into subject-specific teaching, training and learning including work-based learning. They could themselves produce ideas how to best follow-up VET-students' competence development, how to do exams or assessment online, how to deliver inclusive online training and how to do other pedagogically meaningful operations and actions online maintaining the same quality level as in classroom situations.

The purpose of the first intellectual output (O1) was to collect information on the methods used in online learning in partner countries and so to obtain an important overview of the current competences of VET-teachers and the skills and knowledge required.

In addition, information was collected on students' views of online learning practices. Based on this knowledge, it is possible to develop useful training programs tailored to each partner country, considering both the competence requirements of online learning in partner countries and the views of teachers and students.

The research was conducted with two surveys and desk investigation:

- (a) **Teacher survey:** In order to find out what online learning implementations have already been made by teachers and what skills are needed to implement them. In addition, the teachers were asked what kind of skills they still need and what kind of additional training would be needed regarding working skills to deliver inclusive online education.
- (b) **Student survey:** In each partner country, a survey to VET-students on good online learning practices was conducted.
- **The desk investigation level** of the research concentrated on finding out the studies made in partner countries concerning online learning and teaching practices in VET-education. The objective of the desk research is to widen the perspective and to gather relevant research on the field in the partner countries.

The survey to teachers was conducted between November 12th 2021 - November 29th 2021 and the survey to students between February 3rd 2022 – March 1st 2022 in partner countries using the digital Arnes survey tool. The developed questionnaires are available at the end of this report and both surveys were conducted in English only. The questionnaires were distributed using the contacts of each partner organisation.

The survey results and desk investigation results were compiled in this report, which is a comprehensive output of teachers' required digital pedagogical skills and students' views on good online learning practices. These results provide a good basis for the design of a digital pedagogical model (O2) and educational material (O3) for teachers. This report is available in English only.

2 Results

2.1 Respondents of teacher survey

By the end of the deadline, we received 59 completed and valid survey responses from three partner countries: Finland, the Netherlands and Slovenia. From **Finland, we received 63 %** of all survey responses [37], **17 % from Dutch participants** [10], and **20 % of surveys responses were from Slovenia** [12].

Overall participating countries, respondents among teachers come from age groups 25–34 years old [24 %], 35–44 years old [15 %], from 45–54 years old [37 %], and 55–64 years old [24 %] From age groups 18–24 and from 65 and more years old, there were none. However, distribution in the individual countries does not entirely mimic the overall pattern.

We have from **Finland** the majority of the respondents from age group from 45–54 years old [43 %] and from 55–64 years old [32 %]. Followed by 16 % in the age group from 35–44 years old, and 8 % in the age group from 25–34 years old.

From **the Netherlands**, the distribution among age groups is as follows. The majority of the respondents fall into the age group from 25–34 years old [60 %], followed by 20 % of surveys in each of the following age groups >> from 45–54 and 55–64. There are no surveys received from the age group from 35–44 years old.

For **Slovenia**, the majority of respondents come from the age group 25–34 years old [42 %], followed by the age group of 45–54 years old [33 %] and by 34–44 years old [25 %].

On average, overall countries, teachers took the survey using a phone in 12 % of cases, and in 88 % of cases, they have used a PC.

2.2 Respondents of student survey

By the end of the deadline, we have received 98 completed and valid surveys responses, from three partner countries: Finland, the Netherlands, and Slovenia. **We have received 28 % of all surveys from Finland, 32 % from Dutch participants, and 40 % of surveys from Slovenia.** Students invited to take the survey are between 15 and 19 years old.

On average, overall countries, students took the survey using mobile phones in 52 % of cases, and in 48 % of cases, they have used a PC.

2.3 Teacher survey

2.3.1 Question types

The teacher survey consists of 25 questions, out of which 1 is a consent question, and 2 are demographic questions; the remaining 23 questions are a combination of *Yes/No question type*, *Multiple-choice questions*, *Rating [from 1–5]*, and *Free response question type*. The average time participants needed to finish the survey was 9 minutes 1 second.

2.3.2 Findings in figures

Findings per sections are presented in the following pages. All graphical materials represent aggregated results overall countries, overall age groups.

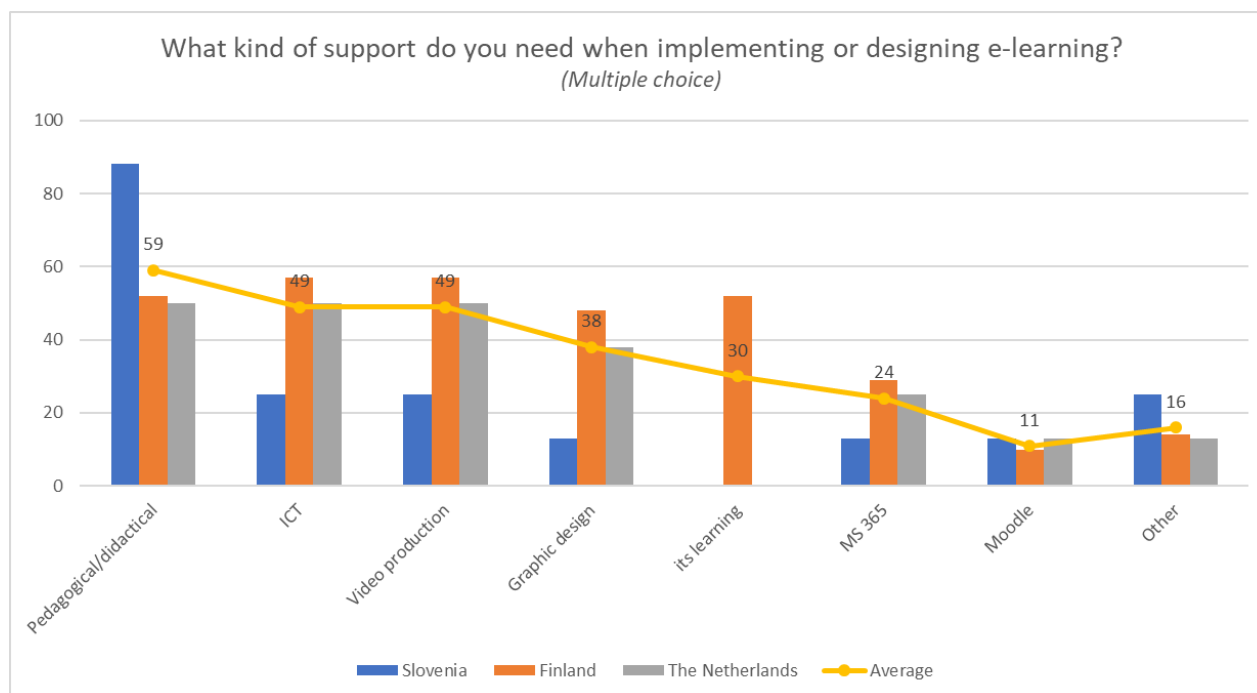


Figure 1: Needed support when implementing/designing e-learning

On average teachers needed the most support in the pedagogical/didactical field, followed by needs in the technology field (ICT, Video production, Graphic design, etc). Itslearning was not chosen at all for Slovenia and the Netherlands because it's not used in the two VET-schools that participated in the survey.

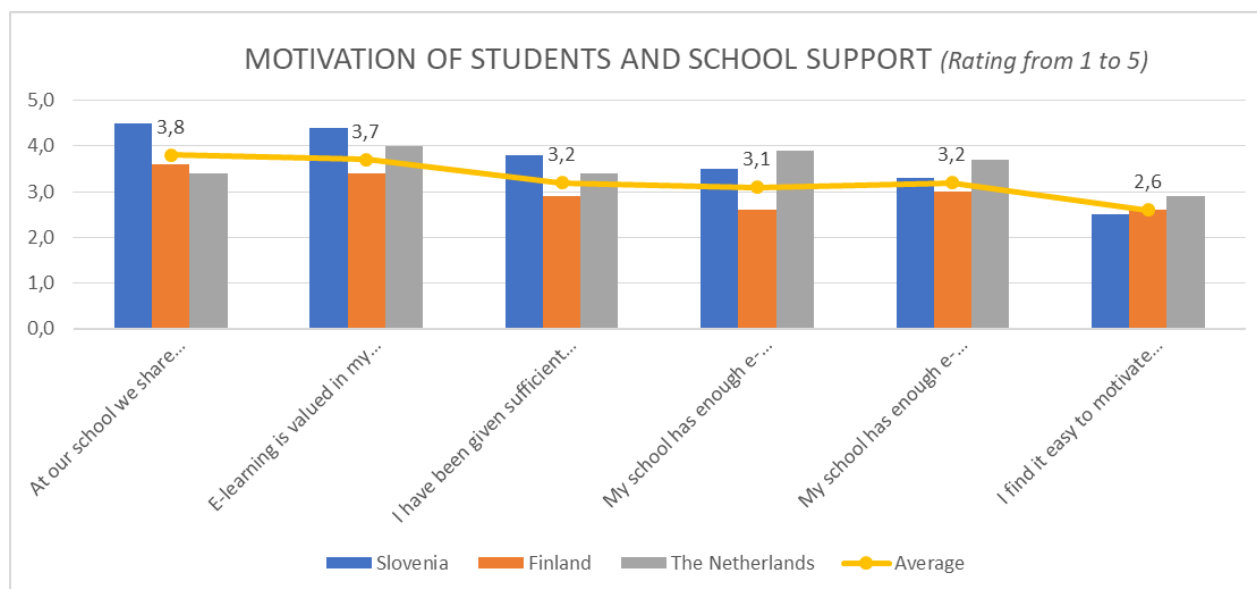


Figure 2: Motivation of students and School support

For the motivation of students and school support, teachers rated the highest statements "At our school, we share experiences (good practices) with our colleagues" and "E-learning is valued in my school". However, they did not find it easy to motivate students for e-learning, which shows the statement rated with 2.6 in the graph.

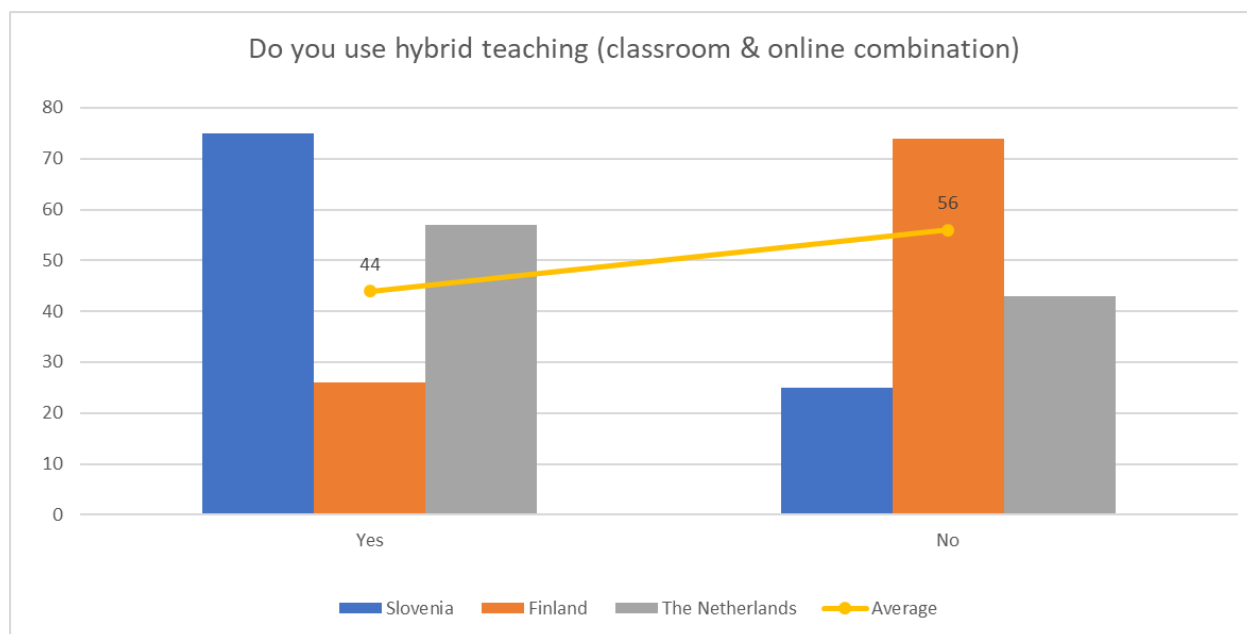


Figure 3: Use of hybrid teaching

A bit less than half of the teachers is using hybrid teaching [with some students in the classroom and some online]. However, a number of teachers using hybrid teaching in Finland highly deviates from the average.

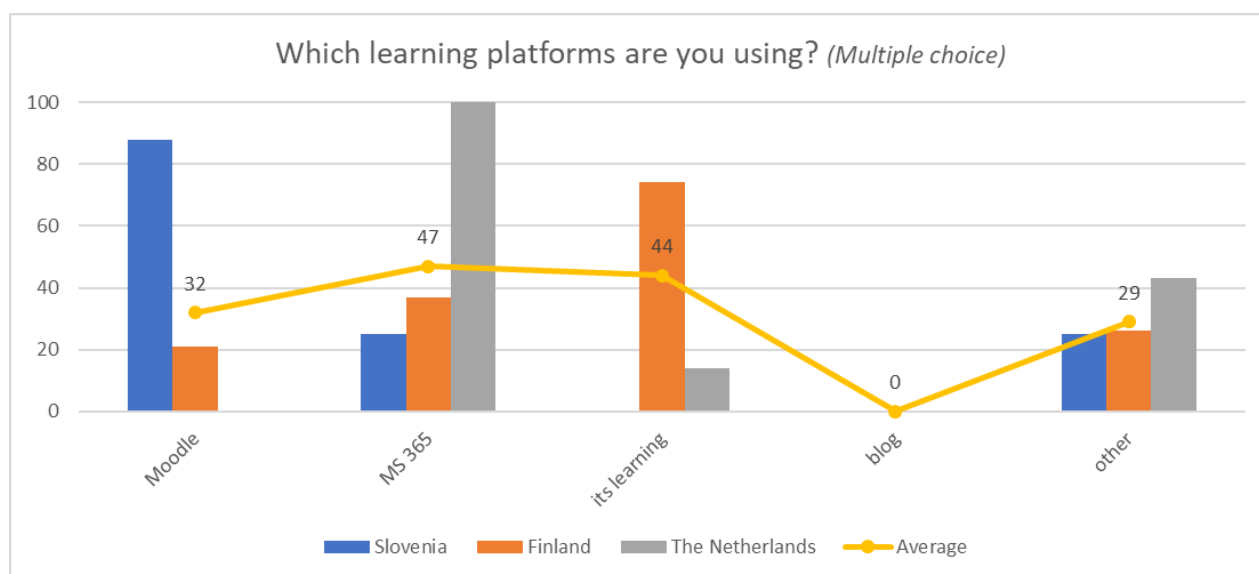


Figure 4: Use of learning platforms

On average, mostly used platforms are MS 365 [the most used in the Netherlands] and itslearning [the most used in Finland]. In Slovenia, the use of platforms deviates from the average – there Moodle is the most used, while its learning is not used at all.

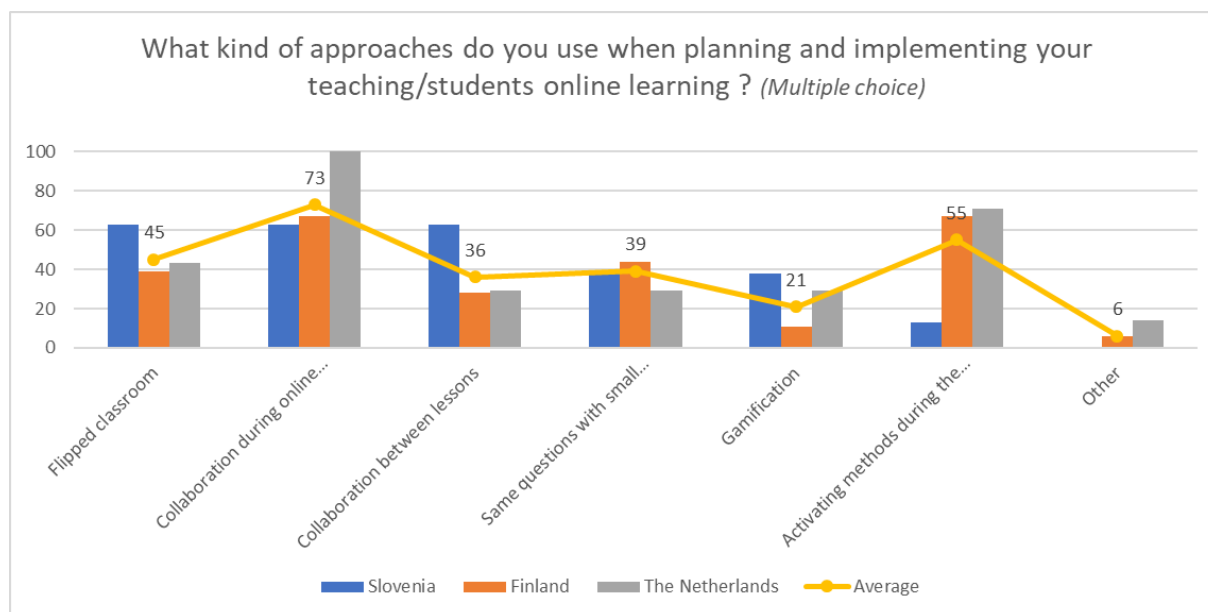


Figure 5: Best practices for online learning

For planning and implementing e-learning, the most used approach is with 73 % “Collaboration during online lessons”, followed by “Activating methods during online lessons” and “Flipped classrooms”, with 55 % and 45 % accordingly. The least used is Gamification with 21 %.

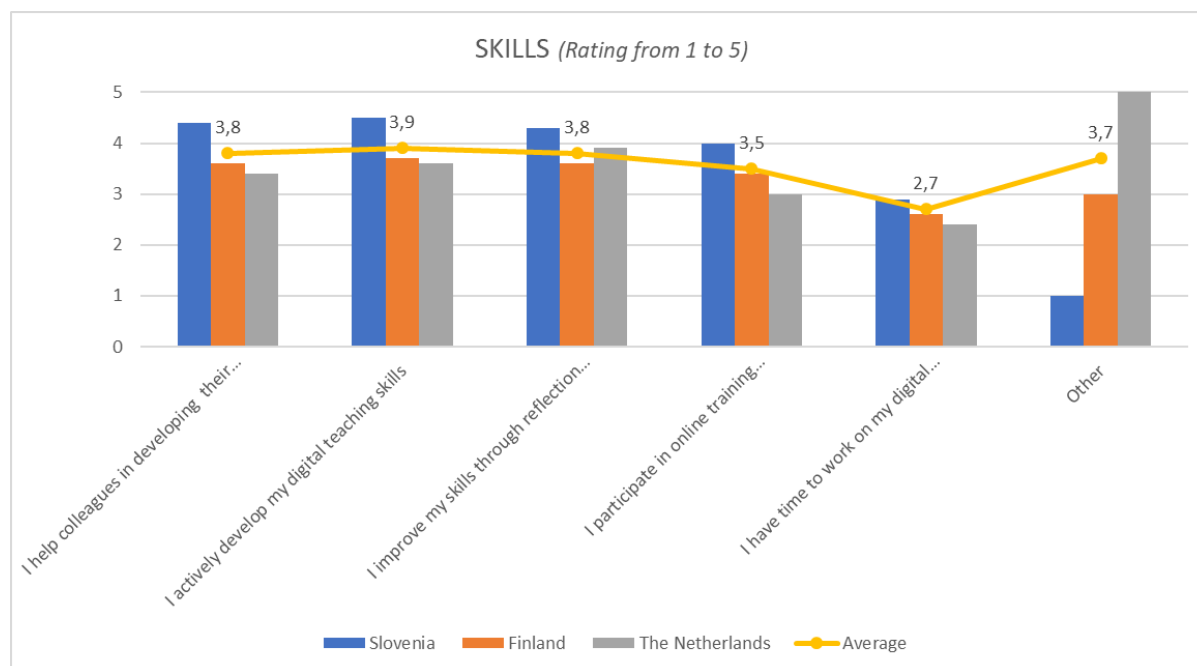


Figure 6: SKILLS rated

For skills development, teachers rated on the agreement scale 3,9 the statement “I actively develop my digital skills” and with 3,8 both, “I improve my skills through reflection and experimentation” and “I help colleagues in developing their digital teaching strategies”. The least teachers agreed with the statement “I have time to work on my digital teaching skills”

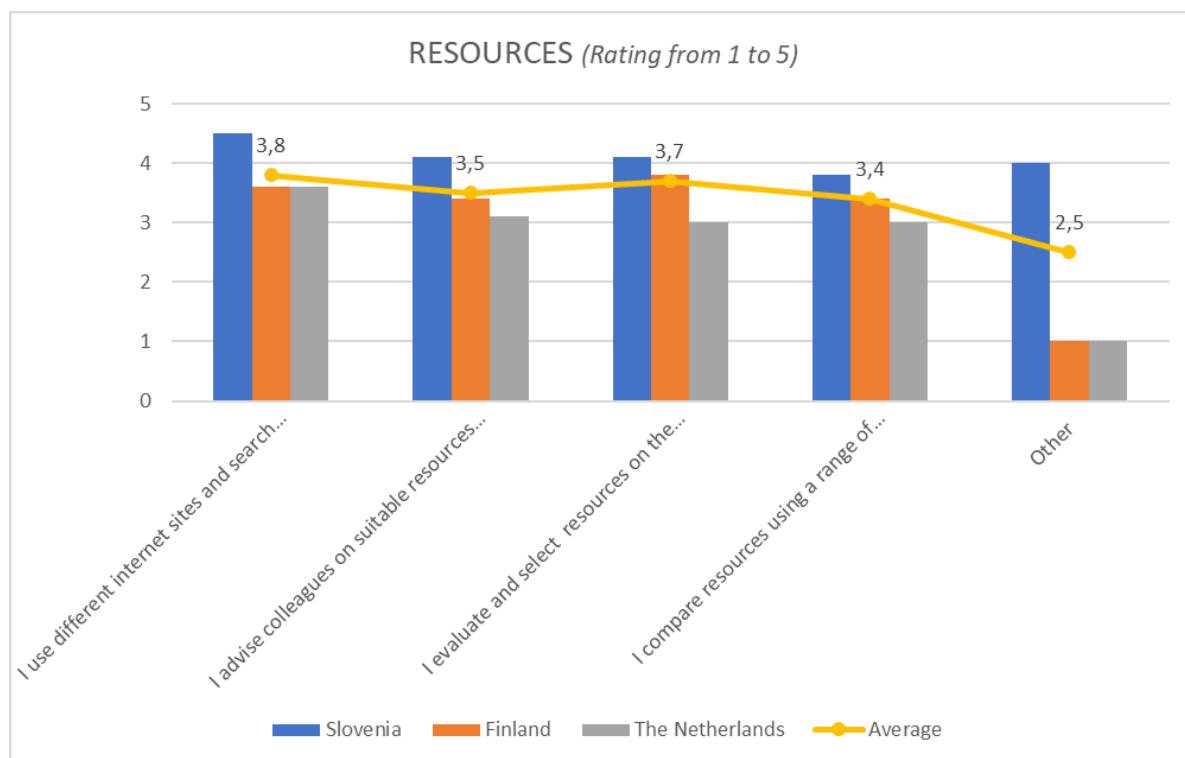


Figure 7: RESOURCES rated

Concerning resources, the statement “I use different internet sites and search strategies to find and select a range of different digital resources” was the most agreed upon, followed by “I evaluate and select resources based on their suitability for my learner group”.

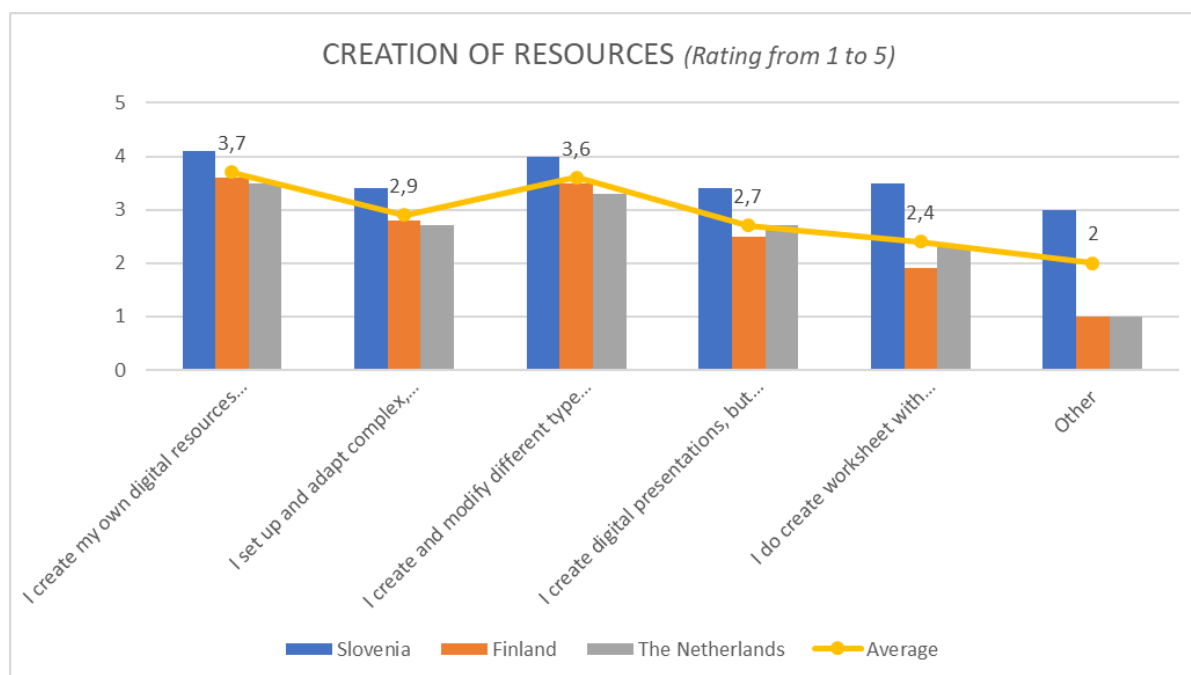


Figure 8: CREATION OF RESOURCES rated

On the matter of “Creation of the resources”, teachers mostly agreed with the statements “I create my own digital resources and modify existing ones to adapt them to my needs” and I create and modify different types of resources.”

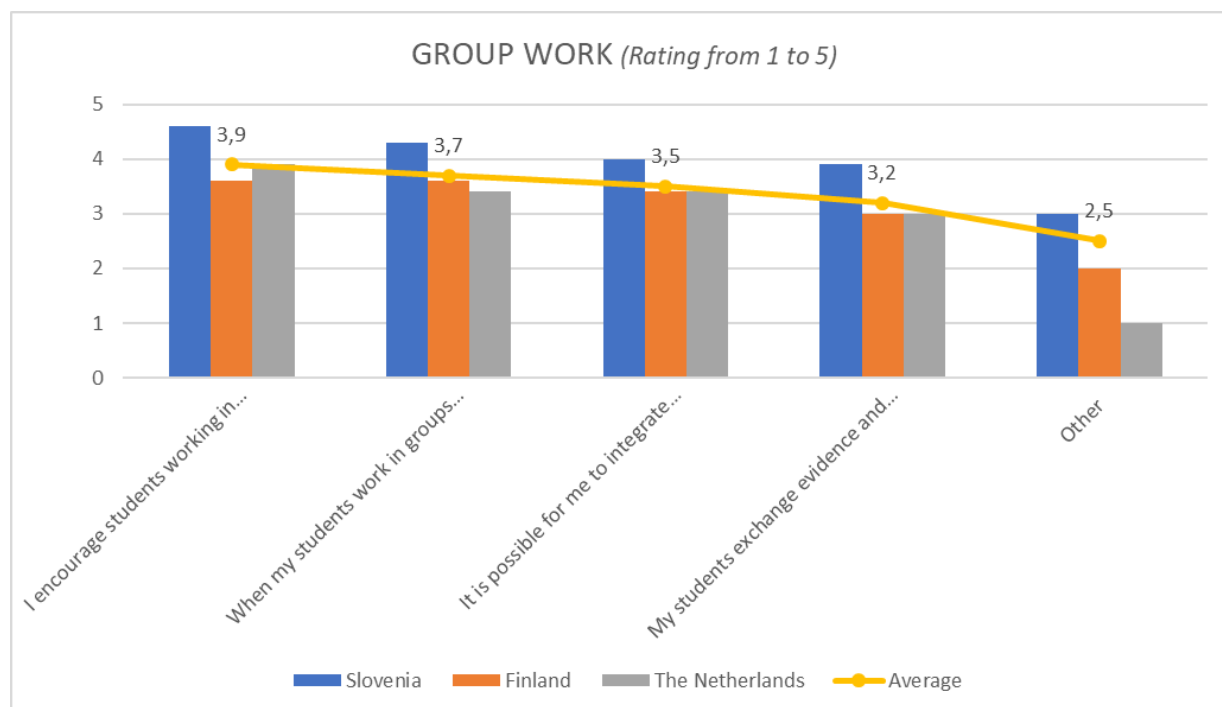


Figure 9: GROUP WORK rated

For the group work approach, the most agreed statement is “I encourage students working in groups to search for information online or to present their results in digital...”

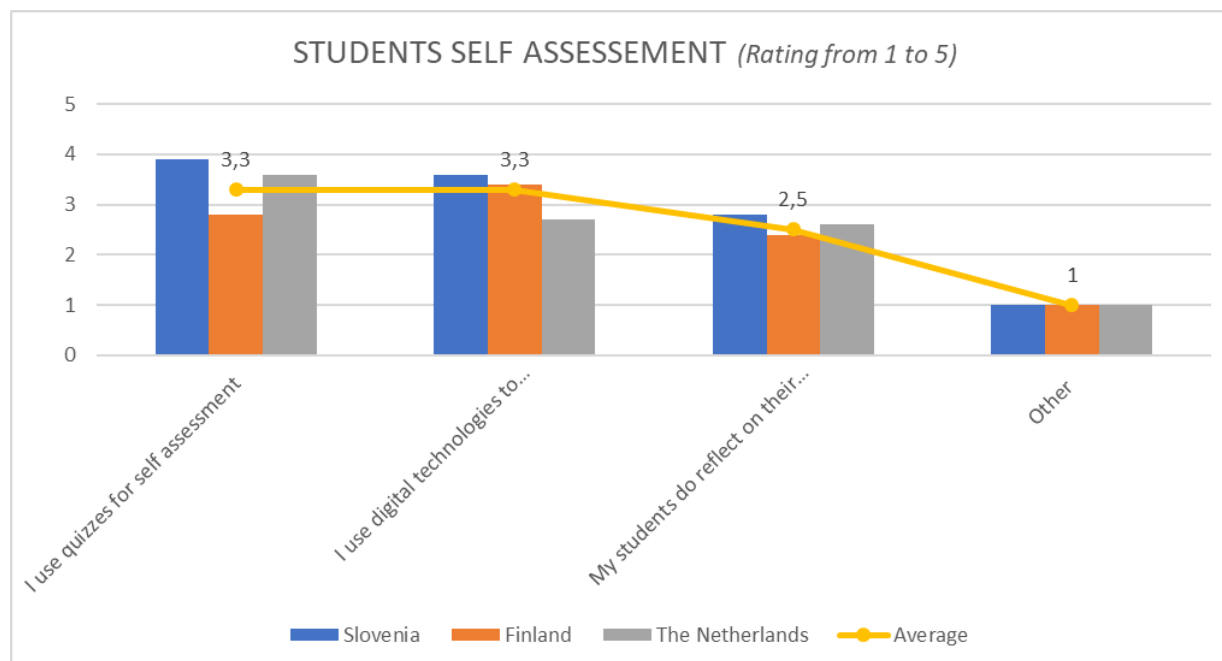


Figure 10: STUDENTS SELF ASSESSEMENT rated

Teachers rated two statements as mostly undecided in regards to Students self-assessment topic, and this one they do not agree upon “My students do reflect on their learning but not with digital technologies”.

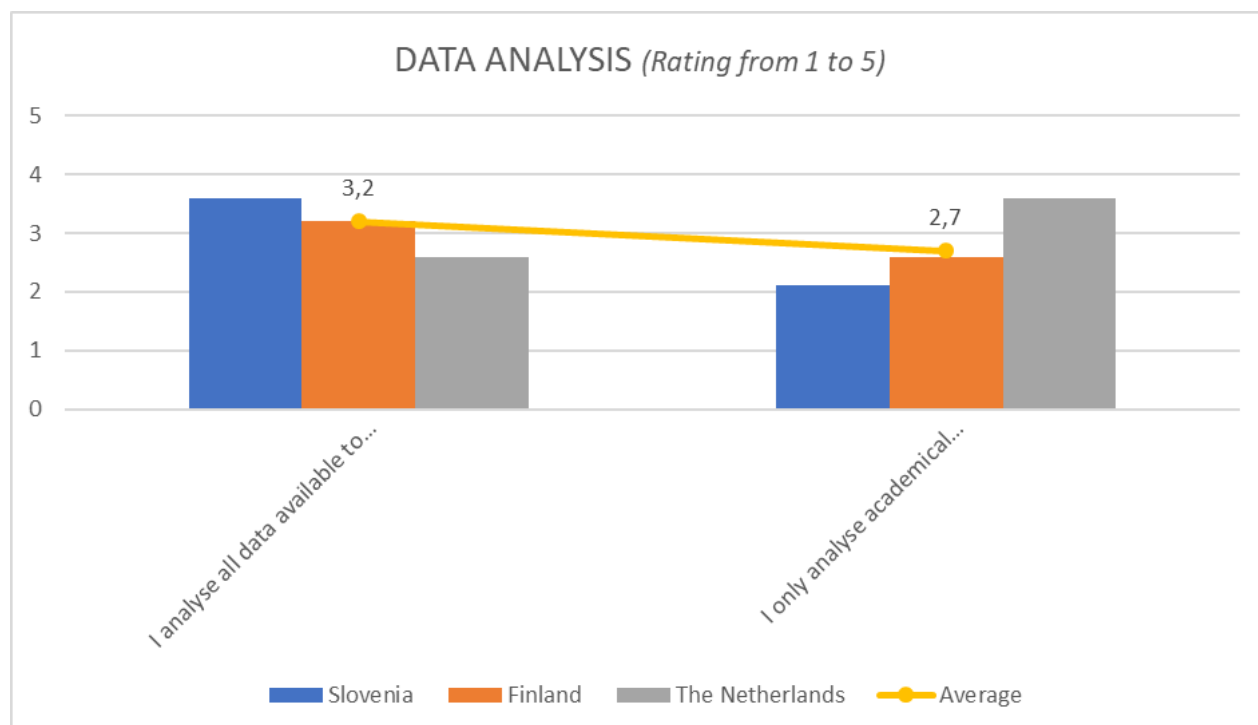


Figure 11: DATA ANALYSIS rated

On average, teachers sometimes use data to identify students who need additional support and they analyse even less only academically relevant data (e.g. performance, grade).

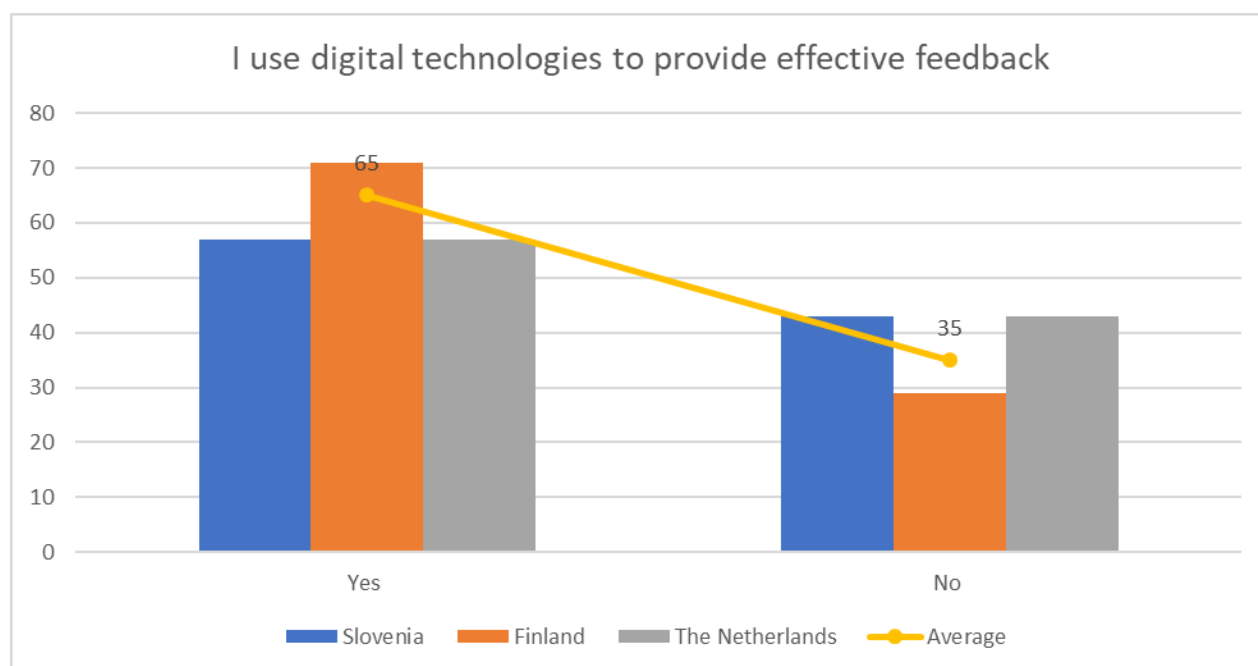


Figure 12: Use of digital technology (Yes/No question)

More than 60 % of teachers use digital technologies to provide feedback to the students. Results from individual countries comply with the overall findings.

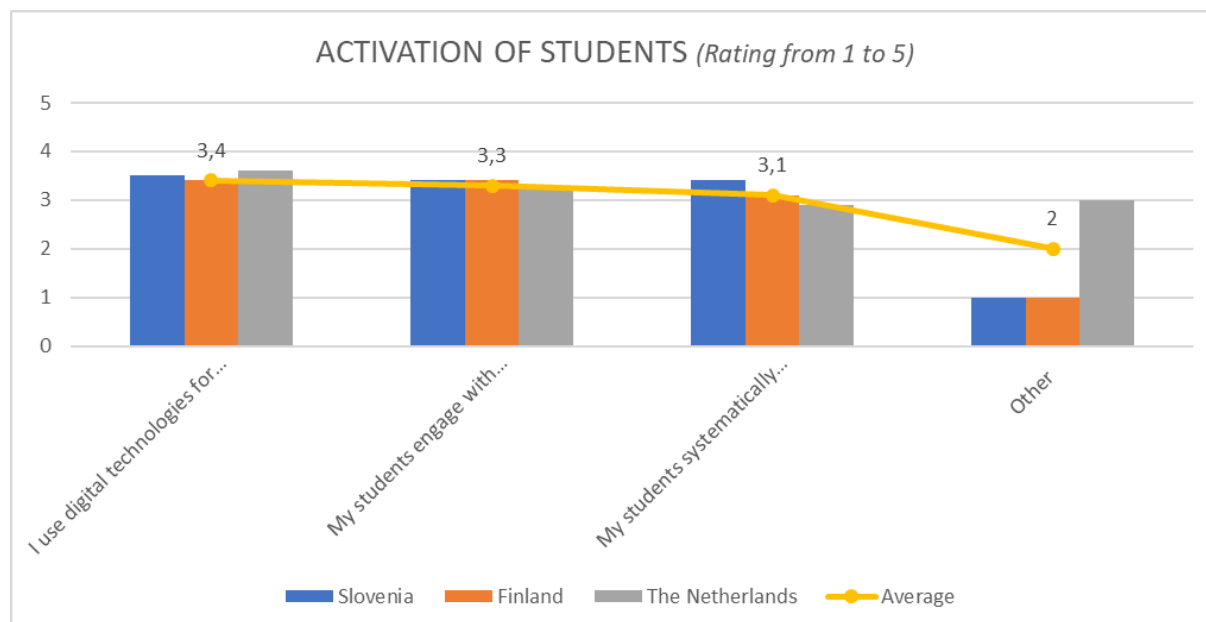


Figure 13: ACTIVATION OF STUDENTS rated

On average, teachers have rated between undecided and agree (between rate 3 and 4) statements in regards to the use of digital technology during lessons.

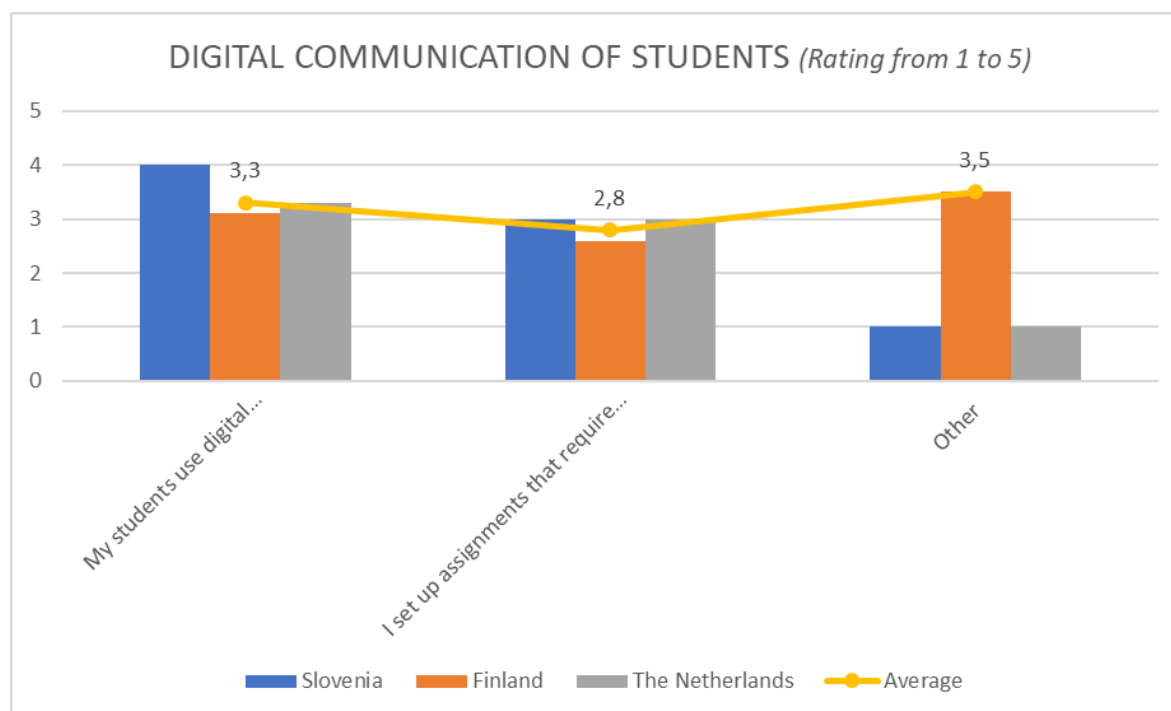


Figure 14: DIGITAL COMMUNICATION OF STUDENTS rated

On average, teachers do not set up assignments that require students to use digital means to communicate nor students use it proactively; average rates are 2,8 and 3,3 accordingly.

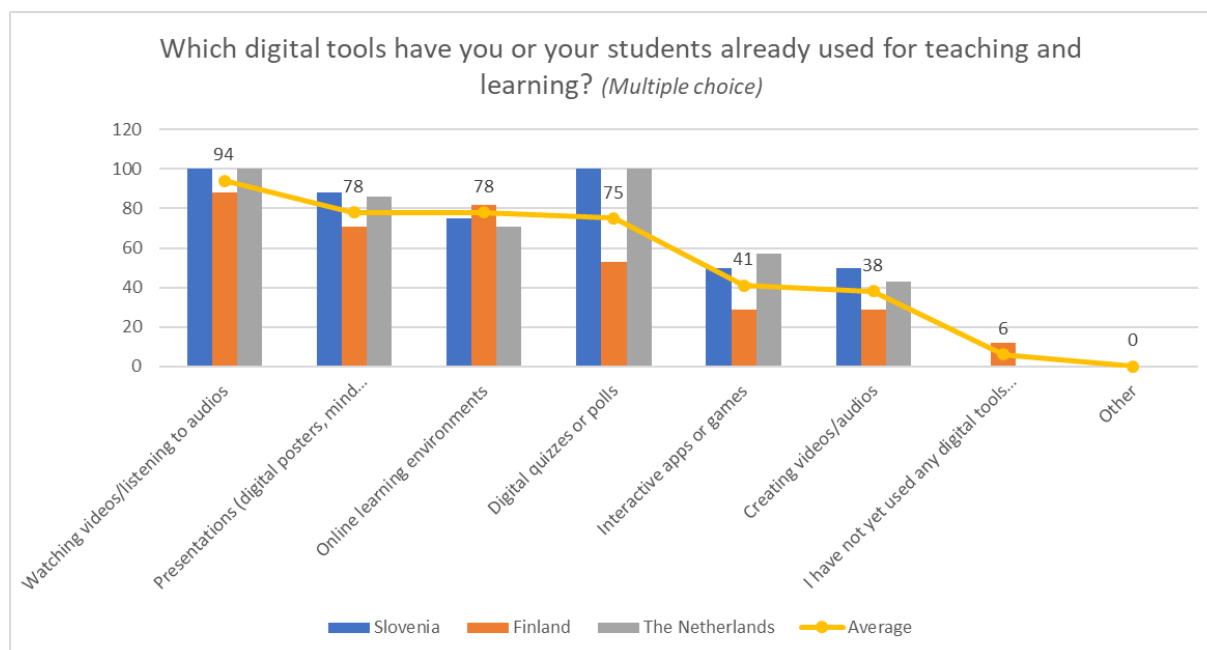


Figure 15: Digital tools already used for learning

The most used digital tool teachers have been already using is Watching videos or listening to audios. Follow presentations and Online learning environment. Deviation among the countries we can see for the tool Digital quizzes or polls, where in Slovenia and the Netherlands they were using it about 50 % more often than in Finland.

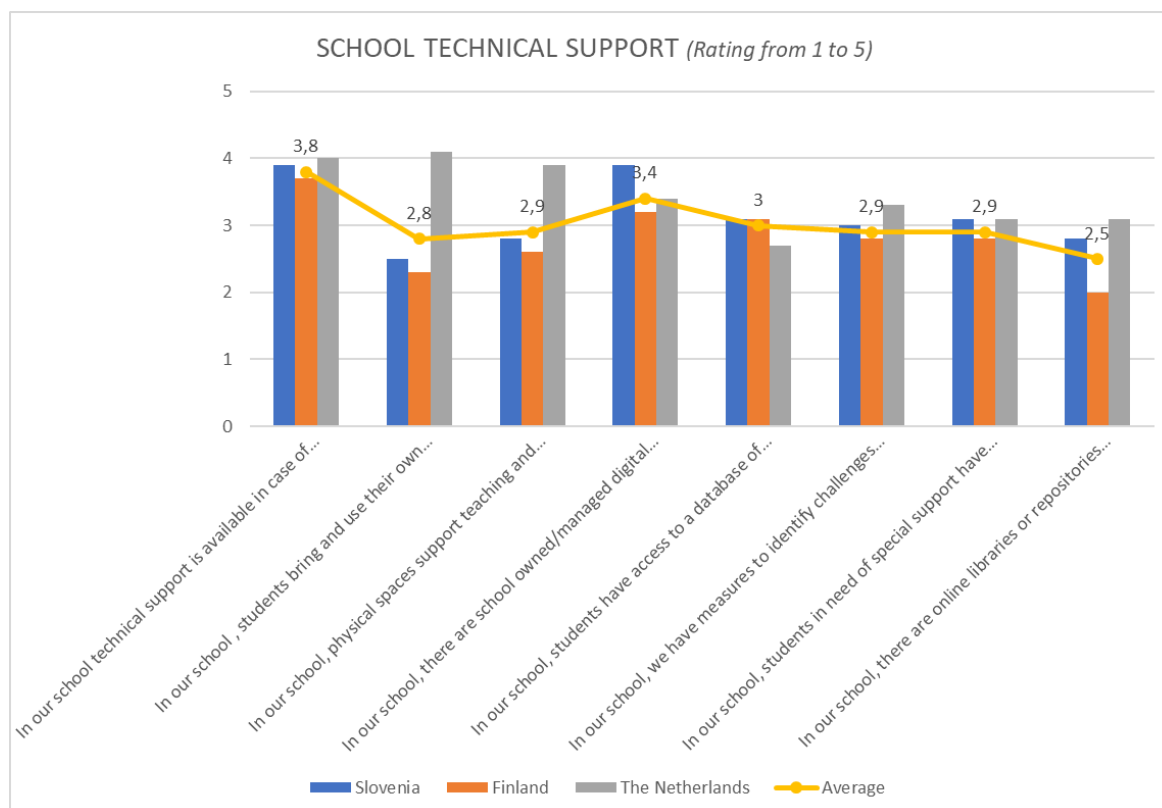


Figure 16: SCHOOL TECHNICAL SUPPORT rated

On average, teachers are close to agree that in their school technical support is available in case of problems with digital technology; they rated 3,8 their agreement with this statement. While in the Netherlands teachers agree (rated 4) that "students bring and use their own portable devices during lessons", that is not the case for Slovenia and Finland (rated 2,8 and 2,3 accordingly)

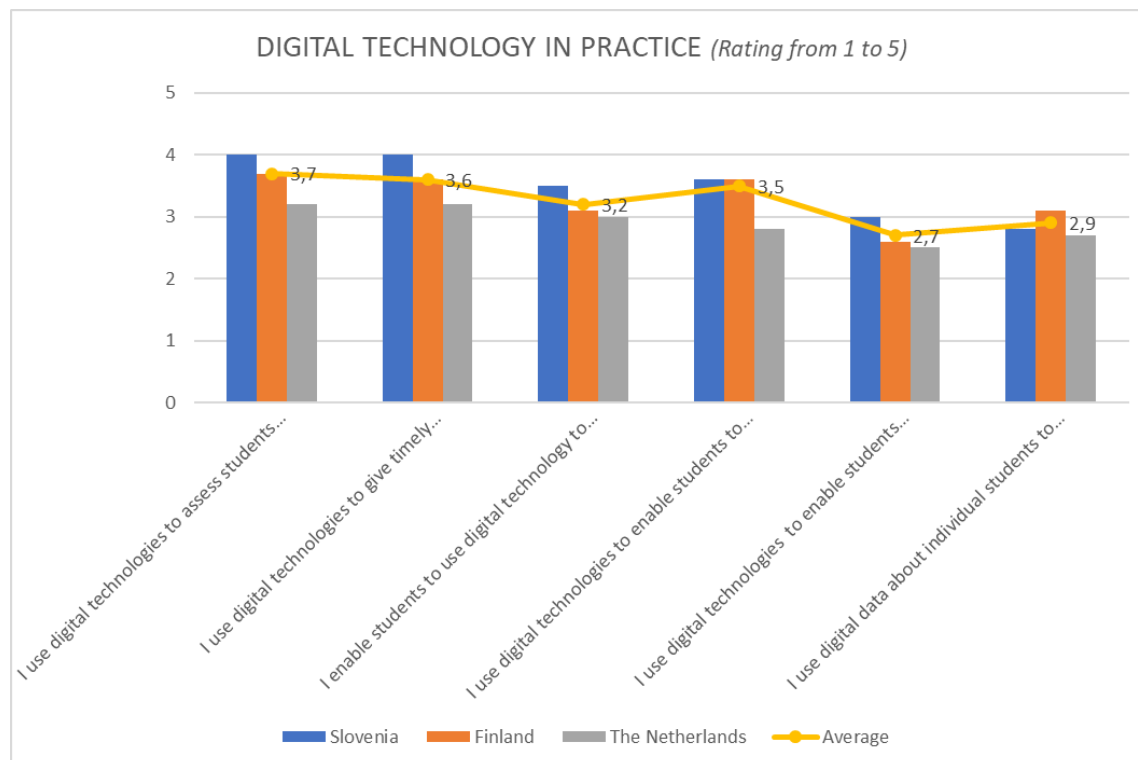


Figure 17: DIGITAL TECHNOLOGY IN PRACTICE rated

On average, teachers tend to agree they are using digital technology to assess students' skills and to provide them with timely feedback. As per the survey, digital technology is less used to enable students to provide feedback on other students work or to improve individual students learning experiences.

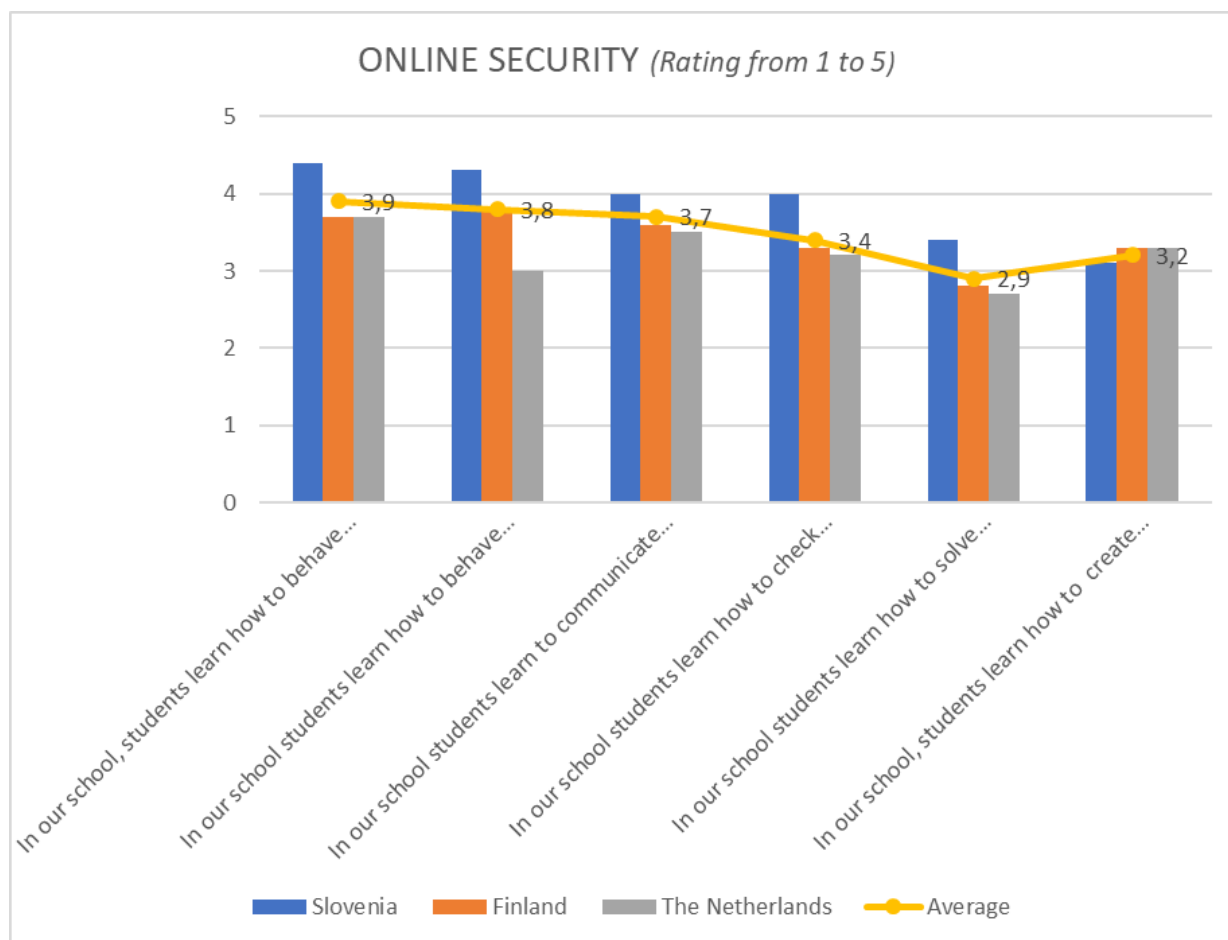


Figure 18: ONLINE SECURITY rated

On average with 3,9 teachers agree that in their school students learn how to behave responsibly when they are online. In Slovenia and Finland, teachers rather agree that students also learn how to behave safely online, while in the Netherlands they are undecided [rate 3].

2.3.3 Overview of open questions' findings

In the teacher survey, there were four (4) open questions, where participants could have expressed their opinions on the subject of the questions. Where participants were answering in a local language, we have translated the answers using an online translating tool [Google translate] for a better understanding of the topic. We have reviewed the answers and where it was possible, the top three (3) main items that the majority of the respondents have mentioned in their answers are given.

Overview per country per question is presented in the following pages.

2.3.3.1 Finland

Open question 1: Please **list three challenges** that you faced when planning or implementing online lessons / assignments.

By reviewing responses, we can see that there are three (3) main challenges mentioned by several respondents. These challenges are around:

- Communication & motivation of students
- Time management
- Technical issues & technical know-how

Open question 2: Please **list three barriers** that you had to overcome or needed to be addressed when planning or implementing online lessons/assignments.

By reviewing responses, we can see that there are four (4) main barriers mentioned by several respondents. These barriers are around:

- Technical knowledge gap
- Hardware/software issues (i.e. old hardware, unstable/weak internet connection, applications not responding)
- Learning needs (i.e. on how to use technology; how to use new applications; new teaching & pedagogical methods)
- Engaging and motivating students.

Open question 3: **How do you activate** students to communicate two ways and interact with teachers and other students while e-learning?

By reviewing responses, we can see that there are three (3) best practices methods mentioned by several respondents. These methods are:

- Applying interactive communication and actively engaging students (with polls, direct one-to-one personal communication, adding calls for action)
- Work in smaller groups
- Insisting on using a camera during lessons and conversations

Open question 4: **What are the challenges of hybrid teaching?** Please name 3.

In this case, we could not have made out any common highlights. The exact answers participants have offered are as follows:

- Students missing in class
- Bringing dynamic interactions or participation of students during the hybrid teaching
- Internet connection is unstable; teamwork and conversations; extempore decisions and timetables
- Use of substances; software panning lessons time usage

2.3.3.2 Slovenia

Open question 1: Please **list three challenges** that you faced when planning or implementing online lessons/ assignments.

By reviewing responses, we can see that there are three (3) main challenges mentioned by several respondents. These challenges are around:

- Time management
- Engagement and motivation of students

- Transition to online teaching in terms of adequately substitute classroom/lab teaching

Open question 2: Please **list three barriers** that you had to overcome or needed to be addressed when planning or implementing online lessons/assignments.

By reviewing responses, we can see that there are three (3) main barriers mentioned by several respondents. These barriers are around:

- Equipment (hardware) issues
- Getting familiar with new technology – software issues (new apps, licensed programs)
- Properly and effectively engaging the students

Open question 3: **How do you activate** students to communicate two ways and interact with teachers and other students while e-learning?

By reviewing responses, we can see that there are three (3) best practices methods mentioned by several respondents. These methods are:

- Direct one-to-one communication (addressing students by their names)
- Work in groups
- Assignments variety

Open question 4: **What are the challenges of hybrid teaching? Please name 3.**

By reviewing the answers, we can see a few common challenges:

- Synchronization between online and in-class groups
- Time-consuming / double work
- Motivating students

2.3.3.3 The Netherlands

Open question 1: **Please list three challenges** that you faced when planning or implementing online lessons/ assignments.

By reviewing responses, we can see that there are three (3) main challenges mentioned by several respondents. These challenges are around:

- Motivating the students to keep webcam on and to participate in the lessons
- New technology know-how
- To assure variety in activities

Open question 2: **Please list three barriers** that you had to overcome or needed to be addressed when planning or implementing online lessons/assignments.

By reviewing responses, we can see that there are three (3) main barriers mentioned by several respondents. These barriers are around:

- Equipment (hardware) issues
- Digital skills

- Motivating and controlling the students

Open question 3: **How do you activate** students to communicate two ways and interact with teachers and other students while e-learning?

By reviewing responses, we can see that there are two (2) best practices methods mentioned by several respondents. These methods are:

- Organize assignments with breakout rooms or group chat
- Ask them questions
- Require to have a webcam on

Open question 4: **What are the challenges of hybrid teaching?** Please name 3.

By reviewing the answers, we can see a few common challenges mentioned by more participants:

- Insufficient attention for students at home
- Differentiate / well apply assignments for online and in-class teaching
- Due to a lack of personal communication students at home are non-active

2.4 Student survey

2.4.1 Question types

Student survey consists of 9 questions, out of which 1 is a consent question, and 1 is a demographic question. The remaining 7 questions are a combination of Yes/No question type, Multiple-choice questions, Rating [from 1–5], and Free response question type. The average time participants needed to finish the survey was 2 minutes 37 seconds.

2.4.2 Findings in figures

Findings per the sections are presented in the following pages. All graphical materials represent aggregated results overall countries.

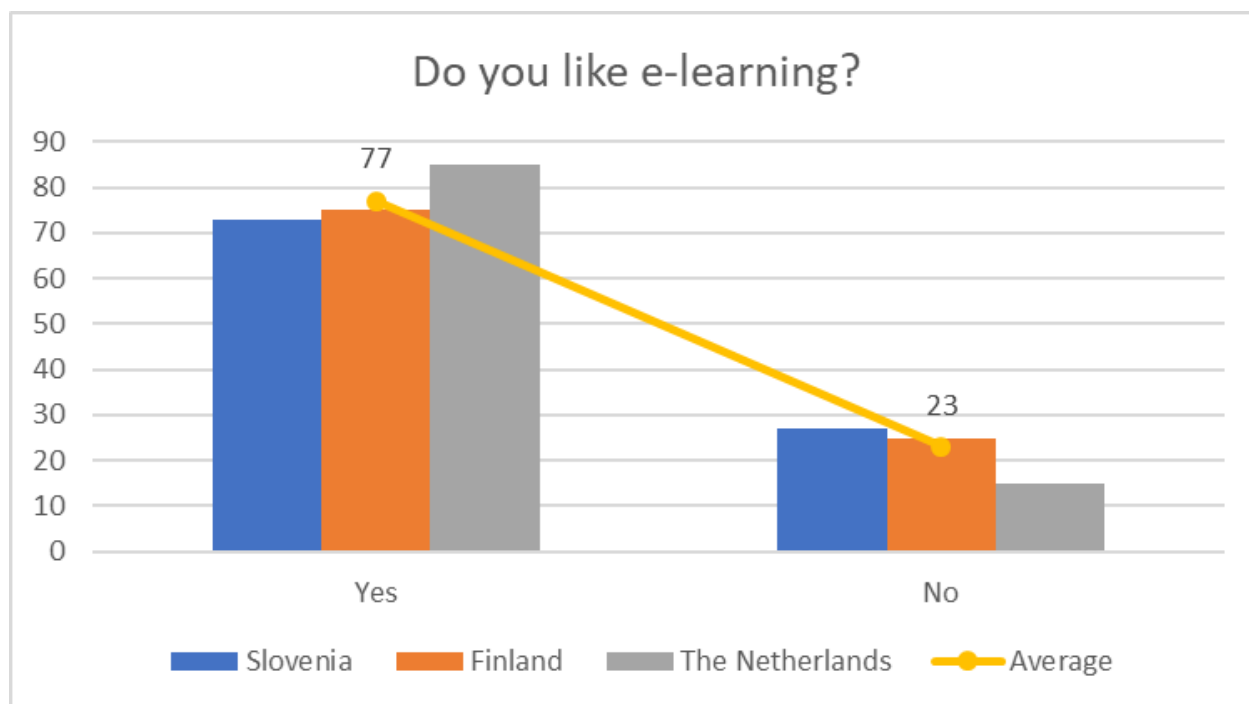


Figure 19: E-learning preference (Yes/No question)

In all countries majority of students answered they like e-learning. Most liked is in the Netherlands.

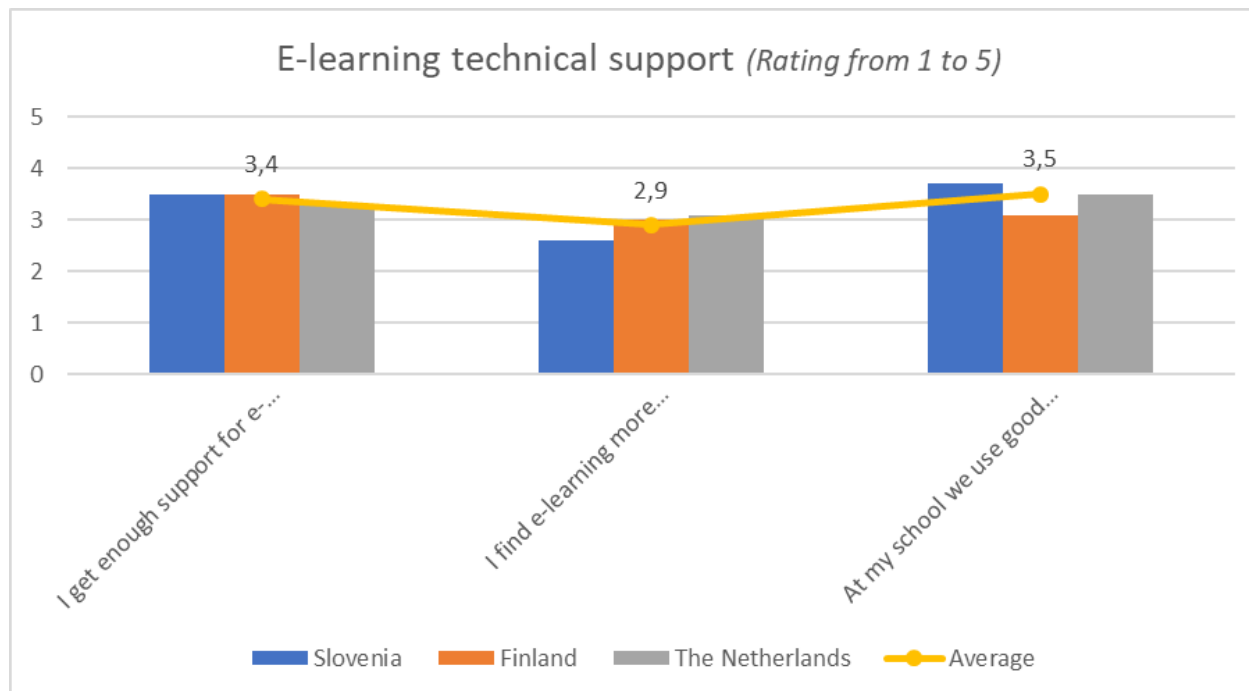


Figure 20: E-learning technical support

50 % of students feels they get enough support for e-learning and 60 % that at their school is using good tools for distance learning. Whether e-learning is more effective than traditional classes they disagree or are undecided.

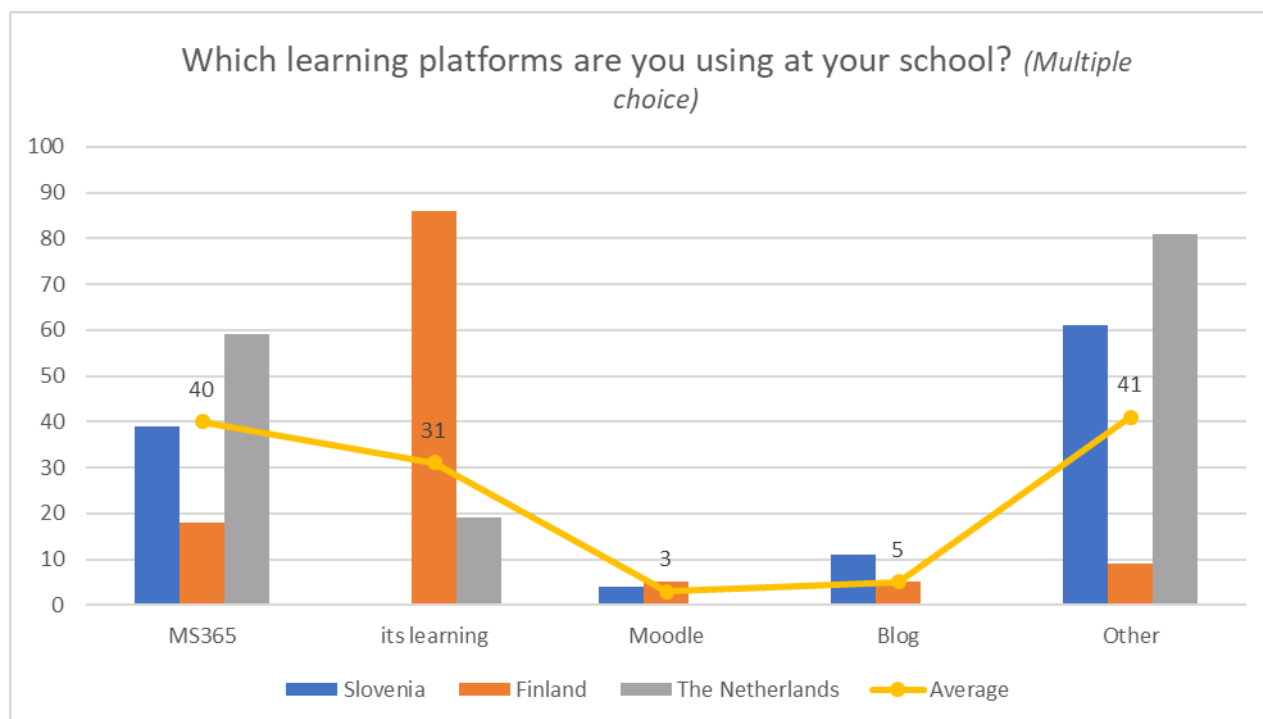


Figure 21: Use of learning platforms

Deviation among the countries and learning platforms students marked they are using, are rather significant. Itslearning is most commonly used platform in Finland, while in Slovenia is not used at all. MS 365 is quite often used in the Netherlands and also in Slovenia, but less in Finland. Moodle and Blog does not have high scores for any of the countries.

On average overall countries, students noted under Other in almost 50% of cases Kahoot, Lesson Up, Zoom and Arnes as learning platforms they are using at their school.

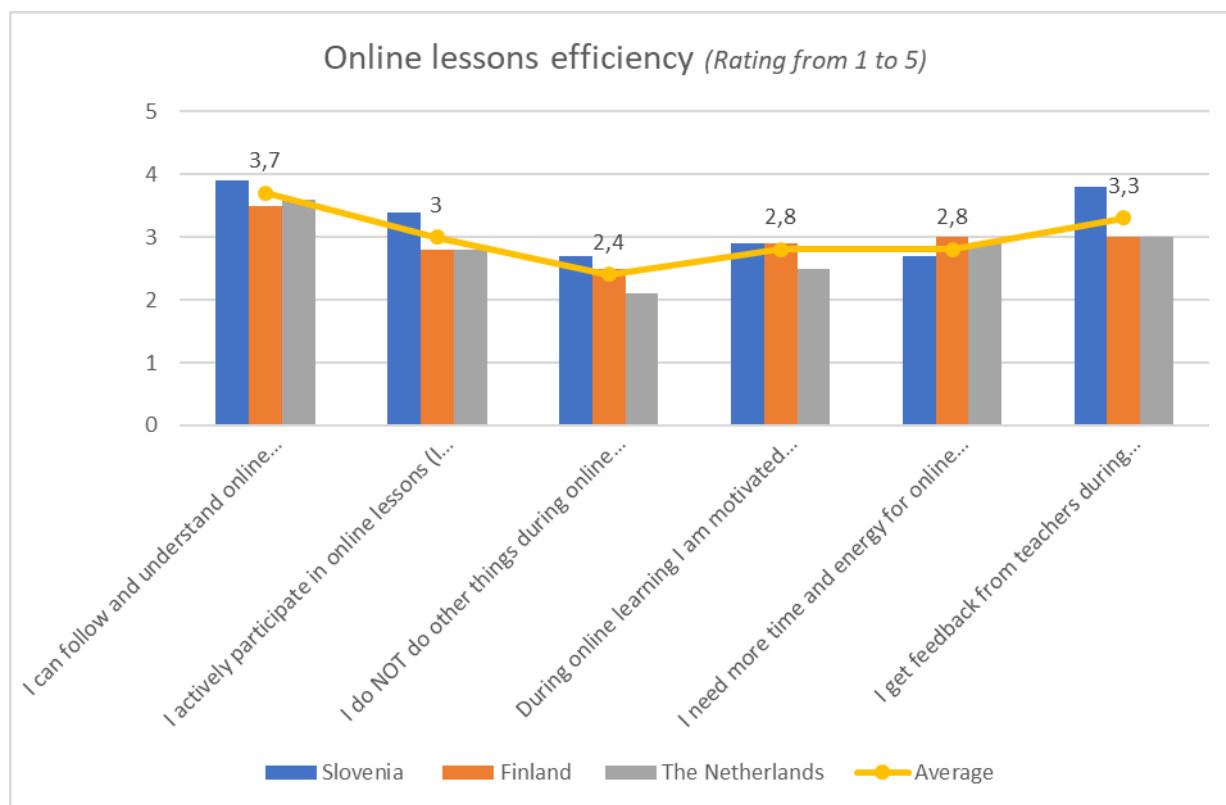


Figure 22: Online lessons efficiency

Majority of surveyed students can follow and understand online lessons, and also majority said they are doing some other things during online lessons. Answers are evenly distributed in question whether they need more time and energy for online learning than live classroom learning – some do and some do not.

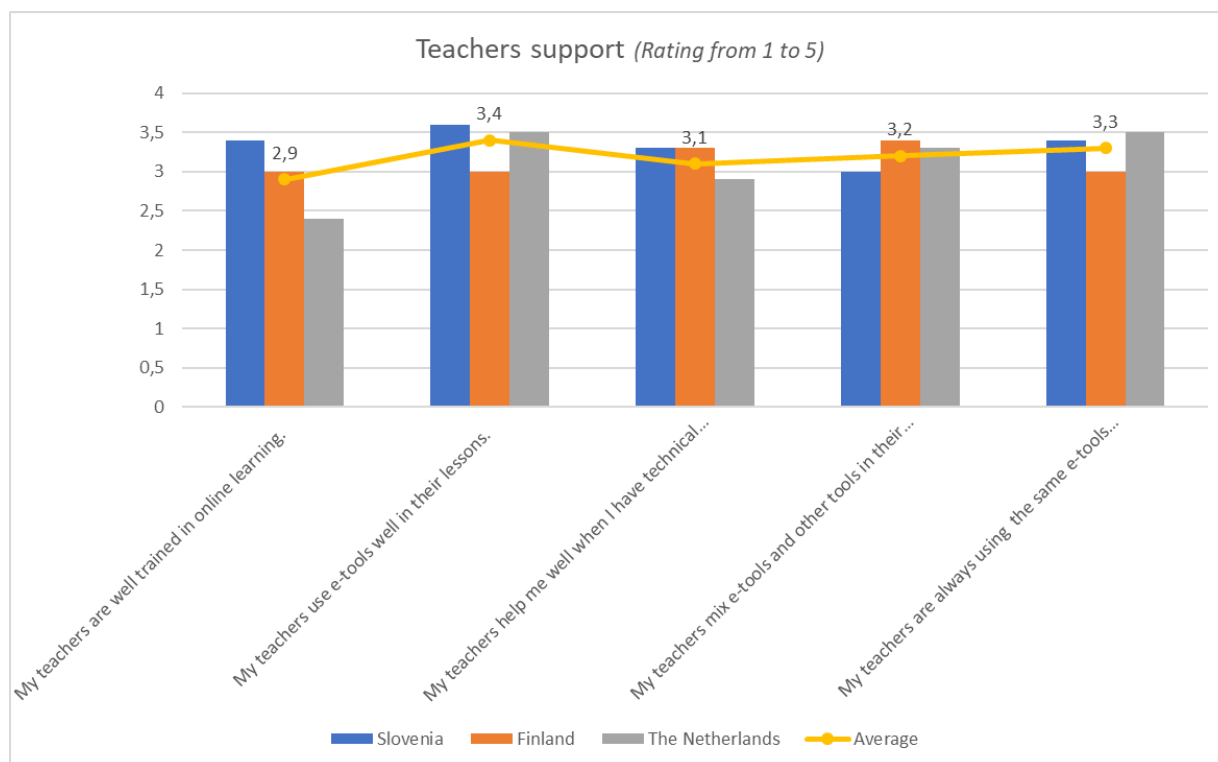


Figure 23: Teachers support

Almost 50 % of students agreed that teachers are using e-tools while teaching and that they are always using the same e-tools in their lessons, while one third answered that teachers mix them. In regards to statement whether “teachers help students with technical or other problems” students are mostly undecided.

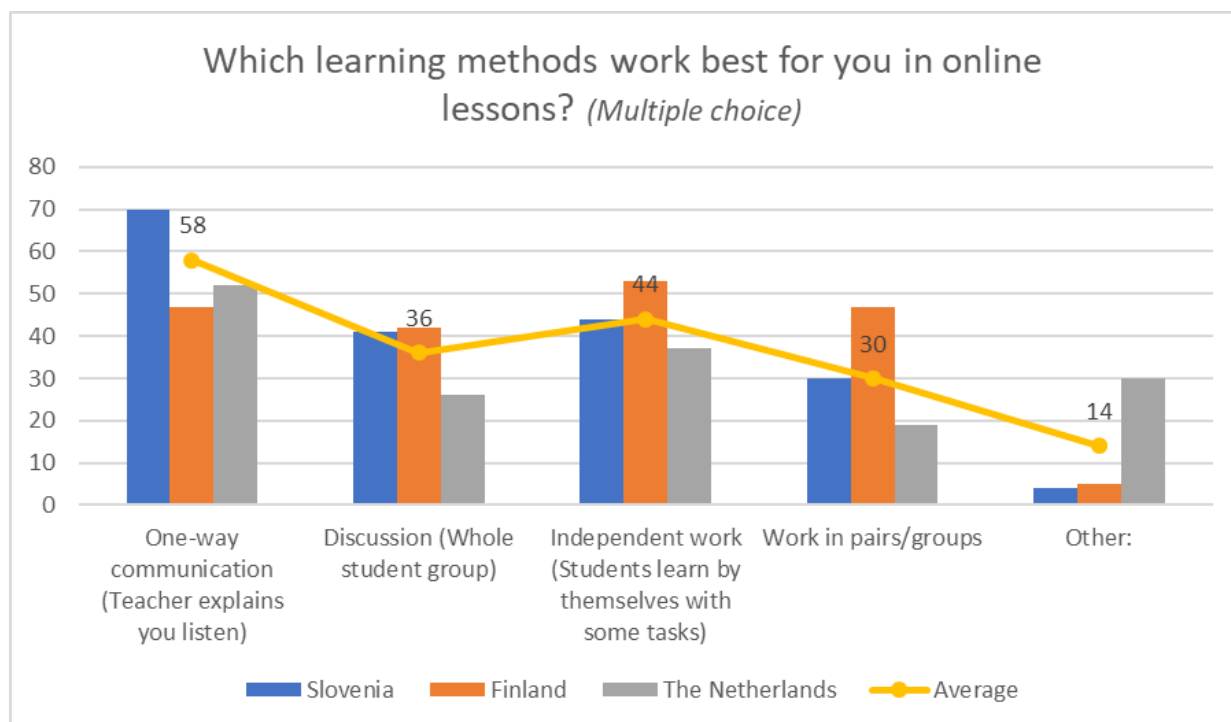


Figure 24: Online learning methods best practices

Survey shows that best learning method for students is one-way communication, followed by independent work. One third of students have preferences for Discussions and bit less for Work in pairs. Under Other, 70 % of participants have chosen Kahoot and LessonUp as the best learning methods for them.

2.4.3 Overview of open questions' findings

The questionnaire featured one (1) open question in the survey for students. First, participants were asked whether they like e-learning [with a Yes/No question]. As a follow-up, they were asked an open question, to write what they like or dislike about e-learning. Where participants were answering in a local language, we have translated the answers using an online translating tool [Google translate] for a better understanding of the topic. Answers have been reviewed and where it was possible, we have listed the top three items that the majority of the respondents have mentioned in their answers.

Question was **“Please explain why you like or dislike e-learning.”**

Responses per country are presented below.

2.4.3.1 Finland

Likes:

- Can focus better
- Advantage of home comfort (can sleep longer))
- More fun

Dislikes:

- Insufficient technical know-how
- Lack of motivation

2.4.3.2 The Netherlands

Likes:

- No need to carry heavy books, instead materials are online
- Advantage of home comfort
- The efficiency of e-learning (on school subjects, learning new technology)

Dislikes:

- Lack of personal contact
- The use of digital materials, physical books are better
- You learn less of new subject online

2.4.3.3 Slovenia

Likes:

- It is easier
- Flexibility and fun (learning through video clips)
- No need to commute

Dislikes:

- Lack of appropriate equipment (learning over the phone)
- Lack of motivation
- No fun (no personal contact)

2.5 Desk Investigation

2.5.1 Finland

Several interesting studies and research has been made in Finland during the past three years regarding online learning and online teaching practices in VET-education. The most recent studies deal with the implications of Covid-19 outbreak and the rapid shift to distant and online education. Some of the studies / research have been described below.

1. Challenges in online teaching experienced by teaching staff in vocational education

- Authors: Mikko Laitinen
- Published in year: 2021, Master's thesis.
- Name of the publication: Digitalisaatio ammatillisessa koulutuksessa (Digitalisation in VET-education)
- Link to the publication:
<https://jyx.jyu.fi/bitstream/handle/123456789/76970/URN%3aNB%3afi%3ajyu-202107024157.pdf?sequence=1&isAllowed=y>
- **Short description of the study:** The goal of this study was to identify the challenges in online teaching experienced by vocational teachers and teaching support, guidance, and planning staff. Identifying the challenges of online teaching is essential to overcome these challenges. The study utilizes both a quantitative and a qualitative approach. The research material consists of 55 questionnaire responses and seven theme interviews. There were both closed and open questions in the questionnaire. The results of the study show that the most common challenges are caused by the lack of time and competence of the teaching staff, the insufficient skills of the students and the fact that the educational institution has not agreed on the practices related to online teaching comprehensively enough. The poor availability of support for online teaching and the negative attitude of teaching staff and students towards online teaching also pose challenges for online teaching.
- **Key findings:** It is not understood to give enough work time for e-learning and its preparation, it is often thought that the material is done quickly and at once and it is forgotten that it needs to be updated and edited and e-learning also needs to be guided.

The challenge was perceived to be the lack of one's own technical and pedagogical competence. The students' ability to study online and the students' differences in level of competence were also a cause for concern. There are no commonly agreed practices in the implementation of e-learning, clear decisions on common guidelines were wanted. The school has traditionally thinking co-workers who stick to the old and don't want new ways of doing things.

2. Impacts of COVID-19 pandemic on upper secondary level education

- Authors: Owal Group Oy (ordered by Finnish National Agency for Education)
- Published in year: 2021. Research conducted end of year 2020 and JAN 2021.
- Name of the publication: Koronavirusepidemian vaikutukset toisen asteen koulutukseen (Impacts of COVID-19 pandemic on upper secondary level education)
- Link to the publication: https://owalgroup.com/wp-content/uploads/2021/03/Koronan-vaikutukset-toisen-asteen-koulutukseen_1603.pdf
- **Short description of the study:** Three questionnaires were used when conducting the study: 1. The questionnaire for VET-students – n=2599 2. The questionnaire for teachers and counselling staff – n=438 and 3. The questionnaire for VET-providers – n=105. The objective of the study was to find out which impacts the COVID-19 pandemic and rapid shift to distant and digital education caused to VET-education (upper secondary level education).
- **Key findings:** The study provided information on the effects of the coronavirus epidemic on secondary education as well as separately for high school education and vocational training. The state of emergency caused by the coronavirus began in Finland in March 2020, and all the vocational schools moved on a fast schedule to distance learning. In this corona period teaching and assessment have been diversified, IT skills have developed, and distance learning will be used in a more diverse way in the future. The key challenges in moving to distance learning have been related to what is expected of student's self-direction, which not everyone has and which it has been challenging to support remotely. The situation has been particularly challenging for students who have been weak before the corona crisis, but the lack of inclusion and community has also made it difficult under normal circumstances successful students' studies and coping. In both forms of education, there are students for whom distance learning is well suited. According to the estimates of the students in the student survey, distance learning undermined the quality of teaching.

3. Motivation Enhanced Deep and Meaningful Learning with Social Virtual Reality

- Authors: Stylianos Mystakidis
- Published in year: 2019, Dissertation.
- Name of the publication: Motivation Enhanced Deep and Meaningful Learning with Social Virtual Reality
- Link to the publication: <http://urn.fi/URN:ISBN:978-951-39-7977-5>
- **Short description of the study:** Current distance learning online teaching and learning practices have limitations in terms of quality and effectiveness. Deep and meaningful learning theories have the potential to meet these challenges by emphasizing the cognitive, social, and affective aspects of learning by engaging the individual holistically.

New e-learning models and frameworks are needed to develop and maintain high levels of motivation, commitment and satisfaction of learners. This dissertation focuses on methods for improving motivation for deep and meaningful learning in distance learning. The overall goal is to explore the impact of motivational enhancement approaches using social virtual reality environments in e-learning and open learning. The dissertation proposes four initial frameworks towards in-depth and meaningful e-learning through game-based motivation enhancement methods; OpenQuest, a Serious E-Scape Room, a blended model for deep and meaningful online learning in a social virtual reality environment, and Patras' blended strategy model.

- **Key Findings:** Storytelling can be used to develop and demonstrate educational goals in practice. Modern digital media can complement traditional ways of learning by creating new ways for learners to experience and remember stories and similar knowledge and information. Technology alone cannot cause learning to happen, but its benefits can enable certain activities in which learning takes place. In addition to the content side, equal emphasis must be placed on the social and emotional part of the e-learning process. One approach is to increase motivation and social interaction through appropriate methods such as problem-based learning, project-based learning, intelligence-based learning, game-based learning, playful learning, playful learning (gaming) or multiple games.

4. Digitalisation in VET-education

- Authors: Marika Koramo, Sanna Brauer, Laura Jauhola
- Published in year: 2018. Research conducted JAN–DEC 2017
- Name of the publication: Digitalisaatio ammatillisessa koulutuksessa (Digitalisation in VET-education)
- Link to the publication:
https://www.oph.fi/sites/default/files/documents/191033_digitalisaatio_ammattillisessa_koulutuksessa.pdf
- **Short description of the study:** The objectives of the study were 1. To find out what is the status of digitalisation in VET-education. 2. What is the impact of digitalisation regarding acquiring and developing vocational competences: a) How digitalisation has changed learning practices in VET-education and b) What is the role of digitalisation in VET-education in the future. The research methods included teacher survey (n=930) & student survey (n=2010) & literature review (over 70 references) & 2 workshops and complementary interviews.
- **Key findings:** Overall VET-institutions, their staff and management in Finland have a very positive attitude towards digitalisation and the use of digital tools. There were however major differences between the fields of study. The most positive attitudes, best digital competences and resources are in education and humanities & natural sciences, mathematics and statistic. The lowest competences and resources and negative attitudes are in engineering, manufacturing, construction and logistics. The biggest challenge regarding digitalisation was in the opinion of VET-teachers the lack of resources (e.g. time) and own organisation's nonalignment to digitalisation. The practices and tools of digitalisation were unstable and there was a lack of pedagogical and technical support. The VET-students rated their competences to use digital tools as good already before their VET-studies but VET-students also experienced a lack of support when using

digital tools and solutions in their VET-studies. Almost 50 % of the students would like to use more digital tools and solutions in their VET-studies and as part of counselling practices. One key finding was that not all VET-students are in equal position regarding digitalisation. Some VET-teachers do not use digital tools and there are great variations between the fields of studies. Both teachers and students recognize many advantages and benefits in digitalisation e.g. individual study paths, development of wide-ranging competences, targeting of resources to those students who need them most, easier access to information and learning resources.

2.5.2 The Netherlands

Preparation

In the preparation of KA2 project Genuine Digi we have used the basis theory from the book Educational Technology; A Primer for the 21st Century by Ronghuai Huang, J. Michael Spector and Junfeng Yang (Springer Nature Singapore Pte Ltd., 2019).

A brief summary of the preface:

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources. Educational technology focuses on both the technical and pedagogical ways and means of supporting learning and instruction. It is the basis for the success of the e-learning revolution in recent years. Technology-based instruction can surpass traditional classroom-based instruction in quality by providing a wide variety of affordances and capabilities that can promote motivation and result in engaging, efficient, and effective learning.

The demand for educational technologies has been rising steadily; e-learning is a huge and expanding worldwide industry. The needs and requirements of the various organizations, both educational and commercial, vary widely in terms of the knowledge and skills needed to implement educational technology solutions effectively. Further complexity comes from the fact that potential students of educational technology exist at different levels and in a variety of contexts; potential students come from a variety of backgrounds, ranging from education, computing, engineering, design, arts, the humanities, finance, and the natural sciences.

DIOS

In the light of this background and in the light of the KA2+ project Dios, we have looked internally at how the use of electronic and technical resources (such as ICT) can be stimulated among our teachers. As such, we also examined where there are overlaps in the research area of: what organizational and policy measures are needed to make the use of pedagogical and didactic resources permeate their use in the classroom.

Technical staff

Additionally, national and regional research in the province of Gelderland, has been conducted into the effects of digitization in education. This mainly concerned the applications of ICT during the corona time and the way in which the school organizations of vocational education implemented and maintained this. It was clear that the use of a dedicated technical staff serving the teachers and their teams, a well-supported material availability of hardware and the presence of a technical laboratory to test and recommend technical didactic resources, were important issues for those schools that scored reasonably well.

STRAX

In our lab setting (STRAX) we have stimulated the use of a didactic tool (app) that supports teachers in applying background information when designing education. Likewise, we have gained experience in delivering targeted teacher courses in online teaching methods, the use of lesson videos and the use of cameras during the lessons and in the creation of teaching materials. Teachers could also use our materials from our media library. These additional applications were scored positively by our teachers in the regional survey.

iCoaches

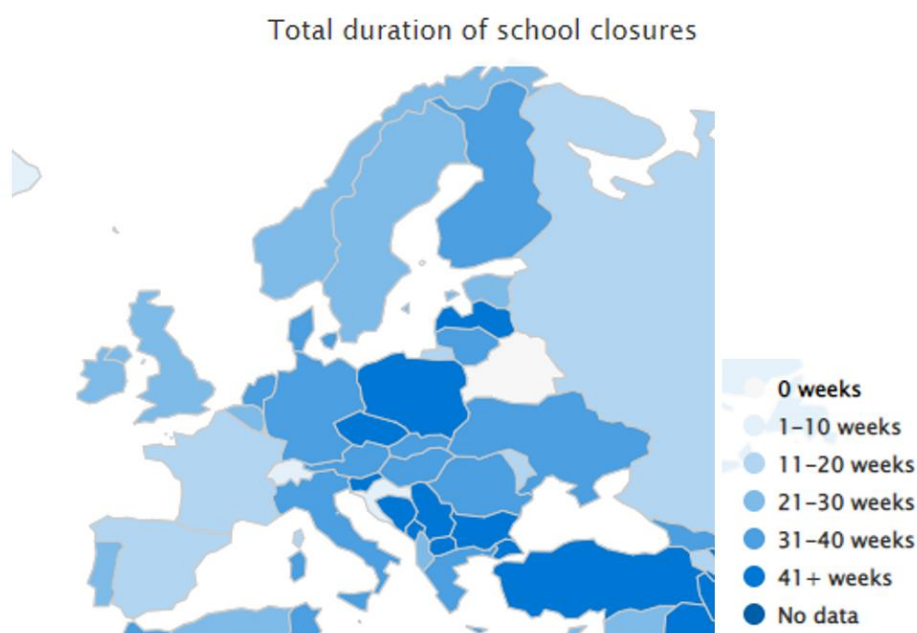
Later, our organization put together a team of iCoaches to support the teachers in the different education sectors. The iCoaches contribute to the digitization of education and lessons both on demand and on their own initiative. These iCoaches maintain close contacts with STRAX.

Moving on

Due to these conclusions we are convinced that the path we have embarked on must be continued. These data and findings are also central to our comparison with the surveys conducted for the Genuine Digi project.

2.5.3 Slovenia

Since the Covid-19 outbreak in 2020, the pandemic has disrupted education system around the globe. Its impact on teachers and students was surveyed by different institutions in the past 2 years, in Slovenia as well. In total, schools in Slovenia were closed for 47 weeks, which place Slovenia in the top 10 European countries with the longest school closure.



Picture 1: Total duration of school closures (Source: <https://en.unesco.org/covid19/educationresponse>)

Ministry of Education, Science and Sport conducted a research after the first few months into the pandemic, in May and June 2020 with focus on “Distance education during the Covid-19

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epidemic in Slovenia". The study involved 7,382 primary and secondary school teachers, 24,684 pupils and students, 406 primary and secondary school principals, and in seven focus groups 16 principals and 32 teachers [meaning, slightly less than a third of all primary and secondary schools, one tenth of pupils and students and two thirds of principals].

The results of the research show that pupils and students found that distance learning during the new coronavirus epidemic was more demanding than classroom teaching, while distance learning was also found to be interesting and creative. The negative aspects of the students were the lack of social contact, both with classmates and teachers. Quite a few also missed the teacher's explanation. Few students stated that they did not know how to use a computer, and about 20 percent had to share a computer with family members. On the positive side, they felt that they were able to schedule work during the day on their own and that they did not have to perform in front of classmates. Among high school and upper elementary school students, there was a large proportion of them, over 30 percent, who estimated that it was easier to learn in this way.

Teachers also assessed that distance teaching was demanding and stressful, but they managed to achieve most of the set learning goals. In greater distress were those teachers who felt they could not attract students to participate. Most of them were teachers of an upper level of elementary school. Teachers were self-critical in their self-assessment of the quality of teaching, with 60 percent judging that their distance learning was slightly worse and 10 percent thinking it was significantly worse than live teaching, as distance teaching required completely different approaches than live teaching. As the predominant way of teaching they named combining lessons through videoconferencing and directing learning through written instructions, but the research showed that teachers in Slovenia very rarely encouraged group work or work in pairs.

In different Slovenian faculties, such as Faculty of Arts, students as their master thesis also took under review how the pandemic has impacted educational system. Findings from researches from year 2021 were similar to the ones conducted after the first months of the pandemic and its consequence, distance learning.

Overall, studies show that distance learning brought quite few disadvantages, even though part of population (predominately among students) experienced distance learning as pleasant and comfortable. Though the latter is mainly around comfort of being at home, e.g. no need to commute (financial savings as well as time efficient), following own study pace etc. Disadvantages are on the other hand, more around quality of transferred and then also gained knowledge, difficulties with mastering new technologies, lack of motivation and social isolation.

Studies and researches done in Slovenia in the first phase after the pandemic has started primarily focus on teaching/learning processes and its execution.

3 Conclusions

The objective of the project Genuine Digi is to increase VET-teachers' pedagogical online teaching skills and thereby increase the digital competences of both teachers and students. To be able to meet set goals, we first needed to evaluate the situation on the field. Hence, the purpose of the first intellectual output is to collect information in order to obtain an important overview of the current competences of VET-teachers and the skills and knowledge required to deliver quality and inclusive education online. At the same time, the aim was also to learn from students themselves which methods they perceived as good online learning practices.

Results showed that teachers needed the most support in the pedagogical and didactical field. Essentially

On the second place is the requirement for support concerning the technology field e.g. ICT, video production, graphic design. Also the need for on-site support at school concerning e-learning and ICT is ranked high. VET-teachers are using some of the digital tools already, such as watching videos / listening to audios, digital quizzes, making presentations etc, and in this area they did not require as much additional support as they did with teaching strategies.

Teachers did not find it easy to motivate students for e-learning, even though they were sharing good practices with their colleagues and e-learning seems to be valued in every of the participating schools. Motivational challenges experienced by teachers confirm the previous statement that the key need to address is to offer better support to teachers with pedagogical and didactical guidelines.

Almost half of the teachers (44 %) use hybrid teaching (classroom & online combination). Notable in the results is that the use of hybrid teaching by the Finnish teachers deviates highly from the average: in Finland approximately a quarter of the teachers use hybrid teaching. One of the challenges of hybrid teaching is to include efficiently and equally both groups of students in the learning process to assure that they all will benefit from the lesson. Another challenge the teachers mentioned is that hybrid approach is more time consuming and consequently they cover less from the curriculum.

On average the most used platform was according to the survey MS365. The reason may be that this platform is available in all three countries. In the Netherlands MS365 was clearly the most used learning platform. In Slovenia the most used e-learning platform was according to the survey Moodle, while itslearning platform was not used at all. In Finland on the other hand Itslearning was the number one platform. Students results partially comply with teacher's perspectives: Finnish students answered they are using Itslearning and Slovenian students answered they are using Moodle and MS365, however, the Slovenian students also experienced quite strongly that they were using Arnes and Zoom as e-learning platforms. In the Netherlands the students answered that they are using MS365 and other learning platforms (e.g. Kahoot). These results show that the platform used is not the most important issue because technical user training is easy to provide. How to use the platform and the possibilities it offers in a pedagogically and motivationally meaningful way is the key issue.

The most used approaches for e-learning by teachers are 1. collaboration during online lessons (73 %) 2. activating methods during online lessons (55 %) and 3. flipped classroom (45 %). The least used approach for e-learning was according to the survey results gamification (21 %). The most already used digital tools were 1. watching videos and listening to audios 2. presentations (digital posters, mind maps etc.) and 3. online learning environments. It's interesting that

according to the survey results digital quizzes or polls were used quite a lot in Slovenia and the Netherlands but much less in Finland. The least experimented digital tools were creating videos or audios and interactive apps or games. Majority of students agree that they can follow, understand and actively participate in online lessons. Learning methods that work best for the students are 1. one-way communication (58 %) 2. independent work (44 %) and 3. discussion among the whole student group (36 %). There are of course slight variations among the preferences of each country's students.

Teachers evaluated that they actively develop and improve their digital skills through reflection and experimentation. However, the teachers feel they do not have sufficient amount of time available to do it. They do create own different types of digital resources and modify existing ones to adapt them to their needs. Set up or adaptation of complex interactive methods they do less often.

The teachers use digital technologies to provide feedback to students (65 %) and some of them use all data available to timely identify student who need additional help. Teachers assess that students use digital communication and cooperation predominantly among each other, however, teachers also sometimes use it during their classes. Teachers tend to agree that they are using digital technology to assess students' skills. Digital technology is less used in enabling students to give feedback to other students.

It is encouraging to see that teachers in all countries evaluate that students learn how to behave responsibly online. In Slovenia and Finland teachers rather agree that students also learn how to behave safely online while in the Netherlands they are undecided.

In teachers' open answers concerning the challenges and barriers of online teaching (including hybrid teaching) there are variations among countries. Nevertheless 1. time management / time consuming 2. motivating and keeping students engaged and participating 3. issues related to technology (e.g. hardware, software, internet connection, technical knowhow) seem to be categories that challenge the teachers in all the countries. How the teachers activate the students? In all the countries teachers mention methods that fell into category group work. Also webcam on and other communicative methods (e.g. using chat, calling by name) are mentioned. Concerning the open answers of students lack of motivation was mentioned in all countries when students were asked to explain why they like or dislike e-learning. Also technology related challenges were mentioned (lack of appropriate equipment, insufficient technical knowhow). As a positive side of online learning staying home was mentioned in all of the countries.

According to the survey results one of the (simple) opportunities for improvement is providing adequate technical equipment for students and teachers. It could be also stated that technical support for both students and teachers should be available when and as needed. Technical issues need to be addressed when they arise not days after the challenging situation. Both teachers and students feel that motivation is needed even more when learning online because it's easier to get occupied with other (more interesting and/or irrelevant) issues. So further opportunities for improvement are around aligned strategies and guidelines which would improve the whole process of distance and online learning.

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5 Questionnaires used

5.1 Teacher survey

Please find copy of the Teacher's survey below:

On-line Education Questionnaire

Teachers

Survey short title: On-line Education Questionnaire

Question number: 25

Number of variables: 110

Dear all. In front of you is a questionnaire intended for pedagogical workers, with which we want to find out more about the practices you use in on-line teaching. The results will help us to prepare additional trainings for teachers. With this we want to enable teachers and students to use modern technology in a more friendly and efficient way. Completing the questionnaire in will take about 20 minutes.

Q1 - The survey data will be stored in Arnes(Arnes), during project time and accessed only by members of the research team. Only anonymous statistic data will be gathered through the survey, no personal data will be gathered or stored.

- ☐ I agree
- ☐ I do not agree

Q2 - From which country do you come from?

- ☐ Finland
- ☐ Netherlands
- ☐ Slovenia

Q3 - What is your age?

- ☐ 18-24 years old
- ☐ 25-34 years old
- ☐ 35-44 years old
- ☐ 45-54 years old
- ☐ 55-64 years old
- ☐ 65 or more

Q4 - Please list three challenges that you faced when planning or implementing on-line lessons/assignments.

Q5 - Please list three barriers that you had to overcome or needed to be addressed when planning or implementing on-line lessons/assignments.

Q6 - What kind of support do you need when implementing or designing e-learning?

Multiple answers possible.

- ☐ pedagogical/didactical
- ☐ itslearning
- ☐ ICT
- ☐ video production
- ☐ graphic design
- ☐ MS 365
- ☐ Moodle
- ☐ Other:

Q7 - How do you activate students to communicate two ways and interact with teachers and other students while e-learning?

Q8 - MOTIVATION OF STUDENTS AND SCHOOL SUPPORT

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
I have been given sufficient resources to plan or prepare online teaching.					
I find it easy to motivate students for e-learning.					
My school has enough e-learning didactical/pedagogical support staff.					
My school has enough e-learning ICT support staff.					
E-learning is valued in my school.					

At our school we share experiences (good practices) with our colleagues.

Q9 - Do you use hybrid teaching (some students in classroom some online)?

- ☐ Yes
- ☐ No

Q10 - What are the challenges of hybrid teaching? Please name three.

Q11 - Which learning platforms are you using?

Multiple answers possible

- ☐ MS 365
- ☐ itslearning
- ☐ Moodle
- ☐ Blog
- ☐ Other:

IF (3) Q3 = [1, 2, 3, 4, 5, 6] (starost)

Q12 - What kind of approaches do you use when planning and implementing your teaching/students online learning ?

Multiple answers possible

- ☐ Flipped classroom
- ☐ Collaboration during online lessons
- ☐ Collaboration between lessons
- ☐ Same questions with small group work...
- ☐ Activating methods during the online lessons
- ☐ Gamification
- ☐ Other:

Q13 - SKILLS

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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I actively develop my digital teaching skills.
I have time to work on my digital teaching skills.

I improve my skills through reflection and experimentation.
I help colleagues in developing their digital teaching strategies.
I participate in online training opportunities (online courses, MOOCs, webinars...).

Other:

Q14 - RESOURCES

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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I use different internet sites and search strategies to find and select a range of different digital resources

I evaluate and select resources on the basis of their suitability for my learner group

I compare resources using a range of relevant criteria, e.g. reliability, quality, fit, design, interactivity, appeal

I advise colleagues on suitable resources and search strategies

Other:

Q15 - CREATION OF RESOURCES

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
.					

I create my own digital resources and modify existing ones to adapt them to my needs

I set up and adapt complex interactive resources

I do create worksheets with a computer, but then I print them

I create digital presentations, but not much more

I create and modify different types of resources

I set up and adapt complex, interactive resources

Other:

Q16 - GROUP WORK

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
.					

When my students work in groups or teams, they use digital technologies to acquire and document evidence

It is possible for me to integrate digital technologies into group work

I encourage students working in groups to search for information online or to present their results in digital format

My students exchange evidence and jointly create knowledge in a collaborative online space

Other:

Q17 - STUDENTS SELF ASSESSEMENT

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
.					

I use digital technologies to allow students to plan, document and monitor their learning themselves (e.g. quizzes for self-assessment, ePortfolios for documentation and showcasing, online diaries/blogs for reflection...)

My students do reflect on their learning, but
not with digital technologies
I use quizzes for self-assessment
Other:

Q18 - DATA ANALYSIS

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

.	1 - totally disagree	2	3 -	4 -	5 -
		- disagree	undecided	agree	strongly agree

I analyse all data available to me
to timely identify students who
need additional support ("Data"
includes: students' engagement,
performance, grades, attendance;
activities and social interactions
in (online) environments;
»Students who need additional
support" are: students who are at
risk of dropping out or
underperforming; students who
have learning disorders or
specific learning needs, students
who lack transversal skills, e.g.
social, verbal or study skills).
I only analyse academically
relevant data, e.g. performance
and grades

Q19 - I use digital technologies to provide effective feedback.

- ☐ Yes
- ☐ No

Q20 - ACTIVATION OF STUDENTS

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

.	1 - totally disagree	2 -	3 -	4 -	5 -
	disagree	disagree	undecided	agree	strongly agree

I use digital technologies for students to actively
participate in class
My students engage with digital media in my classes,
e.g. electronic worksheets, games, quizzes
My students systematically use digital technologies to
investigate, discuss and create knowledge
Other:

Q21 - DIGITAL COMMUNICATION OF STUDENTS

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1 - totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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I set up assignments that require students to use digital means to communicate and collaborate with each other or with an outside audience.

My students use digital communication and cooperation mainly among each other
Other:

Q22 - Which digital tools have you or your students already used for teaching and learning?

Multiple answers possible

- ☐ Presentations (Digital posters, mindmaps, planning tools)
- ☐ Watching videos / listening to audios
- ☐ Creating videos / audios
- ☐ Online learning environments
- ☐ Digital quizzes or polls
- ☐ Interactive apps or games
- ☐ I have not yet used any digital tools in class
- ☐ Other:

Q23 - SCHOOL TECHNICAL SUPPORT

Please evaluate your practice described by the following statements from 1 to 5. Where 1 means that you strongly disagree and 5 that you strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
--	-----------------------	-----------------	------------------	-----------	--------------------------

In our school, technical support is available in case of problems with digital technologies.

In our school, there are school-owned/managed digital devices for students to use when they need them.

In our school, students have access to a database of in-company training opportunities.

In our school we have measures in place to identify challenges that arise with remote teaching and learning, related to students' learning needs and socio-economic background.

In our school, students bring and use their own portable devices during lessons.

In our school, physical spaces support teaching and learning with digital technologies.

In our school, students in need of special support have access to assistive technologies.

In our school, there are online libraries or repositories with teaching and learning materials.

Q24 - DIGITAL TECHNOLOGY IN PRACTICE

Please evaluate your practice described by the following statements from 1 to 5. Where 1 means that you strongly disagree and 5 that you strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
I use digital technologies to assess students' skills.					
I use digital technologies to provide timely feedback to students.					
I use digital technologies to enable students to reflect on their own learning.					
I use digital technologies to enable students to provide feedback on other students' work.					
I enable students to use digital technologies to document what they have learned relevant to their qualification.					
I use digital data about individual students to improve their learning experience.					

Q25 - ONLINE SECURITY

Please evaluate your practice described by the following statements from 1 to 5. Where 1 means that you strongly disagree and 5 that you strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
In our school, students learn how to behave safely online.					
In our school, students learn how to behave responsibly when they are online.					
In our school, students learn how to check that the information they find online is reliable and accurate.					
In our school, students learn to create digital content.					
In our school, students learn to communicate using digital technologies.					
In our school, students learn how to solve technical problems when using digital technologies.					

5.2 Student survey

Please find copy of the Student's survey below:

On-line Education Questionnaire

Students

Survey short title: On-line Education Questionnaire
Question number: 9
Number of variables: 30

Dear all. In front of you is a questionnaire intended for students, with which we want to find out more about the practices you use when on-line learning. The results will help modify teachers' practices according to your needs. With this we want to enable teachers and students to use modern technology in a more friendly and efficient way. Completing the questionnaire in will take about 5 minutes.

Q1 - The survey data will be stored in Arnes(Arnes), during project time and accessed only by members of the research team. Only anonymous statistic data will be gathered through the survey, no personal data will be gathered or stored.

- ☐ I agree
- ☐ I do not agree

Q2 - From which country do you come from?

- ☐ Finland
- ☐ The Netherlands
- ☐ Slovenia

Q3 - Do you like e-learning?

- ☐ YES
- ☐ NO

Q4 - Please explain why you like or dislike e-learning.

Q5 - Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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I get enough support for e-learning.

I find e-learning more effective than traditional classes.

At my school we use good tools for distance learning.

Q6 - Which learning platforms are you using at your school?

Multiple answers possible

- ☐ MS 365
- ☐ itslearning
- ☐ Moodle
- ☐ Blog
- ☐ Other:

Q7 - Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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I can follow and understand online lessons.

I actively participate in online lessons (I take notes, ask questions, etc.).

I do NOT do other things during online lessons.

During online learning I am motivated for school.

I need more time and energy for online learning than live classroom learning.

I get feedback from teachers during online learning.

Q8 - What applies to you and your school?

Please rate each of the statements in the table below from 1 to 5. Where 1-Strongly disagree, 2 - disagree, 3 - undecided, 4 - agree and 5 - strongly agree.

	1-totally disagree	2 - disagree	3 - undecided	4 - agree	5 - strongly agree
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My teachers are well trained in online learning.

My teachers use e-tools well in their lessons.

My teachers help me well when I have technical or other problems with online learning.

My teachers mix e-tools and other tools in their lessons.

My teachers are always using the same e-tools in their lessons.

Q9 - Which learning methods work best for you in online lessons?

Multiple answers are possible

- One-way communication (Teacher explains you listen)
- Discussion (Whole student group)
- Independent work (Students learn by themselves with some tasks)
- Work in pairs/groups
- Other: