Digital Classes for VET

Institutional Report

Biotechnical Educational Centre Ljubljana

Digital Culture for the 21st Century

Vetwork

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Content

Introduction

Teachers participating in the project will implement ICT-based classes for their students using the methods learned in the previous phase and the resources created. Teachers will evaluate the lesson (self-reflection) in a common template, and the students' feedback is collected in an online questionnaire. Based on experiences, feedback and self-reflection, the partner schools will summarize it all in a CASE STUDY.

TASKS (teachers)
- Updating the DMC lesson plan and completing it with the necessary information (or creating a new one)
- Developing a digital learning material and sharing it on DMC
- The 10 teachers working on the project will deliver the class/classes planned and collect feedback of students
- Evaluation of the ICT based classes (Teachers'/Tutors' self-reflection)

TASKS (mentors)
- Creating a short summary of the piloted class/classes in a few sentences as comment to the actual lesson plan on the DMC
- Preparing the case study

Teachers participating

Teacher's name	Subject/s)
Jože Premru	mathematics
Adela Žigert	physics
Vesna Loborec	economics in tourism
Jasna Šček	professional italian and german
Irena Štrumbelj	Vocational college
Maja Vlahovič	School of Food Processing
Mojca Jevnikar	librarian
Pia Kovač	psychology
Rok Demič	biotechnology
Monika Dolinar	food processing and nutrition
Nina Sitar	mathematics
Suzana Makarič (only for O1)	psychology
Irena Ulaga	librarian
Anita Fajić	School of Food Processing

Digital Classes

Sectors/professions (to which the piloted classes are related)

Data on the classes piloted:

TEACHER	DATE	CLASS	NUMBER OF STUDENTS	TOPIC
Maja Vlahovic	29. 11. 2022	14. grade	10	Sensory analysis of food
Adela Žigert	6. 12. 2022	10. grade	16	Work and energy
Jasna Šček	25. 11. 2022	11. grade	12	Food ordering and composing a menu in Italian language
Vesna Loboroec	3. 11. 2022	14. grade	40	Valorisation of the Tourism Offer
Nina Sitar	8. 11. 2022	10. – 12. grade	27	finance and interest rate
Anita Fajić	23. 11. 2022	12. grade	21	Classification and properties of substances
Rok Demič	27. 11. 2022	12. grade	30	transport through the membrane
Monika Dolinar		11. grade	25	Determining milk density
Jože Premru	24. 11. 2022	12. grade	21	Behavior of a polynomial graph around its zeros
Pia Kovač	28. 11. 2022	11. grade	24	Sensation and perception
Total				

Links to the lesson plans of teachers on the DMC platform

The teacher's name, link to the lesson plan

Pia Kovač: https://dmc.prompt.hu/sl/node/341
Anita Fajić: https://dmc.prompt.hu/sl/node/339
Rok Demič: https://dmc.prompt.hu/sl/node/327
Nina Sitar: https://dmc.prompt.hu/sl/node/333
Maja Vlahovic: https://dmc.prompt.hu/sl/node/338
Adela Žigert: https://dmc.prompt.hu/sl/node/342
Jasna Šček: https://dmc.prompt.hu/sl/node/324
Vesna Loboroec: https://dmc.prompt.hu/sl/node/397
Mojca Zajc: https://dmc.prompt.hu/sl/node/347
Nina Sitar: https://dmc.prompt.hu/sl/lesson-plans/979730392
Anita Fajić: https://dmc.prompt.hu/sl/lesson-plans/1513722957
Rok Demič: https://dmc.prompt.hu/sl/lesson-plans/169473127
Irena Štrumbelj-Drusany: https://dmc.prompt.hu/sl/node/346

Monika Dolinar: https://dmc.prompt.hu/sl/node/336
Irena Ulaga: https://dmc.prompt.hu/sl/node/331
Jože Premru: https://dmc.prompt.hu/sl/node/337
Pia Kovač: https://dmc.prompt.hu/sl/lesson-plans/258752146

Brief information on the piloted lessons

1. The importance of the senses in the sensory analysis of foods. - Maja Vlahovic

Teaching method: Inquiry-Based and Research-Based Learning – 2 lessons
Learning and development goals: By the end of the lesson, students will know the importance and function of the senses in sensory analysis of a sample.
Evaluation: Diagnostic assessment using the Plickers digital tool - at the end of the lesson, students have a learning sheet with comments written on it, answers to questions from the online classroom are written on it, and the Plickers app allows me to get immediate feedback on their understanding of the material.
(Food quality control, 14.vgrade)

2. Work and energy. - Adela Žigert

Teaching method: group work
Learning and development goals: Students learn the definitions of work and mechanical energy and energy changes.
Evaluation: The teacher produces a teamwork evaluation sheet. The plan is for the students to assess the other team members, at the same time as the teacher assesses the cooperation, communication and ... of the students. At the end, all students test the published materials and evaluate them. The final grade consists of the teacher's grade, the team members' grade and the product grade. Group evaluation, evaluation of the class
(Physics, 10. Grade)

3. Al ristorante - ordering food in a restaurant - Jasna Šček

Teaching method: Flipped classroom – 1-2 lessons
Learning and development goals: Creating menus and ordering food and drinks in foreign language (Italian).
Evaluation: The task is successfully completed when they manage to order all the elements of the Italian lunch independently. I assess the material covered by students by oral questioning for high school students, and for college students by oral examination.
(Foreign language, 11. grade)

4. Valorizing the tourism offer. - Vesna Loboroec

Teaching method: multilateral communication, dialogue method, explanation – 90 min lesson
Learning and development goals: integrating theory and practice, the student understands the importance of valorization in the tourism offer

Evaluation: Designing an exam box with individual examples
(Tourism, Economy, 14. grade)

5. Financial literacy. - Nina Sitar

Teaching method: Gamification – 2 lessons
Learning and development goals: Students will learn some financial facts to improve their own financial literacy.
Evaluation (method): Interactive quiz, followed by a traditional written quiz: we reviewed the analysis of the interactive financial quiz. We then take the quiz again in written form to check how much the students have remembered.
(Mathematics, 10. – 13. grade)

6. The matter. Classification and properties of the matter. -Anita Fajić

Teaching method: Explanation – 2 lessons
Learning and development goals: Students learn that the environment we live in is made up of many different substances.
Evaluation (method): Taking a quiz in the Moodle online classroom. The quiz is open until the end of the school year and is designed for revision and consolidation. The teacher and students receive feedback on the success of the quiz.
(Food processing and nutrition, 12. Grade)

7. Transport of substances through the cell membrane. - Rok Demič

Teaching method: Flipped classroom method – 2-3 lessons
Learning and development goals: Students will learn about the different forms of active transport of substances across the cell membrane.
Evaluation (method): discussion, success on Google Forms, student's evaluation, self-reflection.
(Microbiology, 12. grade)

8. Determination of milk density. - Monika Dolinar

Teaching method: Demonstration, Problem-based Learning – **1 lesson**
Learning and development goals: Students can independently determine the density of milk
Evaluation (method): Calculate the density and enter the results in an excel spreadsheet to help them reach a conclusion.
(Nutrition of food of animal origin, 11. grade)

9. Polynomial graph and its zeroes. – Jože Premru

Teaching method – Demonstration - 1 lesson
Learning and development goals: Students will understand the behavior of a polynomial graph around its zeros (multiplicity of zeros and their influence on the shape of the graph) by visualizing graphs of polynomial functions.

Evaluation: Written assessment (homework)
(Math, 11. and 12. grade)

10. Perception. – Pia Kovač
Teaching method – Gamification, Brainstorming - 1 lesson
Learning and development goals: Students are able to define the concept of perception and attention. They know the principles of perceptual organization, attention and false perceptions.
Evaluation: Peer evaluation, Self-assessment by quiz
(Psychology, 11. and 12. grade)

Below are listed plans for lessons which were prepared and are accessible on DMC, however, lessons were not piloted. We are including them in the report as an additional value:

11. Creating the first program in Excel. - Irena Ulaga
1 lesson
Learning and development goals: expanding knowledge and practical application
Evaluation (method): group evaluation, discussion
(Programming languages, ICT, 13. grade)

12. Safety in the laboratory. - Irena Štrumbelj-Drusany
Teaching method: Research-Based Learning **– 2 lessons**
Learning and development goals: find the safety data sheet for each reagent and describe its properties
Evaluation (method): The task is completed when students have found solutions to the errors in the video.
(chemical analysis of food 12. Grade)

13. Finding, evaluating, selecting information and its sources. - Mojca Zajc
Teaching method: flipped classroom - 8 lessons
Learning and development goals: Library and information literacy. Developing independent learning skills (different strategies and self-checking), getting used to using different sources of information, developing skills in finding, evaluating and using informatio**n.**
Evaluation (method): Students have mastered the material if they know the basic concepts and terminology, they are aware of the meaning of the information and know the problem-solving process, they know and successfully use appropriate tools and different information retrieval procedures, know how to evaluate information and its sources and select the most appropriate information to solve a given problem.
(Cross-curricular cooperation; 9. – 14.grades)

14. Intelligence. – Pia Kovač

1 lesson

Learning and development goals: Students are able to define the concept of intelligence and learn about different theories of intelligence (Thurstone, Garnder).
 (11. and 12. grade)

15. Menus - Anita Fajić

Teaching method – Explanation – 2 lessons

Learning and development goals: Self-initiative and self-direction, communication and cooperation, to learn criteria for drawing up menus, calculate nutritional and energy values, and know allergens.

Evaluation: The presentation and completion of the quiz show how successful the students have been in learning the topic.
(Food processing and gastronomy,14. Grade)

16. The operon system. - Rok Demič

Teaching method: inquiry-based teaching – 3 lessons

Learning and development goals: Students will understand the principle of the operon system and its importance for the bacterium.

Evaluation: Google Forms shows how well students have done in learning the topic, and the MST assignment also shows what students have written. The combination of the quiz, notes and the final collaborative video call can show any misconceptions, misunderstandings, etc.
(Microbiology, 12. grade)

17. Using Graph and Excel in mathematics. - Nina Sitar

Teaching method: Flipped classroom method – 8 lessons

Learning and development goals: Students will learn to answer some matriculation / end-exam questions using ICT (Graph, Excel)

Evaluation: I use formative/developmental assessment. I check knowledge on an ongoing basis and adjust teaching according to the current knowledge checked.
(Mathematics, 13. Grade)

Institutional Overview

It is necessary to summarize here what the selected methods and tools were, why they changed compared to the plan (e.g. the workshops presenting digital tools added inspiration), or what motivated the teachers to choose them (institutional innovations, country-specific recommendation or legal requirement, such as the project method in Hungary)

Here is also a summary table, based on which the following information can be overviewed

SUMMARY TABLE OF THE METHODS AND TOOLS USED IN CLASS

TEACHER	TEACHING-LEARNING METHOD	DIGITAL TOOL APPLIED	EVALUATION METHOD
Nina Sitar	Gamification	Kahoot	Double Evaluation - digital quiz (Google forms) and paper-pencil quiz
Maja Vlahović	Inquiry-Based and Research-Based Learning	Canva, YouTube, Gizmos, Moodle, H5P, Plickers	Diagnostic assessment (Plickers)
Anita Fajić	Explanation	Moodle, H5P	Digital quiz (open for repeating)
Vesna Loborec	Multilateral communication, dialogue method, explanation	Moodle, PowerPoint 2016+ (screen recorder)	Evaluation of practical work
Rok Demič	Flipped classroom	Google Forms, video-animations, YouTube, MsTeams	Discussion, success on Google Forms, student's evaluation by questionnaire, self-reflection.
Jasna Šček	Flipped classroom	MsTeams, H5P	Oral questioning
Monika Dolinar	Demonstration, Problem-based learning	Video	Evaluation of practical work
Pia Kovač	Gamification, Brainstorming	Google Forms, YouTube, MsTeams	Quiz, self-reflection
Jože Premru	Demonstration	GeoGebra	Written assessment (homework)
Adela Žigert	Flipped classroom	Online repository for Physics	Peer evaluation, Written assessment (homework)

In the class teachers used various teaching methods, flipped classroom was used most often, however, other various innovative methods were used by individual teachers.

Some teachers changed or modified the originally planned lessons. When teachers first planned their lessons, in some cases they then changed teaching methods for the piloted lessons. Based on the workshops they have attended, they decided to use methods which were very well accepted at the workshop and well promoted as well, i.e. flipped classroom method. Some of them also decided to use digital tools they already know rather well from their previous work.

Change of teaching method was in rare cases introduced due to higher circumstances - in case of unexpected technical challenge teachers included an explanation method, which was
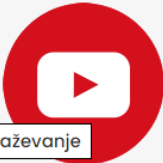
originally not planned in such a way. I.e. the sound was not working in the classroom, hence the teacher gave an explanation herself.

For the evaluation and assessment of student's learning progress (and knowledge) innovative techniques such as group evaluation, assessment by taking quizzes or other online techniques were applied, also oral questioning, written quizzes, discussion and student's evaluation.

A variety of digital tools was chosen by teachers. Most often Moodle was used, followed by h5p and Kahoot, MS Teams, Mentimeter and others. Applications to recorded screen were used as well, i.e. PowerPoint 2016+ as screen recorder. Online test-taking as an assessment option, was chosen in order to give students the possibility to practice and to learn and firm the knowledge every time they take a quiz.

Digital learning materials created by the teachers

The digital teaching materials uploaded by our teachers and the samples used for measurement and evaluation of the students are as follows:

Google Forms

Izobraževanje Z Microsoft Forms lahko ustvarimo ankete, kvize in vprašalnike, povabimo druge k odgovarjanju prek skoraj katerega koli spletnega brskalnika ali mo

Plickers

Izobraževanje Aplikacija Plickers je pri pouku uporabna predvsem za pridobitev povratne informacije na koncu določenega sklopa in za popestritev šolske ure.

PowePoint 2016 as screen recording

Ustvarimo lahko posnetek zaslona, ki je na voljo v samem programu PowerPoint v različici PowerPoint 2016. Posnamemo lahko kazalec miške in tudi zv

Izobraževanje

Moodle

Moodle zagotavlja prilagodljiv nabor orodij za podporo kombiniranega učenja in tečajev.

N/A

H5P

H5P je enostavno orodje, ki omogoča ustvarjanje več kot 40 različnih tipov interaktivnih gradiv.

Izobraževanje

Občutenje in zaznavanje - Google Forms

N/A Ponovitev sklopa Občutenje in zaznavanje

Kahoot

Kahoot (Kahoot!) je izobraževalna platforma, katere najbolj prepoznavni del so vsekakor kvizi, ki so v pomoč tako učiteljem kot učencem.

N/A

GeoGebra

Naravoslovje, matematika in statistika

GeoGebra (kratica iz besed geometrija in algebra) je interaktivna aplikacija za geometrijo, algebro, statistiko in računanje, namenjena učenju in p

MS Teams

MS Teams omogoča varno komunikacijo med dijaki, šolami in širšo skupnostjo s klici, srečanji in klepetom.

Izobraževanje

YouTube

Dijaki radi gledajo videoposnetke na YouTubu, saj jim pomagajo tako pri učenju zapletenih pojmov, kot tudi tudi pri izboljšanju spretnosti poslušan

Izobraževanje

Gizmos

Naravoslovje, matematika in statistika

Gizmos so interaktivni matematični in naravoslovni laboratoriji ter simulacije. Gizmos ponuja ogromno interaktivnih poskusov iz matematike in narav

Google Forms

Izobraževanje

Z Microsoft Forms lahko ustvarimo ankete, kvize in vprašalnike, povabimo druge k odgovarjanju prek skoraj katerega koli spletnega brskalnika ali mo

Plickers

Izobraževanje

Aplikacija Plickers je pri pouku uporabna predvsem za pridobitev povratne informacije na koncu določenega sklopa in za popestritev šolske ure.

PowePoint 2016 as screen recording

Izobraževanje

Ustvarimo lahko posnetek zaslona, ki je na voljo v samem programu PowerPoint v različici PowerPoint 2016. Posnamemo lahko kazalec miške in tudi zv

Excerpts from teachers' reflections

Teachers report on using different teaching methods and digital tools in their lessons. They are mostly content with their experience. The platform DMC encouraged them to use different methods than they usually use in their classrooms. All the teachers agree that digital materials are good for activating students, to gain their attention and illustrate examples that help them to memorize. The teachers in our school already knew of a few digital materials and teaching

methods, they already use some, but the project helped them to gain new knowledge and broaden their horizons, share experiences and also learn about themselves. Below are some examples from their pilot lessons.

Flipped classroom

I found the flipped learning lesson useful and the students learned a lot. I see the advantage in the fact that in class they practiced dialogues which we find ourselves in in real life situations. In this way, they were able to correct and improve their pronunciation of difficult words and acquire additional knowledge about Italian culture. During the lessons, I listened carefully to their dialogues and gave them feedback, answered their additional questions and offered help if they needed it. As they had already processed the material at home, there was more time for group work in the classroom. During class, all students were much more active because they were able to apply their knowledge, they were better prepared and had the equal opportunities to be actively involved in the class rather than remaining passive. (Jasna Šček)

The lesson was designed so that everyone would do one part on their own, and at least some in pairs. Watching videos in class and then talking in pairs would have made too much noise in the classroom, so I allowed them to "wander" around the school. As for the teacher's workload, I wouldn't say that the preparation is more extensive than it be would otherwise the lesson is set up in a way that the teacher does not need to be actively involved during the lesson, but it does take some time to gather resources, write up the instructions and check at the end if the quizzes have been taken. However, in case the teacher has the same lesson in several parallel classes (A, B and C), he has even less work than in regular lessons where he has to actively work/explain, check, etc. Even though the lesson is set up in such a way that the teacher does not need to be involved much, students still need certain directives to get the work done - most of the time the students have only done the work at school. At the end of this lesson or at the beginning of the next one, it makes sense to do an exercise together, to check what students indeed learnt and where the newly acquired knowledge is linked to what is already known. (Rok Demič)

Gamification

The method chosen has proved successful. The students were interested in taking the survey in an interactive format (Kahoot) and actively participated. When the quiz was administered again in written form, it turned out that the students remembered a lot of the new content and answered many more questions correctly in the second attempt than in the first. The students found this approach interesting and expressed their wish to have more lessons of this kind. I therefore believe that it is worthwhile to use this type of tool again. However, there is a need to think about what content it can be used for. In mathematics, I find it quite difficult, because most of the content is such that you have to write a procedure and just circling the answers is not enough. So the method is more suitable for learning theory and for some additional content, such as financial literacy in this case. (Nina Sitar)

The chosen method has proved to be successful (explanation, active learning). I managed to carry out all the activities as planned. The students showed a great ability in synthesizing newly acquired information with existing knowledge. The assessment was carried using a quiz in the Moodle online classroom. Before taking the quiz, I explained to the students that I also get feedback. I think that made them take the activity more seriously. The use of ICT allows them to revisit the quiz, which helps them to revise and consolidate their knowledge. This motivated some of the students a lot and they took the quiz several times because they wanted to reach 100%. Next time I need to prepare additional activities for students who finish early. The learning objectives were achieved. (Anita Fajić)

The extra work with preparations made sense and I think it was worth it. I believe that every effort made to develop and experiment with new methods is in some way a contribution to personal professional development. The lesson was more interesting for the students but the material was not very difficult to understand. The students had already encountered the topic in practical exercises, so they already had a lot of background knowledge and it was more about enriching the lesson and experimenting with the integration of digital tools. Students were actively involved as the lesson was based on their active participation and also on practical work - sensory analysis.

Demonstration

I believe that the chosen method was successful, for acquiring an understanding of the behavior of the polynomial graph in the vicinity of its zeros. With a visual demonstration in the GeoGebra environment, despite the fact that the students do not yet know how to plan a polynomial graph, we made sense of the multiplicity of zeros and their meaning on the shape of the polynomial graph. I think it is important to use other techniques, let's call them half-proofs, in addition to proofs. Due to time constraints, it is not possible to derive and prove every property or formula in mathematics lessons. It is therefore important to use techniques that encourage inductive and deductive reasoning. I used the demonstration method in the given case with the purpose of inductive reasoning about all zeros of polynomials and their influence on the behavior of the graph of the polynomial around its zeros. Students raised their hands, collaborated and summarized the findings. These were mainly students who are academically stronger. The opportunity was also presented to students with weaker learning skills. The students were able to predict after demonstrating the first three examples of the graph of the polynomial, how the graph of the fourth polynomial will behave around its zeros. I believe that all digital learning materials have measurable pedagogical benefits. Even in the given case, I am sure that if a lesson with the same goal was carried out in the department without a demonstration in GeoGebra, that the students would need more lessons and consolidation in order to correctly learn the behavior of the polynomial graph around its zeros. (Jože Premru)

Students' Feedback

Students were asked to fill in a short online questionnaire to evaluate the pilot lessons. Each teacher made sure to gather the feedback, but they gathered it separately. Here is the summary.

90 % of all students who participated reported on wanting to have more lessons like the ones that were in the project. Around 60% - 75% of students reported that the digital material helped to make the class more interactive and interesting, which made sure they were attentively learning. Others reported that the content was easier to understand with the extra material or that they could ask additional questions which helped them understand better. The general impression of around 70% of the students is that a lesson which includes digital learning material is interesting and proceeds without problems. Other students commented that the lesson felt new or that it was as usual (since some teachers are actively using digital material in class).

Below are a few reflections from the teachers which tell of students' progress.

Flipped Classroom

Students are satisfied with the flipped learning method. They feel that they have paid more attention in class and have learnt more as a result. They especially liked that their questions were answered, or if they did not understand something or wanted additional knowledge, they got the answers they wanted on the spot. They expressed their wish to have more such sessions in the future. They liked the fact that they were not left to their own devices, but tested what they had learnt in the classroom with their classmates. The lessons were more active, more interesting and the classroom atmosphere was better. (Jasna Šček)

Gamification

Students evaluated that they have learned more than during traditional in-class learning, they were more attentive and actively participated much more during lessons. They liked digital tools used (Kahoot quiz) as the learning was more fun and interesting, therefore they paid more attention to the lesson. They also learned more and would like to have more such lessons in the future. (Nina Sitar)

Explanation

More than three quarters of the students said that lessons were basically the same as usual. The rest thought they were working with methods and tools that had never been used before and were interesting. Almost half of all students responded they have learned more, that digital materials enlivened the classroom and made them pay more attention. They liked that they had a chance to discuss topics they did not understand and also that they could speak during the class, which is not usual practice. Around 5% of them were bored. Using digital tools helped more than half of the students to understand the topic better, and 10%

responded it did not help them. Majority of the students would like to have such classes in the future as well. (Anita Fajič)

Inquiry-based and research-based learning

The lesson was well received by the students, who said it was interesting and that they were more cooperative. Half of the respondents said that it was no different from usual because they already know the content. The use of digital materials has motivated students to participate more actively in lessons. They were satisfied with such lessons and would like to have more such learning methods included. (Maja Vlahovič)

Copy of the student's questionnaire:

1**. My teacher's code:**
2. **Comparing to other classes, what was this lesson like?**
- • We worked with previously unused and interesting methods and tools.
- • Basically, the class was the same as usual.
- • Digital devices made learning more difficult.

3. **How would you describe your own class work compared to other classes? (You can mark more than one answer)**
- • I acted more
- • I paid more attention
- • I learned more
- • I was bored
- • I was not interested
- • I stayed in the background
- • I didn't learn new things
- • It was confusing because things didn't work

4. **How was the class different from others? (You can mark more than one answer)**
- • The teacher explained less
- • It was possible to discuss what I did not understand
- • Our classes are always just as interesting
- • Digital materials "enhanced" the class, we paid more attention.
- • It was possible to understand the lesson better.
- • Technical problems took a lot of time.
- • It was free to talk, which is not the case at other times.

5. **What do you think about the digital teaching material used in class? (You can mark more)**
- • It was interesting and flowing
- • It was novel
- • I understood the lesson better
- The digital teaching materials did not help me to understand the lesson better.
- • It was boring
- • It was like average

6. Would you like to have more similar classes in the future?

- Yes
- No
- I don't care

Conclusions

Here we kindly ask for a brief conclusion built around 3 questions:

1. *How do you see the professional development of the teachers working in the project (pedagogical methods, lesson planning, digital skills, self-reflection on their own pedagogical work, knowledge sharing with other teachers)?*

Teachers report about learning new techniques and trying out new methods.
The Website DMC turned out to be a great learning experience. Teachers like that things are gathered together in one place in a fairly transparent way, allowing for further exploration even after the formal "end" of the project. They see the project as a means that pushed them to go outside of their comfort zone and use ICT they did not feel qualified to use yet.

The method flipped classroom gained extra recognition among teachers as a method that allowed students to learn a lot. The advantage of the method mentioned was that it allowed students to practice dialogue in foreign language, which applies to real life situations. The students improved their pronunciation of more difficult words and acquired additional knowledge that refer to Italian culture. The teacher gave feedback, answered theirs additional questions and offered help if they needed it. Since the students processed the material at home, there was more time for group work in class than usual. During the lesson, all students were much more active, used their knowledge well, were better prepared and had equal opportunities to be actively involved in the lesson.

The teachers tell of satisfaction in learning about different evaluation methods and self-reflection. New methods take a lot of time to implement, but they do bring some extra entertainment into the classroom.

Another comment from the teachers was that the lessons were interesting, but in the future they would include fewer digital tools in one lesson, since that way of working is particularly well suited to reinforcing material that is already familiar to students and less suitable for learning new material. They believe that most of the students who are enrolled in our programs also need a lot of traditional teaching and note-taking, which is still an important learning process.

2. *What would you highlight from the students' reflection?*

The teachers agreed with the student evaluations that the lessons were interesting. The students were satisfied with the different way of teaching and expressed their desire to study in this way again. They liked to use their phones, actively participated and memorized a lot.

Some students are generally uninterested in participating and not all of them filled out the feedback despite the fact that the teacher gave them instructions that they should all fill it out. Since the students had already learned about this way of working and we had already used a similar way of using digital materials, as many as 50% of the students answered that the lesson did not differ from the usual one, although in the other answers they answered that they worked more, that they were more attentive and that they learned more.

To sum up, more and different learning methods and digital material is a great way to make lectures more interesting and make the content more approachable for the students. Some conquered and remembered the presented topic more easily, for some, the different digital tools were not new.

> 3. *What are the organizational multiplication level effects of the project, the developments and ongoing processes?*

Teachers report about learning new methods and digital tools as well as the intent on using them later on. They find the DMC website a useful repository and have told about it to teachers outside of our school. We have also noticed an increase in the exchange of materials between math teachers this year (Geogebra and Photomath).

Our teachers like to add something extra to their lessons. The project encouraged them to do it more often. When the students use digital tools at one subject, it is usually easier for them to use digital tools at others as well. Our school is generally encouraging teachers to be creative in teaching, we believe this project gave satisfactory results.

We had some non pedagogical staff in the project. Our librarians also learned about new teaching methods and digital applications. The long-term effect of the project is certainly the upgrading of their existing knowledge. The platform is useful and stimulating because it combines different teaching approaches and encourages us to be innovative. One of the librarians commented that the project was a great contribution to their professional development, since they are still at the beginning of their work as a teacher; they did Pedagogical andragogical training but they are still perfecting and upgrading their knowledge.

Which teachers' works would you recommend to be published in the volume presenting the results of the project?

(The book will be published in English, Hungarian and Slovenian)

We suggest to publish the work of the teachers:

Jože Premru: https://dmc.prompt.hu/sl/node/337

Rok Demič: https://dmc.prompt.hu/sl/lesson-plans/169473127

Maja Vlahovič: https://dmc.prompt.hu/sl/node/338

Nina Sitar: https://dmc.prompt.hu/sl/lesson-plans/979730392

Who do you recommend to be awarded with the proposed certifications?

Erasmus+ VET teacher: prepared at least 2 lesson plans on DMC within the VETWork project

Nina Sitar, Rok Demič, Anita Fajič, Pia Kovač

Innovative VET teacher: prepared a lesson plan, delivered the lesson and shared digital learning materials on DMC

Jože Premru, Rok Demič

Digital Mentor in VET: contributed to the development of DMC contents as an author, uploaded one or more professional content (teaching, evaluation method, OERs) to DMC- within the VETWork Erasmus+ project.

Pia Kovač

Notification: we discussed the above titles together in Nagyvárad, but we can still change them.

☐ Aim of the project

The project aims to embed the traditional digital pedagogy teacher training program in a broader context by organizing customized school-based contact training sessions, linking it to organizational development components that enhance institutional digital competence and quality culture.

☐ Objectives

- Institutional level intervention will begin with getting commitment from the management of partner schools. In each school, a management representative – so called "change agent" - will be selected to closely work on the project with a group of teachers.
- Partner VET schools will perform an initial self-assessment on digital pedagogy at institutional and individual (teacher) level, using the SELFIE tool and the DigCompEdu framework.
- Groups of teachers will participate in an online learning experience on the Digital Menu Card platform, for developing their digital competences based on DigComp 2.1 and and the DigCompEdu framework.
- Partner schools will create their own digital pedagogy strategy and will create related action plans, broken down to individual level.
- On-the-job workshops will be organized for teachers, who can put their new skills into practice and develop digital learning content for their classes with assistance from facilitators.
- Lessons will be delivered to students, using the newly developed materials and active learning methods.
- Finally, based on the experiences, a Digital Pedagogy Training and Intervention Model will be created that can easily be applied by other educational institutions as well, to support institutional level changes and continuous improvement of teaching practices.

☐ Project basics

Title: Digital Culture for the 21st Century Vocational Education
Acronym: VETWork
Project ID: 2020-1-HU01-KA202-078760
Program: Erasmus+ KA2, Strategic partnership
Target group: VET teachers, trainers, managers
Beneficiaries: VET students
Partner countries: Hungary, Slovakia, Slovenia, Romania
Duration: 1st Sep 2020 - 31st May 2023

☐ Partners

PROMPT-H Information Technology Educational, Trade and Service Ltd., Hungary

Expanzió Consulting Ltd., Hungary

University of Primorska Faculty of Management, Slovenia

Hungarian Teacher Training Centre, Romania

Biotechnical Education Centre Ljubljana, Slovenia

Szent László Roman-Catholic High School, Romania

Technical and Business Secondary Vocational School of József Szakkay, Slovakia

Magyar Gyula Vocational School, Hungary

SZÁMALK-Salesian Post-Secondary Technical School, Hungary

☐ Contact

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