SUMMARY REPORT ON THE PILOTING ACTIVITIES OF IO1

1. Partner organizations

ZSZ (PL), KRSC (LT), CWEP (PL), LABC (IT), CCD Teleorman (RO), AEMRN (PT)

2. Date, Country

The piloting activities took place in 5 partnership countries (Lithuania, Italy, Portugal, Poland and Romania) in January-March, 2022:
ZSZ (PL) – 01.2022-28.02.2022
KRSC (LT) – 18.02.2022-28.02.2022
CWEP (PL) – 17.02.2022
LABC (IT) – 15.02.2022
CCD Teleorman (RO) – 28.02.2022-04.03.2022
AEMRN (PT) – 01.2022-10.03.2022

3. Overview of the participants (number, school subject etc)

The target of the piloting activity comprised **164 non-IT subject teachers in total** *(40 teachers more than the number foreseen in the application)*:

Partner organization	**Number of participants**	**Participant profile** *(courses/school subjects, number of teachers)*
ZSZ	30	10 vocational subjects 5 geography teachers 1 biology teacher 6 math teachers 8 teachers of humanities subjects
KRSC	20	5 English language teachers 4 History teachers, 3 Biology teachers 2 Mathematics teachers 2 Chemistry teachers, 3 Geography teachers, 1 Physics teacher
CWEP	20	5 geography teachers 2 biology teachers 6 math teachers 7 teachers of humanities subjects
LABC	20	2 foreign language teachers (French and English); 12 teachers of humanities subjects (Italian, history and philosophy); 6 teachers of scientific subjects (mathematics, science and geography).
CCD Teleorman	40	6 foreign language teachers (French and English);

		11 teachers of humanities subjects (Italian, history and social studies, Romanian language); 8 teachers of scientific subjects (mathematics, science and geography). 4 physical education teachers 11 primary school teachers
AEMRN	34	9 teachers oh the 1st cycle of basic education: all subjects; 10 teachers of the 2nd cycle of basic education: 2 Visual Education, 2 Technological Education, 1 Information and Communication Technologies, 2 English, 2 Portuguese, 1 Mathematics. 15 3rd cycle of basic education: 2 Communication and Information Technologies, 2 Physics and Chemistry, 2 Portuguese, 2 Mathematics, 2 Natural Science, 1 Special Education teacher, 1 Psychologist, 2 History, 1 Geography.

Each teacher was asked to test the Enchiridion 4.0 learning environment (lesson plans and exercises) with a minimum of 20 students. That means that **at least 3,280 students** participated in the piloting.

4. Description of the piloting activity (duration, method (blended, face-to face, online), challenges)

Piloting was divided into 2 parts:

1. 164 non-IT subject teachers piloted the overall structure of Enchiridion 4.0 program and the functionality of Enchiridion 4.0 learning environment.
2. The same 164 non-IT subject teachers (as in part 1) and their students (at least 20 per teacher) piloted and evaluated the Enchiridion 4.0 learning environment (lesson plans and exercises).

The piloting by all partners was based on the blended learning approach, but the process itself was organised differently:

- some project partners (CWEP, CCD Teleorman, ZSZ, AEMRN) first organized face-to-face or online meetings (duration 4-6 hours) to introduce the project and its objectives, the products developed during the project and the e-learning platform. During the meetings, the participants were asked to log in to the platform so they could test the functionality of Enchiridion 4.0 learning environment and analyse the developed learning materials, lesson plans and digital exercises. After the meetings, teachers were asked to test the lesson plans and exercises with their students and after some time to give feedback to the organisers of piloting (either by completing an online survey or via non-formal discussions);
- other partners (KRSC) organised 2 meetings (online and face-to-face). During the first meeting, the participants were introduced to the Enchiridion 4.0 program and the e-

learning platform, they also received detailed instructions on how to register on the platform and how to navigate it. During the second meeting teachers shared their experiences of working according to the given lesson plans and exercises and gave their comments and suggestions for improvement.

- LABC organised a 6-hour online workshop with teachers and students to test the e-learning platform and the results of the project: modules, lesson plans, exercises and videos. At the end of the training, teachers' feedback was collected through a questionnaire.

5. Impact of the piloting activity on the participants both teachers and students (briefly describe the findings using the data of Annex 1 and non-formal interviews with Non-IT teachers)

In order to measure the impact of the piloting activities and the quality of Enchiridion 4.0 program and learning environment, teachers were requested to fill in the questionnaire. Also, their feedback was collected via non-formal discussions and reflection.

The feedback received by the evaluation questionnaire for the piloting participants (teachers) was overly positive.

All participants of the piloting activity rated the e-learning platform and training materials very highly. Furthermore, the teachers explicitly stated that Enchiridion 4.0 is very well structured and easy to find on the project website and the platform itself is easy to use. The lesson plans and interactive exercises were also very positively evaluated, both in terms of content and interactivity.

93,7 % (answers *"fully agree"* and *"agree"*) of the non-IT subject teachers reported to have increased their awareness on Industry 4.0 , especially on: augmented reality, cloud computing, cybersecurity, digital twins, collaborative robots, artificial intelligence, 3D printing. 90% of the participants noticed that now they better understand the implication of Industry 4.0 on
future labour market. 94 % of non-IT subject teachers, who participated in piloting, that they have gained considerable knowledge on how to implement Industry 4.0 didactic principles in education and feel confident in using the Industry 4.0 concept to create their own interactive learning resources for their students.

96 % of teachers rated the overall quality of the Enchiridion 4.0 program as "excellent" and „good". 95 % respondents were satisfied with using the Enchiridion 4.0 learning environment and willing to recomend the resources to others.

According to the teachers, their students gained a lot of knowledge about Industry 4.0 concept and its tools, increased knowledge about augmented reality, cloud computing, cybersecurity, digital twins, collaborative robots, artificial intelligence, 3D printing. Students found the digital exercises atractive, interesting and informative. Teachers also have noticed an increase in their students' interest in technical fields of studies

Teachers comments after the piloting activities:

The programs presented were attractive, presenting a novelty factor.

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The students were delighted with the materials presented and worked enthusiastically.

The students were receptive to the information being passionate about technology and found the exercises challenging.

Some of them were fascinated by 3D printing and the fact that they used their mobile phones and tablets, also contributed to the success of the activities.

They learned by having fun and brought them closer to subjects like Biology, Geography or English and not only.

Some of my students did not know many of the topics covered in the platform. It was a good opportunity for them

I am very enthusiastic, i love to introduce new teaching methods that bring them closer to the technological world, also because it is the future for the students. i think it is important to bring them closer to the subjects in new ways that can be useful for their future work. the students have enjoyed it and increased their knowledge.

My students are used to using educational resources on platforms but were impressed by the clarity and immediacy of the content of the lessons and exercises.

6. General evaluation of the piloting activity (organiser's comments)

Overall, the piloting was evaluated as being very successful in all partner countries. However, the organizers pointed out some minor organizational issues they faced while setting the dates for the face-to-face sessions because of pandemic situation in partner countries. The piloting was therefore organised in a hybrid way, combining virtual and face-to-face meetings and classroom work with students.

The teachers had no problem logging into the platform or navigating within it. There were no major faults detected and the provided material and e-learning platform can be recommended for non-IT subject teachers for further use at schools. Moreover, teachers expressed their willingness to disseminate the platform and the created training content with other teachers in their future careers.

Evaluation surveys showed that given examples of lesson plans and digital exercises were useful and helped to enhance the students' knowledge on Industry 4.0 concept and in particular on augmented reality, cloud computing, cybersecurity, digital twins, collaborative robots, artificial intelligence, 3D printing.