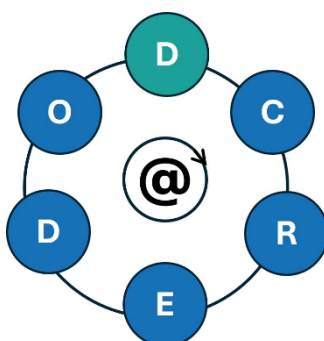


Co-funded by
the European Union

D-CREDO

Digital Health Technologies-Augmented Clinical Reasoning Education

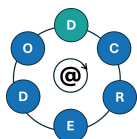


2024-1-PL01-KA220-HED-000247790

D4.3 Pilot Study Plan

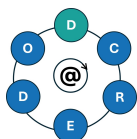
Deliverable number	D.4.3
Delivery date	August 06, 2026
Status	Final
Authors	Andrzej Kononowicz (JU), Tetiana Shchudrova (BSMU), Iryna Popova (BSMU)

Co-funded by the European Union. Views and opinions expressed are however those of the author or authors only and do not necessarily reflect those of the European Union or the Foundation for the Development of the Education System. Neither the European Union nor the entity providing the grant can be held responsible for them.



Document Revision Table

Version	Date	Author(s)	Organization	Comments
01	11.05.2026	Tetiana Shchudrova Iryna Popova	BSMU	First draft
02	05.06.2026	Andrzej Kononowicz	JU	Update and edit draft
03	06.06.2026	Tetiana Shchudrova	BSMU	Update and edit draft
04	07-04.08.2026	All	All	Update and edit draft
05	05.08.2026	All	All	Final version



Summary

Objectives: The EU project D-CREDO (Digital Health Technologies-augmented Clinical Reasoning Education) aims to enhance the skills of health professions students and faculty in using digital health tools. We plan to develop high-quality learning units (LUs) alongside virtual patients (VPs) that will prepare students for the responsible use of digital tools in clinical reasoning (CR). The main objective of developing an evaluation toolset is to establish a means of assessing the quality and impact of the developed LUs.

Approach: A structured, collaborative approach was adopted to facilitate the development of the pilot study plan. To ensure diverse contributions and consensus in the detailed planning of the pilot studies, the working group comprised representatives from each D-CREDO partner institution. Five key activities were identified: selecting the LUs for pilot evaluations with each teaching partner; developing detailed pilot evaluation protocols; refining LU evaluation and learning analytics instruments; considering research questions from the white paper; and ensuring the planned study and evaluations were ethically and legally compliant. The process was guided by collaborative discussions and iterative feedback within the working groups and consortium. The evaluation plans were subsequently refined to ensure consensus and alignment with the project's goals.

Results: A set of pilot study plans has been developed, including nine detailed protocols for LUs' pilot evaluations, associated evaluation instruments and references to the IRB approval process.

Conclusion: The pilot study plan presented in this deliverable will serve as a framework for the upcoming activities in two project work packages: WP2 (Best practice guideline for curriculum implementation) and WP4 (Evaluation report).

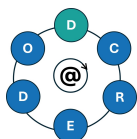
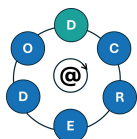


Table of Contents

1 Introduction	5
2 Quality criteria	5
3 Pilot studies	6
4 Pilot evaluation protocols	10
JU	10
Erasmus MC	12
UNIT TIROL	14
BSMU	16
5 Evaluation instruments	18
Satisfaction questionnaires	18
Learning analytics	18
6 Consideration of research questions	18
7 Ethical and legal compliance	20
Conclusions	20
References	21
Appendix 1 - The list of presentations from the Research Meetings	22



1 Introduction

The objective of this deliverable is to plan the systematic pilot evaluation of selected LUs at partner institutions and volunteer associated partners. We aim to maximise the opportunities for evaluation, while taking into account the capabilities and limitations of the participating institutions. Successful pilot evaluations will increase the chances that the LUs will be integrated in curricula and faculty development programmes. An additional aim is to use the pilot evaluation as a means of conducting research that will help to answer questions arising from the literature review, as highlighted in the white paper (WP2).

All teaching project partners (BSMU, JU, EMC and UMIT) will:

- organise pilot evaluations of at least two LUs using the D-CREDO evaluation tools;
- secure necessary permissions for data collection;
- deliver data in the format specified by the WP coordinator, ensuring any required pre-processing and meta-data (translation, digitalisation of data)

This deliverable builds upon the work carried out in WP2 (D2.1 Literature Review Report and D2.3 White Paper) and WP4 (D4.1 Report on Targeted Needs Assessment and D4.2 Evaluation toolset report).

2 Quality criteria

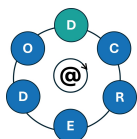
The D-CREDO consortium decided to guide the development of the pilot study plan based on following quality criteria:

The quantitative indicators:

- ≥ 8 protocols for pilot studies
- 2 per teaching partner - except INS
- ≥ 200 participants in the evaluation (app. 50 per teaching partner)

The qualitative indicators:

- coverage with assessment of key elements of student and TTT LUs
- evaluation plan enables comparisons of results across partner institutions
- protocols follow legal and ethical policies at partner institutions
- consideration of research questions from the White Paper in the evaluation plans



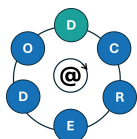
3 Pilot studies

The pilot studies are scheduled to take place at the four teaching partner universities during the autumn semester (Oct-Dec 2026). Each partner university will conduct pilot evaluations of at least 2 learning units (LUs): UMIT TIROL will evaluate three LUs, while JU, Erasmus MC and BSMU will each evaluate two. This makes a total of 9 LUs evaluations across the partner universities. The planned coverage includes five student LUs and two educator (TTT) LUs. LUs 101 and 110 will be piloted at two institutions (UMIT TIROL and BSMU), enabling cross-institutional comparison.

Student LUs

LU101	Foundations of Digital Technologies in Clinical Reasoning
Piloting partner university	UMIT TIROL
Level	Novice
Target group	3 year Bachelor nursing students
Number of participants	10
Dates of piloting	Oct-Dec 2026
Format	Extracurricular
Evaluation tools	Adapted version of the Evaluation of Technology-Enhanced Learning Materials: Learner Perceptions (ETELM-LP-S) Learning analytics
Need for local adaptation	No

LU101	Foundations of Digital Technologies in Clinical Reasoning
Piloting partner university	BSMU
Level	Novice
Target group	5 year medical students
Number of participants	50-60
Dates of piloting	Oct-Dec 2026
Format	Curricular (part of existing course)
Evaluation tools	Adapted version of the ETELM-LP-S

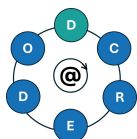


	Learning analytics
Need for local adaptation	Yes (translation into Ukrainian)

LU102	Using Large Language Models for Clinical Reasoning
Piloting partner university	Erasmus MC
Level	Intermediate
Target group	Second year bachelor medical students
Number of participants	24-42 students
Dates of piloting	Oct-Dec 2026
Format	As part of the clinical reasoning educational thread
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	Yes, a little

LU103	Using Digital Tools for Image Analysis in Clinical Reasoning
Piloting partner university	Erasmus MC
Level	Intermediate
Target group	Second year bachelor medical students
Number of participants	24-42 students
Dates of piloting	Oct-Dec 2026
Format	As part of the clinical reasoning educational thread
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	Yes, a little

LU106	From Data to Care: Understanding Electronic Health Records
Piloting partner university	UNIT TIROL

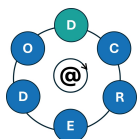


Level	Advanced
Target group	1 and 2 year Master nursing students
Number of participants	20
Dates of piloting	Oct-Dec 2026
Format	Extracurricular
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	No

LU108	Responsible Use of Digital Tools
Piloting partner university	JU
Level	Intermediate
Target group	2 year medical students
Number of participants	100
Dates of piloting	Nov-Dec 2026
Format	Curricular
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	Yes (some)

Educator LUs

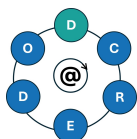
LU110	Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning
Piloting partner university	UNIT TIROL
Target group	Nursing educators
Number of participants	10
Dates of piloting	Oct-Dec 2026



Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	No

LU110	Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning
Piloting partner university	BSMU
Target group	Medical educators
Number of participants	10
Dates of piloting	Oct-Nov 2026
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	No

LU114	Curricular Implementation of D-CREDO tools: CDSS
Piloting partner university	JU
Target group	Medical educators
Number of participants	20
Dates of piloting	Oct-Nov 2026
Evaluation tools	Adapted version of the ETELM-LP-S Learning analytics
Need for local adaptation	Yes



4 Pilot evaluation protocols

JU

Pilot Evaluation 1: LU108 Responsible Use of Digital Tools

The learning unit LU108 (Responsible Use of Digital Tools) will be introduced at Jagiellonian University in the Digital Medicine (Medycyna Cyfrowa) course for second-year medical students in the six-year Polish-language medical programme. The course is facilitated by teachers employed at the Department of Bioinformatics and Telemedicine of the Medical Faculty.

The prerequisites of the course will be completed by

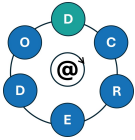
- Reference to the Bioethics course which is conducted by the students in their first year
- Reference to the "Developing Patient Profile" module, delivered at the beginning of the third semester as part of the Introduction to Clinical Sciences course and based on modules developed within the DID-ACT project.
- Reference to the advanced Decision Support Systems Systems class which will be conducted in the same Digital Medicine course but prior to the LU108.

Second-year students regularly use Pegaz, the university's Moodle-based learning management system, for the Digital Medicine course. All prerequisites for the learning unit that are not covered in the previous points will be made available through Pegaz, including instructions for registering for the D-CREDO learning unit on the project's Moodle platform. Access to the D-CREDO learning resources and the pilot evaluation itself will be provided through the D-CREDO project's learning management system. The administration of the Polish version of the ETELM-LP-S evaluation questionnaire will be conducted using the D-CREDO technical infrastructure (LimeSurvey).

The learning objectives of LU108 are aligned with those of the Digital Medicine course. LU108 will replace an existing class on virtual patients within the course. Content that is essential to the course learning objectives but is not covered by LU108 will be incorporated into other classes within the Digital Medicine course, including classes on virtual reality and clinical decision support systems.

The pilot will be offered to all students enrolled in the Digital Medicine course in the autumn semester of the 2026/2027 academic year. The exact number of participants is not yet known at the time of writing. However, we estimate the number to approximately 100 students based on the number of students enrolled in the same course in the autumn semester of 2025/2026.

Within the course, students are divided into cohorts of 8-10 students, with each student working at an individual computer arranged in a semicircle. However, they can easily cluster into small teams around selected computers, which facilitates group-based activities. Students will be asked



to prepare for LU108 at home in advance by completing Phase 1 of the learning unit. By the end of the clinical decision support systems class, they will receive instructions on how to complete the required asynchronous activities of the learning unit.

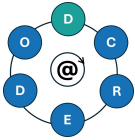
Two assessment activities from LU108 will be integrated into the Digital Medicine course. The summative multiple-choice questions will be incorporated into the final test examination at the end of the semester. In addition, the formative essay assignment, which requires students to analyse and report on a real-world incident involving the irresponsible use of AI, will contribute to the course reflection assignment related to the intended learning outcomes.

The remaining second-year students (approximately 120 students) who will not participate in the pilot evaluation in the autumn semester, due to their classes being scheduled for the fourth semester of the curriculum, will be offered the same D-CREDO learning unit in the spring semester of 2027. This additional implementation in the spring semester will not be reported in the first version of Deliverable D4.4 but will provide an opportunity to test refinements to the learning unit to be described in Deliverable D3.4 based on the findings of the initial pilot evaluation.

Pilot Evaluation 2: LU114 Curricular Implementation of D-CREDO tools: CDSS

Pilot Evaluation 2 will cover the LU114 learning unit (Curricular Implementation of D-CREDO tools: CDSS). It will be organised as part of a seminar offered by the Medical Education Department. Teachers involved in teaching clinical reasoning within the Introduction to Clinical Sciences course (in particular the Developing Patient Profile module) will be invited to participate as an introductory meeting to improve their understanding of how to support students during PBL sessions when developing differential diagnoses. DDX generators (CDSS as covered in LU105) can serve as useful didactic tools in this context, and therefore the classes of the Introduction of Clinical Sciences course can incorporate elements of LU105. In addition, the invitation for the workshop will be extended to teachers working at the Department of Bioinformatics and Telemedicine who are interested in teaching the CDSS class in the Digital Medicine course. While for them the technical aspects will be most likely already familiar, they are interested in learning about the pedagogy of clinical reasoning in the context of CDSS which will be part of the TTT learning unit.

The pilot implementation will not be part of an official faculty development programme, but will be offered to educators by invitation through the communication channels of the Department of Medical Education and the Department of Bioinformatics and Telemedicine. Depending on educators' availability, the workshop is expected to include 10-20 participants. It will be conducted synchronously either face-to-face at the Center of Innovative Medical Education or using the university videoconferencing system Microsoft Teams (depending on the preferences of the participants surveyed at the registration). To prepare educators for their involvement in the



Introduction to Clinical Sciences course, the workshop will be offered shortly before the start of the autumn semester.

Instructions for enrolling in the D-CREDO platform, including access to LU105 (student version) and LU114 (train-the-trainer materials with guidance on completing the Phase 1 activities), will be distributed to participants through the university's communication channels, including Microsoft Teams and email. The synchronous phase of LU114 will be offered twice- first time as a morning activity for the people who are available during typical working hours and the second one as a late-afternoon or evening activity to maximise participation among educators who may otherwise be occupied with teaching responsibilities or clinical duties. The workshop synchronous phase will conclude with an opportunity to complete the Polish version of the ETELM-LP-S evaluation questionnaire which will be conducted using the D-CREDO in the educator edition. This will give the educators the opportunity to answer the additional open ended question on preferred faculty development strategies needed to effectively prepare educators to integrate digital tools into CR instruction. This question is part of the research study conducted in alignment with the pilot evaluation (details are described in section 6 of this deliverable). As a follow-up formative assessment activity, educators in LU114 will be asked to voluntarily reflect in short essays on their experiences with implementing the LU and on students' reactions to the use of CDSS in teaching. Responses to this formative assessment will not be part of the evaluation, will be collected until the end of the winter semester and provided with individual feedback by the TTT course facilitator.

Erasmus MC

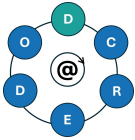
Pilot Evaluation 1: LU102 Using Large Language Models for Clinical Reasoning

The learning unit LU102, *Using Large Language Models for Clinical Reasoning*, will be piloted at Erasmus MC as part of the clinical reasoning educational thread for second-year Bachelor of Medicine students. The pilot will take place between October and December 2026.

The learning unit will be implemented in separate student groups of approximately 12-14 students. Two to three groups are expected to participate, resulting in an estimated total of 24-42 students. Each group will participate in a session of approximately two hours. The pilot will be integrated into the existing clinical reasoning curriculum rather than offered as an extracurricular activity.

The learning activities will be adapted to fit the prior knowledge and competency level of second-year medical students. In particular, the difficulty of the cases, instructions and accompanying learning activities will be reviewed and adjusted where necessary. The core learning objectives and overall structure of the learning unit will be retained.

Students will be introduced to the responsible use of large language models during clinical reasoning. They will work with the learning materials and activities provided within LU102 and



apply the content to clinical reasoning tasks relevant to their stage of training. The sessions will be facilitated by ourselves.

The pilot will be evaluated using a student questionnaire administered after the session. The questionnaire will assess students' perceptions of the clarity, relevance, usability and educational value of the learning unit. In addition, the teachers facilitating the sessions will observe students' engagement, understanding, difficulties and responses to the learning activities. These observations will be used to identify necessary adaptations and areas for further improvement before wider implementation.

Pilot Evaluation 2: LU103 Curricular Implementation of D-CREDO tools: AI in image Analysis

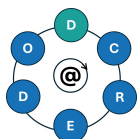
The learning unit LU103, *Using Digital Tools for Image Analysis in Clinical Reasoning*, will be piloted at Erasmus MC as part of the clinical reasoning educational thread for second-year Bachelor of Medicine students. The pilot will take place between October and December 2026.

LU103 will be piloted in different student groups from those participating in LU102. Each group will consist of approximately 12-14 students, with an expected total of 24–42 participants across two to three groups. Each session will last approximately two hours and will be incorporated into the existing clinical reasoning curriculum.

Before implementation, the learning unit will be reviewed and adapted to match the level of second-year medical students. The main adaptation will involve adjusting the difficulty of the clinical cases, image-analysis activities and accompanying instructions. The central learning objectives and key principles of the learning unit will remain unchanged.

During the session, students will explore how digital image-analysis tools can support clinical reasoning. They will work with the learning materials and activities included in LU103 and consider both the potential value and limitations of using these tools in clinical decision-making. The session will be facilitated by ourselves.

The pilot evaluation will consist of a student questionnaire and teacher observations. The questionnaire will examine students' perceptions of the clarity, relevance, usability and educational value of the learning unit. Facilitating teachers will observe how students interact with the learning materials, whether the difficulty level is appropriate, which elements require additional explanation and how well the activities support clinical reasoning. The combined findings will be used to refine the learning unit before further implementation.



UMIT TIROL

Pilot Evaluation 1: LU101 Foundations of Digital Technologies in Clinical Reasoning

The learning unit LU101 (Foundations of Digital Technologies in Clinical Reasoning) will be piloted at UMIT TIROL as part of a course for third-year Bachelor of Nursing students specializing in Nursing Education between October and December 2026. A total of 10 students are expected to participate in the pilot. The learning unit is designed for learners at the Novice level, and no local adaptation of the learning materials is required.

The pilot will be integrated into a regular teaching course, during which students will test the learning unit as part of the course activities. Participants will receive access to the D-CREDO learning resources via the project's learning management system and will complete the learning unit independently during the pilot period. The learning unit consists of digital learning materials, interactive learning activities, self-assessment quizzes, and reflective exercises. Students will complete the asynchronous learning activities at their own pace within the designated timeframe, while technical support will be available if needed.

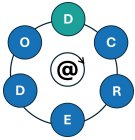
The pilot evaluation will be conducted using an adapted version of the Evaluation of Technology-Enhanced Learning Materials: Learner Perceptions (ETELM-LP-S) questionnaire. The questionnaire will assess students' perceptions of the usability, clarity, quality of the learning materials, perceived learning outcomes, motivation, and overall satisfaction with the learning experience. The survey will be administered through the D-CREDO technical infrastructure.

In addition to the questionnaire, learning analytics collected through the D-CREDO LMS will be used to evaluate learner engagement with the learning unit. Anonymous data, including completion rates, time spent on learning activities, navigation patterns, and the use of learning resources, will provide complementary information on students' interaction with the course materials. The combined analysis of learner perceptions and learning analytics will be used to evaluate the feasibility, usability, and educational value of the learning unit and to identify potential improvements prior to its wider implementation.

Pilot Evaluation 2: LU106 From Data to Care: Understanding Electronic Health Records

The pilot implementation of LU106 – *From Data to Care: Understanding Electronic Health Records* will take place between October and December 2026 under the coordination of UMIT TIROL. The learning unit, which is designed for learners at the Advanced competency level, will be offered as an extracurricular learning activity for Master's nursing students.

Approximately 20 first- and second-year Master's students will participate in the pilot. As the current cohort of the Master's programme at UMIT TIROL is relatively small, the pilot will be



expanded to include first- and second-year students enrolled in the Advanced Nursing Practice (ANP) Master's programme at IMC Krems. Including students from both institutions will ensure an adequate sample size for the evaluation while maintaining a comparable educational background among participants. Since the learning unit is applicable in its existing form, no local adaptation will be required.

Participants will be granted access to the learning materials through the D-CREDO Learning Management System, where they will work through the asynchronous modules independently during the pilot period. The learning unit introduces the principles of electronic health records and their role in supporting evidence-informed clinical decision-making through a combination of multimedia learning resources, interactive activities, reflective tasks, and self-assessment exercises.

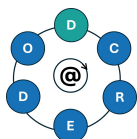
To evaluate participants' experiences, an adapted version of the Evaluation of Technology-Enhanced Learning Materials: Learner Perceptions (ETELM-LP-S) will be administered via the D-CREDO technical infrastructure. The questionnaire will examine aspects such as usability, clarity of the learning materials, perceived learning outcomes, learner engagement, and overall satisfaction.

In parallel, learning analytics generated within the D-CREDO LMS will provide objective information on learner engagement, including completion rates, time spent on learning activities, navigation behaviour, and the use of the available learning resources. The combination of questionnaire data and learning analytics will enable a comprehensive assessment of the learning unit's usability, acceptance, and educational effectiveness, while also providing evidence to inform future refinement and wider implementation.

Pilot Evaluation 3: LU110 Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning

The learning unit LU110 (Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning) will be piloted by UMIT TIROL between October and December 2026. The pilot is intended for nursing educators and aims to evaluate the learning unit from the perspective of educators who may integrate its content into their own teaching. Approximately 10 educators are expected to participate. As the learning unit has been developed for international implementation, no local adaptation is required.

To broaden the range of educational perspectives and facilitate participant recruitment, the pilot will be conducted in collaboration with nursing educators from UMIT TIROL, IMC Krems, and Carinthia University of Applied Sciences. Although UMIT TIROL serves as the responsible piloting partner, involving educators from three Austrian higher education institutions will increase the



diversity of teaching contexts represented in the evaluation and strengthen the relevance of the findings for future implementation.

Participating educators will receive access to the learning unit through the D-CREDO Learning Management System (LMS) and will complete the asynchronous learning activities independently during the pilot period. Beyond exploring the content, they will be asked to critically reflect on the pedagogical design, the applicability of the learning resources in nursing education, and the potential for integrating the unit into existing curricula.

The pilot evaluation will be carried out using an adapted version of the Evaluation of Technology-Enhanced Learning Materials: Learner Perceptions (ETELM-LP-S), administered through the D-CREDO technical infrastructure (LimeSurvey). The questionnaire will focus on the educators' perceptions of the learning unit's usability, relevance, clarity, educational quality, and suitability for teaching clinical reasoning with digital technologies.

In addition, learning analytics collected through the D-CREDO LMS will provide objective information on participants' engagement with the learning materials, including completion rates, time spent on learning activities, navigation behaviour, and use of the available resources. Combining educators' feedback with learning analytics will enable a comprehensive assessment of the learning unit's feasibility, educational value, and potential for integration into nursing education programmes, while identifying areas for further refinement before wider dissemination.

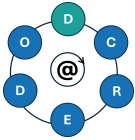
BSMU

Pilot Evaluation 1: LU101 Foundations of Digital Technologies in Clinical Reasoning

The learning unit LU101 (Foundations of Digital Technologies in Clinical Reasoning) will be introduced at BSMU as part of the Clinical Reasoning course for fifth-year students on the six-year Ukrainian-language medical programme.

We expect to involve 4-5 academic groups (12-14 students in 1 group) enrolled on the Clinical Reasoning course in the autumn semester of the 2026/27 academic year. The course will be led by teachers who were involved in developing the D-CREDO student LUs.

Students will complete the course prerequisites by referencing the IT in Medicine course, completed in the second year, and the Clinical Reasoning: Key Theories and Instruments module, conducted prior to LU101 and based on modules developed within the DID-ACT project. Students will be asked to complete the asynchronous first phase of the learning unit prior to the synchronous class.



Access to the D-CREDO learning resources and the pilot evaluation itself will be provided via the D-CREDO project's LMS. The Ukrainian version of the ETELM-LP-S evaluation questionnaire will be administered using the D-CREDO technical infrastructure (LimeSurvey).

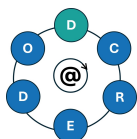
Pilot Evaluation 2: LU110 Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning

The learning unit LU110 (Role of Digital Tools in Clinical Reasoning Teaching and Responsible Use of Digital Tools in Clinical Reasoning) will be introduced at BSMU as part of the continuing professional development (CPD) programme for teachers.

The pilot implementation will be offered through the Department of Education's communication channels in September 2026. We expect to involve educators teaching the clinical reasoning course, as well as educators from clinical departments who are interested in participating, with a target number of 10-15 participants.

Teachers will be introduced to LU110 and provided with instructions on how to enrol on the D-CREDO platform. This will give them access to the student LU101 (Foundations of Digital Technologies in Clinical Reasoning) and LU108 (Responsible Use of Digital Tools). Teachers will also be introduced to the LU110 train-the-trainer materials and provided with guidance on completing Phase 1 activities. They will then be asked to complete Phase 1 asynchronously. Phase 2 will take the form of a face-to-face workshop and will conclude with an opportunity to complete the Ukrainian version of the ETELM-LP-S evaluation questionnaire (educator version).

As a follow-up assessment activity, participants will receive a structured template of the LU outline that they can adapt to their needs. They will then plan how to integrate one of the D-CREDO digital learning units into their teaching. They will describe where the learning unit fits into their curriculum, how they will introduce digital tools, how they will guide students towards the critical and ethical use of digital tools and what adaptations may be necessary. The template demonstrates participants' readiness to teach the learning units.



5 Evaluation instruments

Satisfaction questionnaires

The LU evaluation instrument is based on the Evaluation of Technology-Enhanced Learning Materials (E TELM) tool, which is part of a wider framework designed for the systematic evaluation of technology-enhanced learning in medical education (Cook & Ellaway, 2015). The original E TELM-LP-S (Learner Perceptions – Short Form) was adapted for the DID-ACT project (<https://did-act.eu/>) and was successfully used to evaluate the Student Clinical Reasoning Curriculum and Train-the-Trainer courses from the perspective of participants.

For D-CREDO, we will use the same E TELM-LP-S questionnaire version employed in DID-ACT, with only minor modifications to the demographic section to reflect the needs of our project. The online questionnaire will be deployed via the project's LimeSurvey platform, which is maintained by Instruct. The survey will be available in English, Polish and Ukrainian ( E TELM questionnaires).

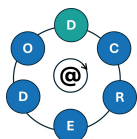
Learning analytics

In preparation for the pilot evaluations, and taking into account the tested learning units and posed research questions, the Learning Analytics subgroup reviewed the set of metrics previously proposed in D4.2. We have also re-evaluated the availability of new plugins compatible with our Moodle version. We decided that the standard logs automatically recorded by Moodle and CASUS are sufficient for our needs and that no additional plugins or report types will be implemented.

Considering that the selected pilots are primarily one-time events of limited duration, as well as the interests and needs of the pilot facilitators, we decided not to provide real-time or formative reports for the pilot evaluations. Instead, we will focus on summative reporting. The raw data from the standard reports will be delivered to BSMU by Instruct after the completion of the pilot evaluation period. All data collection will comply with the legal and ethical requirements of partner institutions and will be limited to the minimum information necessary for evaluation and research purposes. The results will then be processed and analysed by the consortium under the coordination of BSMU and shared in summary form across the project, particularly with the pilot facilitators and learning unit development leads. The findings will inform recommendations for refinements of learning units in D3.4.

6 Consideration of research questions

In order to consider the research questions from the D-CREDO project White Paper, 'Teaching Clinical Reasoning Enhanced by Digital Tools' ([Results - D-CREDO Project](#)), a meeting was held between Andrzej Kononowicz (JU), Laura Zwaan (Erasmus MC) and BSMU to discuss opportunities for data collection to inform the research questions.



Following the discussion, it was concluded that two research questions would be addressed.

RQ7: What is the optimal moment, considering both learning effects and cognitive load, to introduce digital tools for clinical reasoning in healthcare education?

As part of the D-CREDO project, we are conducting a study entitled 'Assessing AI Literacy Among Medical and Nursing Students and Educators', which has been initiated and is being coordinated by Jagiellonian University (JU).

The study's primary objective is to evaluate AI literacy levels among medical and nursing students and educators at D-CREDO partner and associate partner institutions, with the aim of identifying current competencies, existing gaps and training requirements relating to the integration of AI into medical education.

We are using the validated Scale for the Assessment of Non-Experts' AI Literacy (SNAIL) (Laupichler et al., 2023) to measure AI literacy. This scale has already been applied to medical students (Laupichler et al., 2024). The findings will show AI literacy levels across the SNAIL dimensions of technical understanding, critical appraisal and practical application, and will highlight priority areas for AI-related training within the D-CREDO project.

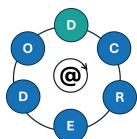
This study will establish a baseline for AI literacy among medical and nursing students and educators, informing the placement of D-CREDO LUs within curricula.

The questionnaire developed in English has been translated into German, Polish, and Ukrainian to improve the response rate and is being administered using the LimeSurvey tool.

RQ12: What faculty development strategies are needed to effectively prepare educators to integrate digital tools into CR instruction?

For RQ12, we added the open-ended question, 'What faculty development strategies are needed, in your opinion, to effectively prepare educators to integrate digital tools into CR instruction?', to the ETELM-LP-S questionnaire. BSMU, UMIT and JU will collect data on this in their TTT evaluations.

To stimulate research around D-CREDO, Erasmus MC organises research group meetings every six months. So far there have been three Research Meetings aimed at fostering knowledge exchange and scientific collaboration among D-CREDO partners and associate partners. The meetings took place in Munich during the D-CREDO in-person meeting (June 2025), a virtual meeting in January 2026, and most recently in Tirol during the June 2026 in-person meeting. The meetings had between 23-30 participants each time. Presentations were given by a mix of partners and associate partners of the project, from different countries and of different levels of expertise (ranging from medical students to full professors). The list of presentations from the research meetings is



provided in Appendix 1. The meetings served multiple purposes: sharing new research ideas and emerging questions, reflecting on data collected within the project, and learning from completed work. Importantly, the meetings also provided an opportunity to update associate partners on the broader progress of the D-CREDO project. A notable outcome has been the emergence of new collaborations and connections between partners and associate partners that had not existed prior to these meetings. This demonstrates that the Research Meetings have added value beyond scientific exchange alone by strengthening the cohesion and network of the D-CREDO consortium.

7 Ethical and legal compliance

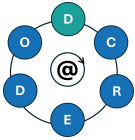
To ensure compliance with EU requirements regarding ethics, legality and data protection, project coordinator Andrzej Kononowicz submitted two IRB applications to the Research Ethics Committee at Jagiellonian University – Collegium Medicum on behalf of the consortium.

The IRB application for the study '*Assessing AI Literacy Among Medical and Nursing Students and Educators*', conducted by JU and addressing one of the research questions identified in the white paper, was submitted on 16 January 2026 (application no. 1072.6120.2.30.2026). The Research Ethics Committee at Jagiellonian University – Collegium Medicum approved this study on 12 February 2026 (approval no. 108/2026). All partners were free to obtain additional local approvals if required. In practice, only UMIT decided to pursue an additional approval process based on JU's approval of the AI literacy study, which was granted.

The IRB application for the LU evaluation study, '*Evaluation of the D-CREDO project's educational modules designed to teach clinical reasoning within the context of digital health tools*', was submitted to the Research Ethics Committee at Jagiellonian University – Collegium Medicum on 3 May 2026 (application no. 1072.6120.2.211.2026). The study was approved on 28 May 2026 (approval no. 303/2026).

Conclusions

This deliverable presents a comprehensive and structured pilot study plan for evaluating the D-CREDO learning units (LUs) at four teaching partner institutions during the autumn semester of 2026. The consortium has established nine detailed evaluation protocols, covering five student LUs and two train-the-trainer LUs, to ensure a balanced assessment of both core learner competencies and faculty readiness.



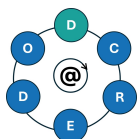
Co-funded by
the European Union

References

Cook DA, Ellaway RH. Evaluating technology-enhanced learning: A comprehensive framework. *Med Teach*. 2015;37(10):961-70. doi:10.3109/0142159X.2015.1009024

Laupichler, M. C., Aster, A., Haverkamp, N., & Raupach, T. (2023). Development of the “Scale for the assessment of non-experts’ AI literacy” (SNAIL) – An exploratory factor analysis. *Computers in Human Behavior Reports*, Vol. 12, 100338. <https://doi.org/10.1016/j.chbr.2023.100338>

Laupichler, M. C., Aster, A., Meyerheim, M., & Raupach, T. (2024). Medical students’ AI literacy and attitudes towards AI: A cross-sectional two-centre study using pre-validated assessment instruments. *BMC Medical Education*, 24(1), 401. <https://doi.org/10.1186/s12909-024-05400-7>



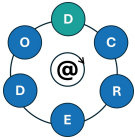
Appendix 1 - The list of presentations from the Research Meetings

#1 Research Meeting – 27.05.2025, Munich

1. Jose Sousa
Institution: Sano Centre for Personalized Medicine
Title: "From Small Data to Big Impact", and its focus was on Sano's expertise in data science and some proposal opportunities for upcoming EU calls.
2. Prof. Dmytro Vakulenko
Institution: Head of Medical Informatics Department, I.Horbachevsky Ternopil National Medical University
Title: "A modern view to the telerehabilitation and telediagnosics ecosystem in Ukraine and Europe"
3. Charlotte van Sassen
Institution: Erasmus MC
Title: "Innovating CR education with AI personalized feedback"
4. Inga Hege
Title: "Differences of CR processes and diagnostic accuracy in students working on virtual patients with and without a CDSS"
5. Joanna Fąferek
Institution: Centre for Innovative Medical Education, Jagiellonian University Medical College
Title: "Does GenAI support early-stage medical students in deliberate reflection on virtual patient cases to develop clinical reasoning abilities?"
6. Elske Ammenwerth,
Institution: UMIT TIROL
Title: "GenAI and its impact on education"

#2 Research Meeting – 21.01.2026 (on Zoom)

1. Wiktoria Bieniek
Institution: Jagiellonian University – Medical Collage
Title: "AI literacy among students and educators"
2. Jonas Verdonshot
Institution: Erasmus MC
Title: "The use of large language models for providing feedback"
3. Yavuz Selim Kiyak
Institution: Gazi University
Title: "Two studies examining how students weigh AI advice"



Co-funded by
the European Union

#3 Research Meeting – 11.06.2026 Hall in Tirol

1. Lisa-Maria Norz
Institution: UMIT
Title: "Bias in Healthcare AI and its impact on Patient Empowerment: A Scoping Review"
2. Klas Karkgren
Institution: Karolinska Institutet
Title: "Facilitation of learning - pedagogical conversational agents that support the management of seriously injured trauma patients"
3. Eva Cobussen
Institution: Erasmus MC
Title: "Can AI Improve Clinical Reasoning Education? Exploring AI-Generated Feedback in Medical Education"