DigiCanTrain

Digital Skills Training for Health Care Professionals in Oncology

Project Number: 101101253

WP 3 Co-design of the DigiCanTrain programme

Deliverable 3.1: DigiCanTrain curriculum

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Executive Summary

This deliverable report describes the curriculum development completed as part of Work Package (WP3) for the DigiCanTrain project, task *3.1 T3.1 Co-design the DigiCanTrain Programme Curriculum* in which the Project task group lead by University of Galway, collaboratively created the overall curriculum including main learning outcomes, learning content, and participants workload in hours (equivalence ECTS, CME and Micro-credentials). This curriculum will be accompanied later by a programme guide in collaboration with the WP4 (Pilot), constituting the practical information on delivery and participation (timelines, assignments and certification).

The curriculum is a guideline also for the content production of the DigiCanTrain programme (task 3.3) and learning activities planned for those who participate the programme, i.e. the healthcare workforce in cancer care settings. The curriculum (Appendix 1) describes what learners should know and what skills they should acquire on completion of the programme modules, to support the development of effective, person-centred digital health care, and digital interventions in cancer care services and the use of digital health interventions. According to project timelines, the module content needs to be ready by the end of August 2024 (D3.2). A partner meeting in Spain (17-18.9.2024) is organised to ensure all partners can launch the pilot according to the pilot protocol and instructions developed (WP4).

Chapter one provides a background on the process of curriculum development and innovative educational technology used to support the curriculum. Chapter two illustrates the process of recognition of prior learning to allow the e-learning programme to be recognised as prior learning for those who complete it. Chapter three will provide an overview of the programme evaluation available to learners once they complete each module/submodule.

Table of Contents

Executive Summary 2
1. Background of curriculum development 5
Course Structure 7
2. Recognition of prior learning 10
Quality of the programme 11
Verification of the certificate 11
Level of the course 13
Learning outcomes 13
Workload 17
Study assessment 20
Participant identification 20
The micro-evaluator tool 20
3. Evaluation 22
4. Conclusion 23
References 24
Appendix 1. The DigiCanTrain Curriculum 26
Appendix 2. Mapping of the programme's learning outcomes across the developed competence framework 48
Appendix 3. Digital competence framework mapped across module learning outcomes (learning outcomes in blue) 49
Appendix 4. Template for modules and submodules 61
Appendix 5. Project team members responsible for each submodule 66

Table of Figures

Figure 1. Timeline for curriculum development....6
Figure 2. CMF criteria (original source: European MOOC consortium) 8
Figure 3. Example of the certificate....12
Figure 4. DigiCanTrain programme modules and embedded submodules....15
Figure 5. Module pathway for each learner group....16
Figure 6. Workload per module....18
Figure 7. Module pathway for each cohort (nurse, medical practitioner, non-clinician or allied health professional) in the 'trainer' group. 19
Figure 8. Module pathway for each cohort in the 'Trainees' group. 20
Figure 9. Evaluation of submodules/modules....22

Table of tables

Table 1. CMF criteria and its translation into the DigiCanTrain curriculum....9
Table 2. EQF Level 7 learning outcomes and its translation into the DigiCanTrain curriculum 13

1. Background of curriculum development

Cancer is one of the most common diseases in Europe. Mainly driven by an ageing population, the burden of cancer is increasing in the EU, with the number of new cases reaching 2.7 million in 2022 (1). The COVID-19 pandemic showed the potential of digitalization to transform the way health care is delivered and therefore building resilience and bringing efficiency, transparency and convenience on health care services (2). eHealth technology, correctly used, can be a very useful tool to facilitate dialogue among health care professionals (HCPs) and meet health and care needs of people affected by cancer. However, despite its current use and despite the positive effects of eHealth technology and its great promise, a vast majority of HCPs may feel insufficiently trained to deal with the digital revolution (3).

The purpose of the DigiCanTrain project is to design, pilot and evaluate DigiCanTrain education and training programme for trainers, clinical and non-clinical HCPs. The aim of the DigiCanTrain curriculum is to provide trainers and trainees with the necessary information for skill development to support clinical and non-clinical workers working in an oncology care setting with the development of effective, person-centred digital health care, digital cancer care services and the use of contemporary digital interventions. Continuing education is an integral aspect of improving professional development (4). However, due to the busy nature of working healthcare professionals the use of more innovative methods to deliver continuous education is required. By being available to a broad audience, and the flexibility it provides for learners, e-learning is very influential to continuous education (4). The DigiCanTrain curriculum is implemented as an e-learning programme. For future use of the curriculum, a guide on the programme delivery will be created following the pilot of the programme and refined based on the experiences and formal evaluation of participants who undertake the pilot.

The importance of healthcare professionals having skills regarding digital health is highlighted in the increasing use of remote consultations in oncology and emphasises the

need for digital patient education and support, communication in digital health care context and ensuring the understanding and collaboration of people affected with cancer. Figure 1. Provides a timeline of the curriculum development.

The overreaching goal of the DigiCanTrain programme is to meet the requirement of digital competence for healthcare professionals which was identified in the needs assessment phase of the project (WP2). Based on the systematic reviews (D2.2), these include information technology, ethical practice, creating a human-oriented relationship and digital patient education and support. Furthermore, the Digital Competence Framework developed in WP2 based on two systematic reviews, mapping study and narrative review on existing frameworks, standards and literature was used to guide the development process and the DigiCanTrain Curriculum was mapped against the developed Digital Competence Framework. The mapping of the program's learning outcomes across the developed competence framework is displayed in Appendix 2. A detailed mapping of the program's learning outcomes across the competence framework is available in Appendix 3.

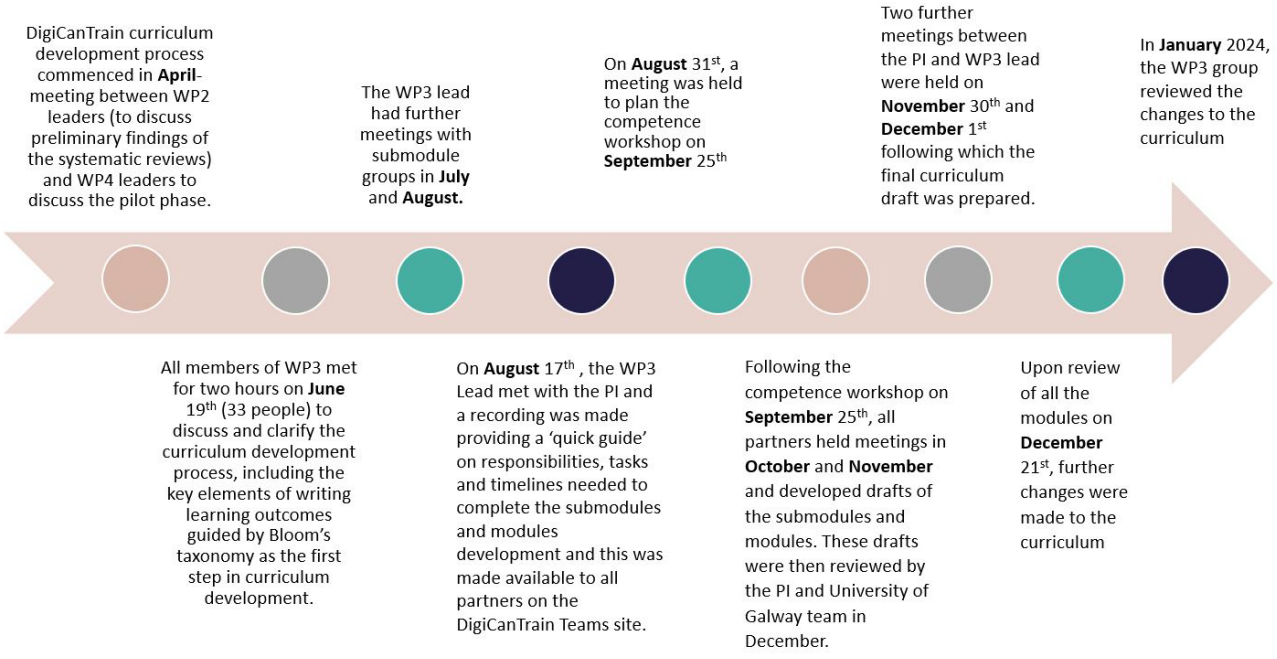

Figure 1. Timeline for curriculum development

Course Structure

The DigiCanTrain programme will be delivered on the online digital tool Thinglink® embedded in Moodle® platform, an open-source learning management system. Using Thinglink will ensure a visual and interactive learning experience. (Example of a course created in EU project Care for Europe https://www.care-for-europe.eu/mooc_eng.htm). The programme will be developed using a micro-credential format. One of the priorities for the European Commission's policy for higher education is the development of micro-credentials (5). Learners want to develop their knowledge and skills at a higher education level; however, there is a desire to achieve these in smaller units which are designed to meet their needs and delivered via more flexible means that fit their lifestyle (6). Micro-credentials provide accessible and flexible opportunities for learners to further their lifelong learning and professional development (5).

"*A micro-credential is a proof of the learning outcomes that a learner has acquired following a short learning experience. These learning outcomes have been assessed against transparent standards*."(7)

The e-learning programme with micro-credential developed to deliver the *DigiCanTrain curriculum* will pilot what the project team envisage as a potential Massive Open Online Course (MOOC) on the topic. MOOCs, an e-learning platform, have altered the delivery of continuing education (4). For an individual's lifelong learning and professional development innovative educational technologies such as MOOCs are appropriate and influential (8). The end goal of the DigiCanTrain project is to develop the curriculum which may be further developed into a MOOC programme or be moved from the university Moodle platform to open European Learning Hub for HCPs working in cancer care. The latter refers to a European Commission co-funded project INTERACT EUROPE 100 (http://www.europeancancer.org/eu-projects/impact/interact-europe-100). In the project, an inter-specialty training programme is co-designed and delivered in 100 cancer centres across Europe. As an end outcome of the project, a larger learning hub is considered and the option of embedding the DigiCanTrain programme will be explored. However, at this point we do not have the options integrating the DigiCanTrain discussed further as the INTERACT EUROPE 100 was just launched.

Therefore, to enhance the quality of the DigiCanTrain programme and ensure European standards are met, the common micro-credential framework (CMF) which applies to short

higher education programmes or MOOC programmes for ongoing education or professional development (6) guided the development of the DigiCanTrain curriculum. By using this framework, we endeavour to apply a common standard to the e-learning programme developed as part of the DigiCanTrain project. The objective of the framework is to assist in the development of programmes and to facilitate their recognition across European Higher Education Institutions (5). There are a number of standards to meet when designing such programmes (5). Figure 2 demonstrates the requirements of the CMF for micro-credentials (5). How we aim to meet these requirements throughout the DigiCanTrain curriculum which are noted in Table 1.

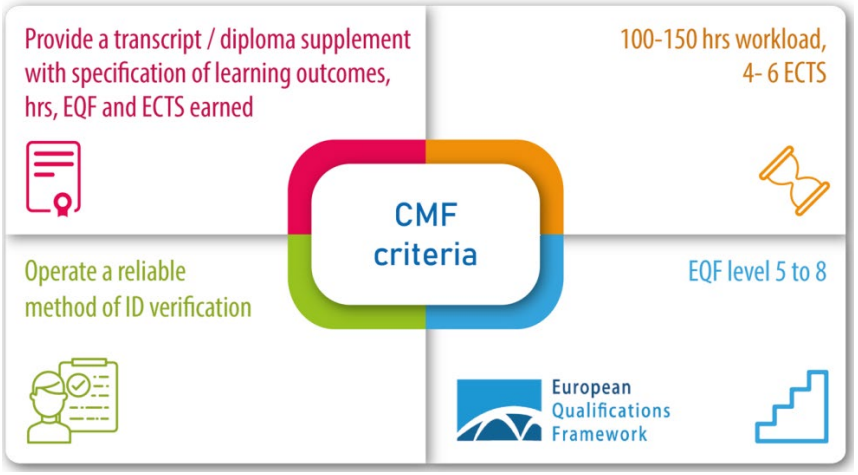

Figure 2. CMF criteria (original source: European MOOC consortium)

CMF requirements	DigiCanTrain curriculum
Total workload of 100-150 hours (4-6 ECTS)	The total number of hours allocated to each module in the DigiCanTrain programme is noted in the 'workload' section of this report. The workload for the DigiCanTrain e-learning programme ranges from 80 to 140 hours depending on learner group. However, participants have the option to complete more modules to increase the number of workload hours.
Reach the European Qualifications Framework (EQF) of level 5–8	The learning outcomes of the e-learning programme has been guided by level 7 of the EQF.
Assess learners to award the credits, such as following successful completion of the course	After every module, learners will complete an assessment e.g. self/peer assessment checklist or a multiple-choice questionnaire on the module content. A pass of 80 % is necessary prior to moving on to the next module.
Provide a reliable method for identification verification at assessment which complies with university policies or a mode which is used across platforms which use CMF	Learners will need to sign into their e-learning programme using their personal email address and password.
Provides students with a transcript which notes the learning outcomes for the micro-credential, total study hours completed, EQF level and the number of credits achieved	Learners will be provided with a transcript after they complete the e-learning program. This transcript/certificate will include relevant details required to ensure micro-credentials validation.

Table 1. CMF criteria and its translation into the DigiCanTrain curriculum

2. Recognition of prior learning

Academic recognition involves evaluating qualifications or a period of study for a learner's admission to a programme of study or exempting them from parts of a programme in an accredited higher education institution (9). Micro-credentials must be available to award learners credit either directly or via recognition of prior learning (RPL) (6). As it may not be feasible to apply accredited credits to the DigiCanTrain programme at this phase as it is a pilot study, the current focus is on ensuring the DigiCanTrain programme meets the criteria of RPL and if seen as possible actions will be taken after the pilot for formal accreditation within the partner universities. RPL is the process which a university acknowledges a learner's past learning and it is taken into consideration when they apply for a formal qualification (6).

The objective of micro-credentials is that they are owned by the learner and they are transferable and can be integrated into credits or courses (7). A methodological approach to the recognition of online modular learning is essential and two European projects have developed these (9). The methodology underpinning recognition of prior learning consists of seven elements as follows (9):

1) quality of the programme

2) verification of the certificate

3) level of the course

4) learning outcomes

5) workload

6) study assessment

7) participant identification.

Each of these criteria contribute to the transparency of the programme which underpins recognition (7).

We discuss the DigiCanTrain e-learning programme in relation to these criteria throughout this report.

Quality of the programme

Prior the completion of the pilot, it is not currently possible for this e-learning programme to be accredited. However, for alternative quality assurance the programme will be developed by experts in the field, and it is recognised by oncology organisations. Thus, we will also investigate the opportunities for accreditation procedure within the partner universities.

Verification of the certificate

Validated proof of an individual completing a micro-credential course is in the form of a certificate or transcript. Figure 3 represents an example of the certificate we envisage providing to learners who have completed the DigiCanTrain program. It will be adapted to suit each micro-credential or number of hours the learner completes. The certificate encompasses elements of the criteria of both the CMF and the seven criteria methodology to clarify the elements needed to help the recognition of online learning.

Certificate

This certificate acknowledges that

_____

has completed 140 hours in the Level 7 EQF DigiCanTrain micro-credential course

The learning outcomes of the programme included;

- To understand and be aware of the concepts of digital education and digital healthcare in the cancer care setting
- To analyse and critically appraise the application of digital health
- To apply the new digital and teaching skills achieved to teach their peers
- To apply the new digital skills to their practice in the cancer care setting
- To integrate their new teaching and digital knowledge, skills and attitudes into the cancer care environment

This micro-credential was assessed;

- After every module completion learners completed an assessment e.g. Quiz on the module content. A pass of 80% was necessary prior to moving on to the next module.

Date _____

Figure 3. Example of the certificate

Level of the course

The aim of the curriculum is to up-skill and re-skill staff in digital education and healthcare. To fulfil the criteria set out by the CMF, the learning outcomes of the programme have been guided by level 7 of the EQF (10). Table 2 provides a summary of the learning outcomes relevant to level 7 as per the EQF and the associated learning outcomes as part of the DigiCanTrain project.

Level 7 learning outcomes as per EQF (10)	DigiCanTrain curriculum learning outcomes
Highly specialised knowledge, some of which is at the forefront of knowledge, in a field of work or study, as the basis for original thinking and/ or research. Critical awareness of knowledge issues in a field and at the interface between different fields.	Learners will be able to explain the concepts of digital education and digital healthcare in the cancer care setting. Learners will be able to analyse and critically appraise the application of digital health to support the development of effective, person-centred digital health care, digital cancer care services and the use of contemporary eHealth technology.
Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures, and to integrate knowledge from different fields.	Learners will be able to apply the new digital and teaching skills to teach their peers. Learners will be able to apply the new digital skills to their practice in the cancer care setting.
Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches. Take responsibility for contributing to professional knowledge and practice, and/or for reviewing the strategic performance of teams.	Learners will be able to integrate their new teaching and digital knowledge, skills and attitudes into the cancer care environment.

Table 2. EQF Level 7 learning outcomes and its translation into the DigiCanTrain curriculum

Learning outcomes

The DigiCanTrain curriculum development process commenced in April 2023 and continued for 9 months. The process commenced with a meeting between WP2 leaders (to discuss preliminary findings of the systematic reviews) and WP4 leaders to discuss the pilot phase.

The curriculum is developed for two population groups. The first group consists of clinical workers (nurses, allied health professionals and medical doctors) and non-clinical healthcare workers working in cancer care settings who are involved in teaching or training staff, we will refer to these as the 'Trainers'. The second group consists of healthcare practitioners (HCP) such as clinical workers (nurses, allied health professionals and medical doctors) and non-clinical healthcare workers in cancer care settings. This group is later referred to as 'Trainees'.

All partners' engagement has been ensured on the process of developing the DigiCanTrain Programme Curriculum, thus, those who had planned responsibilities prepared the submodules and module descriptions had more tasks and each of the submodules and modules formed smaller task groups for the preparation. Templates were created to support the planning (Appendix 4). The project PI and University of Galway project manager provided support during the preparatory phase. This phase took longer than anticipated due to scheduling of meetings needed for the collaborative work. In the last phase the modules, submodules and curriculum draft were shared to capture comments from all beneficiaries involved on WP3. The next phase is to start the content production (Task 3.3), planning the recruitment (WP4) and the pilot protocol and execution.

The DigiCanTrain curriculum consists of five modules with 22 submodules embedded. Figure 4 provides a list of the module titles alongside the submodules embedded within each module. Modules 3, 4 and 5 are specialist modules, there is a module for the nursing cohort, the medical practitioner cohort, and the non-clinical workforce group.

Module 1 - Train the Trainees

- 1.1 Pedagogical Approaches on Digital Health Literacy and Education
- 1.2 Blended Learning Approach in the Era of Digitalisation
- 1.3 The Future Operating Environments and Education Technology
- 1.4 Remote Learning and Teaching in Oncology
- 1.5 Virtual Reality and Simulation in Post-pandemic World
- 1.6 Digital skills – the Educator's toolkit
- 1.7 Interprofessional Education in the Support of Digitalization of Oncology Services

Module 2 - Interprofessional education

- 2.1 Communication Training for HCPs in Digital Care Environment (HCP and patient coms.)
- 2.2 Advance Care Planning and Digital self-management support in cancer.
- 2.3 Digitalised Interprofessional Work Models in Cancer Care

Module 3 - Cancer nurses - Nursing cohort

- 3.1 Person-centred Care and Digital Self-Management Support in Cancer
- 3.2 Patient Involvement on patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) for care and management (health data base)
- 3.3 Remote Monitoring and eConsultation in oncology nursing practice (Nurse to Nurse consultation services)

Module 4 - Specialists (clinical oncology, radiology, surgery) and general medicine - Medical practictioner cohort

- 4.1 Digital tools and artificial intelligence (AI) technology in cancer diagnostics
- 4.2 AI methodology as a part of modern radiotherapy planning
- 4.3 Digital decision supporting systems as working environments in implementing genomics to cancer treatment and prevention (Tumor DNA as well as genetic risk for hereditary cancer).
- 4.4 Electronic patients records and real-world data in supporting treatment decisions
- 4.5 eHealth and digital tools in patient surveillance

Module 5 - Non-clinical staff working in health systems and/or health authorities and or non-governmental organisation - Non-clinical cohort

- 5.1 Cancer Organisations in Digital Cancer Journey
- 5.2 Collaborative models in building organisation resilience in Oncology
- 5.3 European Crises Response Model in Oncology
- 5.4 Digital Support in Health Care System Resilience and Leadership (Utilization of Data pools in Clinical Settings and Leadership)

Figure 4. DigiCanTrain programme modules and embedded submodules

‘Trainers’ are expected to take module 1 and 2 and are then to complete one specialist module depending on their professional background. For example, a nurse would take module 3 – Cancer nurses whereas a non-clinical professional would take module 5 - Non-clinical staff working in health systems and/or health authorities and or non-governmental organisation. To ensure inclusivity, we also propose a pathway for allied health professionals such as physiotherapists and/or radiographers. We propose that this group will take module 1 and 2 and have the option to complete any of the specialist modules which they believe best suits them in relation to their clinical practice.

The second group, ‘Trainees’ will take the second module - Interprofessional education and then one specialist module depending on their professional background, for example medical professionals would take module 4 - Specialists (clinical oncology, radiology, surgery) and general medicine. A module pathway for each learner group can be noted in figure 5.

There will also be a short introductory module to provide learners with an overview of the DigiCanTrain program. Within this introductory module each country will be asked to provide a country-based summary on the digitization of oncology care in their country. Introduction module also includes general information about the DigiCanTrain programme and practical instructions.

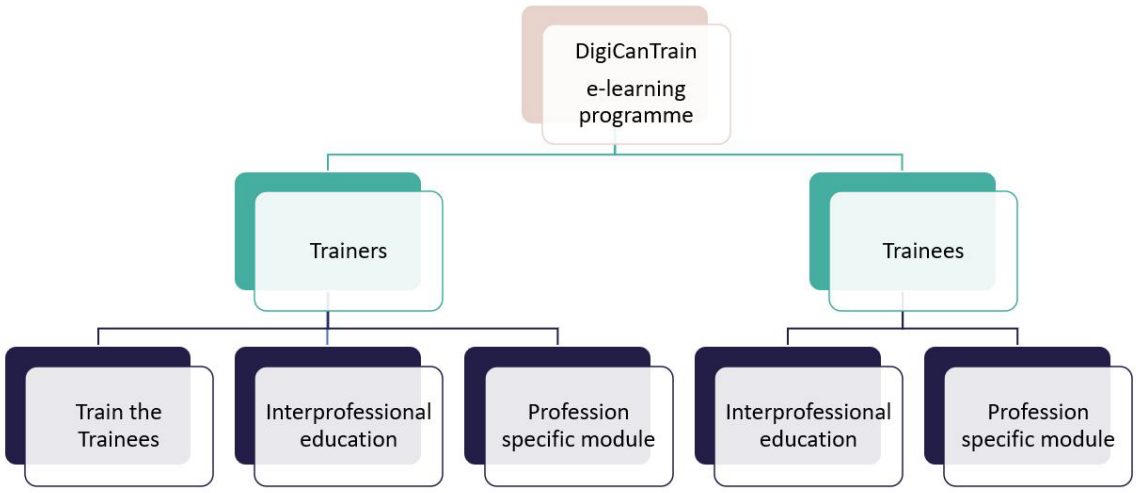

Figure 5. Module pathway for each learner group

All members (n=33) of WP3 met for two hours on June 19th to discuss and clarify the curriculum development process, including the key elements of writing learning outcomes guided by Bloom's taxonomy as the first step in curriculum development. The learning outcomes were also guided by the digital competencies required by healthcare professionals in oncology as identified by the systematic review in WP2. Each submodule's learning outcomes, proposed teaching and assessment strategies are detailed in Appendix 1. Partner organisations responsibility for each submodule are listed in Appendix 5.

Of note, two submodules have been revised and given new titles (also highlighted in the table in Appendix 5). These new titles appropriately reflect the learning outcomes of the sub-modules. The learning outcomes of each module and submodule were guided by an adaptation of Bloom's taxonomy (11,12) (Appendix 4) and the competency framework developed during an earlier phase of this programme (WP 2) (Appendix 3). Module coordinators were provided with a template to help develop their modules and submodules (Appendix 4). The learning outcomes and how they address the competencies within the developed framework can be noted in Appendix 2 and Appendix 3. The learning outcomes address learners' knowledge, skills and attitudes or values expected after completing the subsequent modules. In the development of the modules, we have proposed several teaching approaches to deliver the content. However, this process will be iterative depending on content production and is subject to changes, for example, some resources may not be currently available and alternative resources will be required in these instances. Finally, the learning outcomes of the overall programme are noted on the learner's certificate/transcript.

Workload

We provide the number of workload hours expected for learners to complete modules. The workload hours provide a common language regarding learner

effort among disciplines. In relation to those who follow the European credit transfer system (ECTS), 25 hours of work equates to 1 ECTS (13). Similarly, for those who use Continuing medical education (CME), one CME credit equates to one hour which the learner spends in an educational activity (14). Careful consideration was given to allocating the total workload hours of this programme due to the busy nature of the professional's work life with the aim to ensure a feasible and realistic time commitment to complete the learning activities and assessments. The proposed maximum workload for each micro-credential will be noted on the learner's certificate. Figure 6 provides a breakdown of the proposed maximum number of hours for each module.

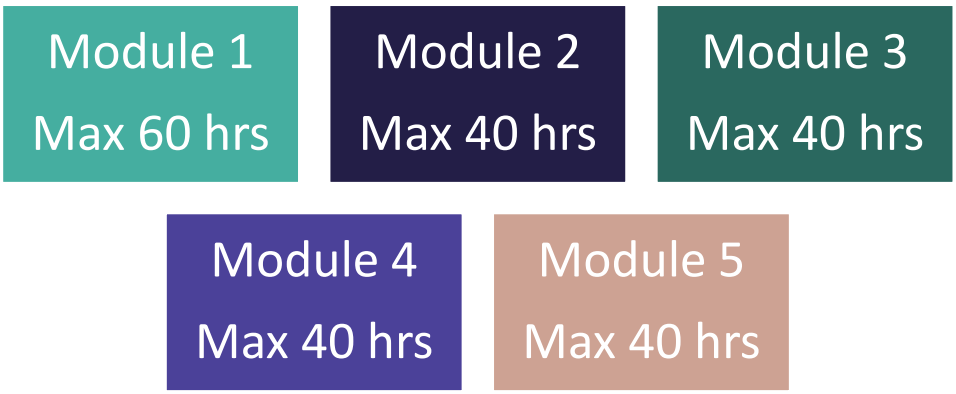

Figure 6. Workload per module

The 'Trainers' will complete three modules (and introductory module) equating to a maximum of 140 hours. The 'Trainees' will undertake two modules (and introductory module) equating to a maximum of 80 hours. However, either group can also complete the remaining professional specific modules as an optional component to increase their workload hours. For example, a nurse in the 'Trainees' group will complete module 2 and 3 however they can also take module 4 and/or 5 if they wish. Figures 7 & 8 provide a visual of the module

pathway for each cohort (nurse, medical practitioner, non-clinician) depending on whether they are in the 'Trainer' group or the 'Trainee' group.

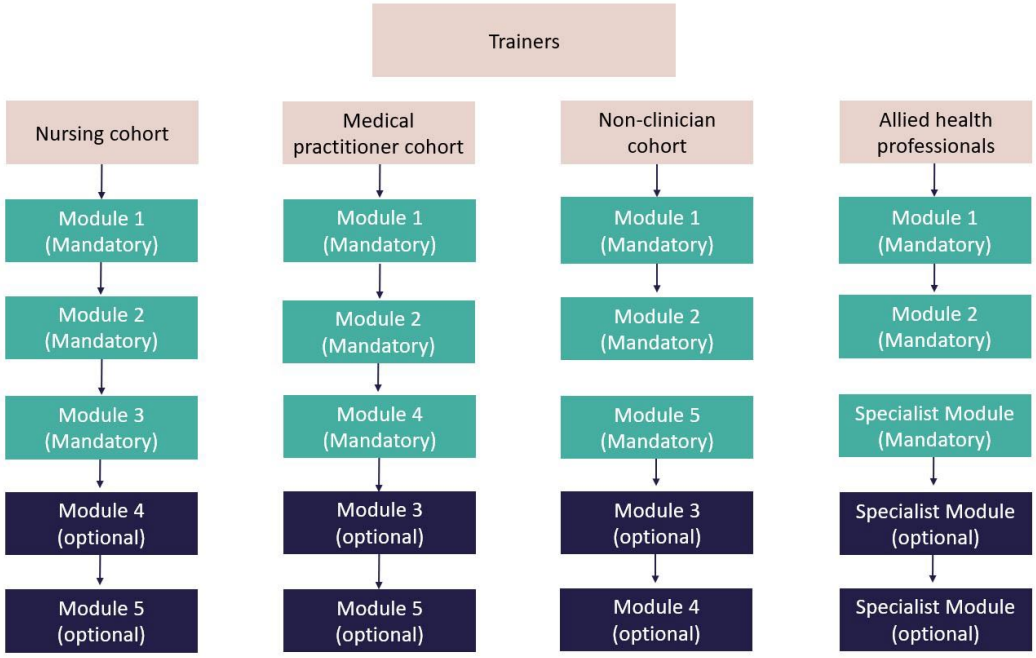

Figure 7. Module pathway for each cohort (nurse, medical practitioner, non-clinician or allied health professional) in the 'trainer' group.

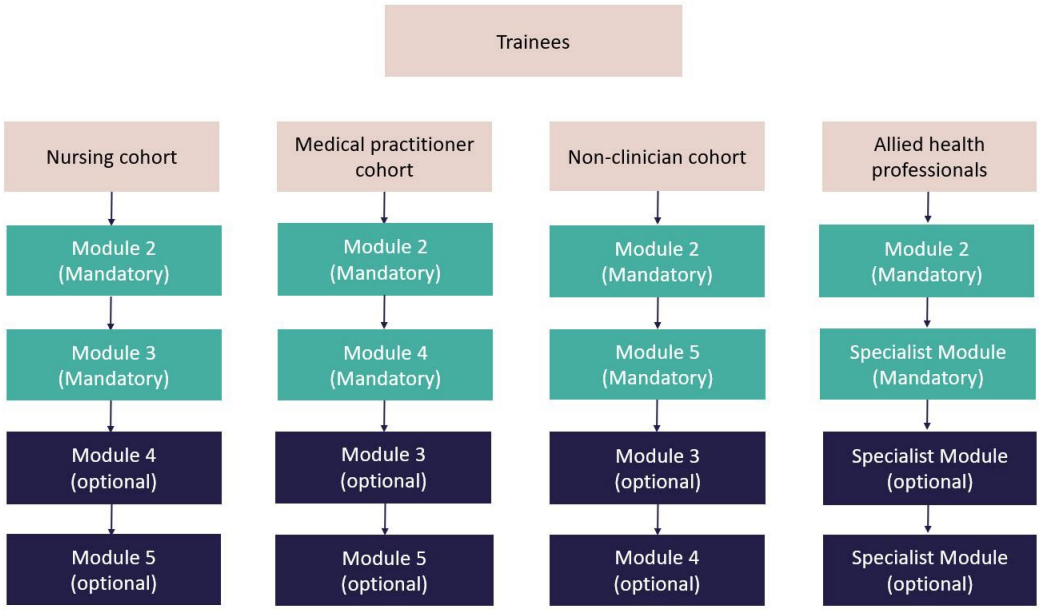

Figure 8. Module pathway for each cohort in the 'Trainees' group.

Study assessment

After completing each sub-module, the learner will complete a final assessment, envisaged to be in form of a quiz or multiple-choice questionnaire. The learner must achieve a pass rate of 80% to move on to the next submodule/module.

Participant identification

The participant will be identified using their email and password to log into the e-learning program. The learner's name will be noted on the certificate/transcript of completion. The identity of participant is secured according to data management plan of the project (following GDPR regulations).

The micro-evaluator tool

To further facilitate a university's recognition of learners' prior learning, the above methodology has been adapted into an online application, the 'micro-evaluator'

tool. This online tool guides users through the recognition process (9). We envisage that the WP3 DigiCanTrain micro-credential course, could use this online tool (https://www.nuffic.nl/en/subjects/recognition-projects/the-micro-evaluator).

3. Evaluation

After each module/submodule, learners will be asked to provide an evaluation. This will need to be completed prior to learners moving onto the next module or completing the program. Figure 9 details an example of the evaluation to be completed by learners using a Likert scale. The objective of the evaluation is to ascertain if learners perceive the module has met their expectations in relation to their knowledge, skills, and attitudes.

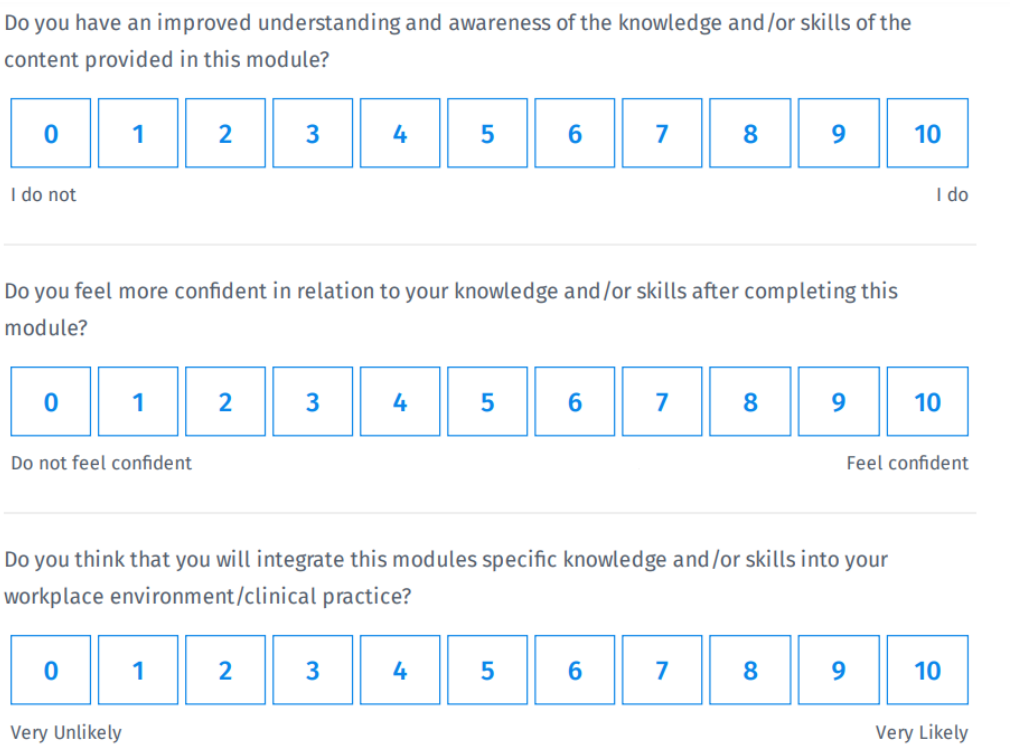

Figure 9. Evaluation of submodules/modules

4. Conclusion

The European DigiCanTrain project 2023-2026 (www.digicantrain.fi) aims on up-skilling and re-skilling the health care workforce in the cancer care setting which then in return support the development of effective, person-centred health care, digital cancer care services and the use of contemporary digital health interventions by the HCPs. The ultimate goal is to improve access to continuing professional education, increase digital skills and the use of digital technology and digital health interventions of clinical and non-clinical health care professionals working with people with and affected by cancer.

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Appendix 1. The DigiCanTrain Curriculum

The DigiCanTrain curriculum consists of five modules with 22 submodules embedded. There is also an introductory module (not assessed). The DigiCanTrain program will be delivered via visual structure created by online digital tool Thinglink® embedded in Moodle®, an open source learning management system. Using Thinglink will ensure a visual and interactive learning experience. By using Thinglink® we are able to create visual and interactive learning experiences. For the learners, this means they will be seeing a picture (with or without a 360 view).

A variety of teaching and learning strategies to engage learners will be used. These include case study scenarios, quizzes, podcasts, and videos.

Module 1 Train the Trainees

Core Module	Learning outcomes
1. Train the Trainees **Total workload = Max 60 hours**	Upon completion of this module, the learner will: • Be able to explain the different learning theories guiding adult learning in digital health (Knowledge) • Be able to apply different remote and distance learning methods in their own teaching (Skills) • Understand the value of using different digital teaching and learning methods in delivery of education to improve digital competences of HCPs (Attitude/Value)

Sub Module	Learning outcomes	Content	Proposed Teaching & Learning strategies	Proposed Assessment
1.1 Pedagogical approaches on digital health literacy and education	Upon completion of this sub module, the learner will: -Be able to explain various learning theories guiding adult learning in digital health (Knowledge) -Be able to apply the different digital pedagogy solutions according to different learning theories (skills)	1.1.1 Digital health literacy in adult learning and learning orientations of different generations 1.1.2 Different learning theories guiding digital pedagogy 1.1.3 Different digital pedagogy solutions	PowerPoint presentation Interactive presentation e.g. using articulate rise Reading Case studies	Peer or self-assessment checklist using rubric linked to case studies. Submodule evaluation questions

	-Be aware of their own views and the views of others on the relevance of digital health literacy (Attitude)	according to different learning theories		
1.2 Blended learning approach in the era of digitalisation	Upon completion of this sub module, the learner will: -Be able to explain what is meant by meant by the terms 'blended learning', asynchronous and synchronous learning and their benefits and challenges (Knowledge) - Be able to apply strategies that create and maintain multidisciplinary peer engagement, communication and support (Skills) -Be aware of their own and others preferences and difficulties with blended learning (Attitude)	1.2.1 Exploration of blended learning experiences 1.2.2 Overview of blended learning (terminologies, benefits, challenges) 1.2.3 What is meant by a 'community of enquiry' and engaging learners.	Case studies Interactive PowerPoint(s) Reading	Multiple choice questions (MCQs) Submodule evaluation questions
1.3 The future operating environments and	Upon completion of this sub-module, the learner will:	1.3.1 Future operating environments in education (e.g. 360)	Interactive PowerPoint(s) Reading	Toolkit checklist [integrate with sub-module 1.6] Submodule evaluation questions

education technology	-Be able to explain future operating environments and education technology (knowledge) -Be able to apply new education technology (apps, available software) in cancer care education (Skills) - Be aware of their own views on the opportunities/value of the use of education technology in future operating environments (attitudes)	1.3.2 Education technology 1.3.3 Role of the trainer in future operating environments in education and education technology	Interactive scenarios using 360 video technology	
1.4 Remote learning and teaching in oncology	Upon completion of this sub-module, the learner will: -Be able to explain what is meant by remote learning and teaching and the different modes of remote learning (e.g. videos, discussion boards, pre-recorded presentations) (Knowledge) - Be able to apply different modes of remote teaching in relation to universal design for learning (Skills)	1.4.1 Distinguishing between remote and blended learning 1.4.2 Reflection on personal experiences of remote learning 1.4.3 Different modes of delivery in remote learning 1.4.4 Designing teaching with universal design for learning principles	Interactive PowerPoint Framework for universal design for learning and own experiences of remote learning Example videos	MCQs Submodule evaluation questions

	-Be aware of their own preferences and any difficulties with remote learning (Attitude)		Recorded PowerPoint Presentation	
1.5 Virtual reality and simulation in a post-pandemic world	Upon completion of this sub-module, the learner will: -Be able to explain the basic principles and terminology of Immersive technologies and Simulation learning using examples of simulation tools (Knowledge) -Be able to use some immersive technologies and Simulation tools in cancer care training (Skills) -Be motivated to foster/ enhance attitudes towards the potential of using immersive technologies and Simulation tools (Attitude)	1.5.1 Learning approaches in immersive technologies and in Simulation 1.5.2 Using immersive learning technologies in education 1.5.3 Simulation practices and developing scenarios for training	Interactive PowerPoint Recorded presentation-expert Case studies	MCQs Submodule evaluation questions
1.6 Digital skills-the educator's toolkit	Upon completion of this sub-module, the learner will: -Explain their trainer role in the DigiCanTrain programme delivery (Knowledge)	1.6.1 How to create a toolkit consisting of teaching, learning and assessment materials and tools.	Interactive PowerPoint Case studies	Creating a toolkit Submodule evaluation questions

	- Apply teaching, learning and assessment materials, methods and tools in teaching and supporting trainees (skill) -Understand the basics of cybersecurity as essential to protect patient data (Attitude)	1.6.2 Selection of materials and tools adaptable on own teaching 1.6.3 How to support trainees during the learning process 1.6.4 Principles of Cybersecurity and protecting and sharing data in a safe digital environment.	Recorded presentation-expert	
1.7 Interprofessional education in the support of digitalization of oncology services	Upon completion of this sub-module, the trainer will be able to: -Explain profession-specific roles, competences, and responsibilities in support of digitalization of oncology services (Knowledge) - Assess barriers and solutions for effective communication in interprofessional education. (Skill)	1.7.1 Communication, teamwork, interprofessional relationships and interprofessional interactions in interprofessional training 1.7.2 Profession-specific roles, competences, and responsibilities in support	Interactive PowerPoint(s) Case studies	MCQs Submodule evaluation questions

	-Recognise the value of communication, teamwork, interprofessional relationships and interprofessional interactions in interprofessional education. (Attitude/value)	of digitalisation of oncology services. 1.7.3 Values and ethics in support of interprofessional education 1.7.4 Barriers and solutions for effective communication in interprofessional education.		

Module 2 Interprofessional Education

Core Module	Learning outcomes
2. Interprofessional Education **Total workload = Max 40 hours**	Upon completion of this module, the learner will: • Be able to identify the tools to support and promote the patient's own process of self-management and decision making (Knowledge) • Be able to use different tools and strategies for an improved interprofessional communication (Skills) • Be able to recognise enablers and barriers in interprofessional digital communication to promote collaboration, co creation and sharing of knowledge (Attitude/Value)

Sub Module	Learning outcomes	Content	Proposed Teaching & Learning strategies	Proposed Assessment
2.1 Communication training for HCPs in Digital Care Environment (HCP and patient communication)	Upon completion of this sub-module, the learner will: -Recognise the different nature, purpose, and function of digital communication, collaboration and participation. (Knowledge) - Assess different types of	2.1.1 Nature, purpose, and function of digital communication 2.1.2 Different types of digital communication, collaboration and participation strategies, forms, channels, and tools for health care professionals (HCP)	Recorded PowerPoint presentation Interactive PowerPoint Simulated case study with	Peer review (or self-assessment) of simulated case study [embedded in 2.1.3 content] Submodule evaluation questions

	digital communication, collaboration and participation strategies, forms, and channels used in individual situations with person-centred manner. (Skills) - Be confident in implementing different types of digital communication, collaboration and participation strategies, forms, and channels for health care professionals (HCP) and used in HCP and patient communication. (Attitude)	used in HCP and patient communication in empowerment, teaching, coaching, mentoring, and supporting patients' and caregivers. 2.1.3 Use of digital technologies to communicate respectfully, professionally, and ethically across different settings and populations. 2.1.4 Digital networks (local, national, and international)	peer/self checklist Reading Video presentation	
2.2 Advance care planning (ACP) and digital self-management support in cancer (revised new title)	Upon completion of this sub-module, the learner will: -Be able to identify the principles underpinning advance care planning and patient's engagement on shared decision-making and	2.2.1 What is advance care planning (ACP) 2.2.2 Principles underpinning cancer patients' readiness for ACP 2.2.3 What is patient engagement in ACP	Recorded presentation - expert Reading Video lecture Case studies	Self-management questionnaire Review website on ACP and complete checklist Case study critique/analyse. Submodule evaluation questions

	explain the role of digital self-management to support patients in their needs of care. (Knowledge) - Be able to assess the effects of mobile health (mHealth) apps on patients' self-efficacy in the advance care planning process, considering both enablers and barriers factors to their use. (Skills) - Recommend a digital self-management approach to facilitate the patient's readiness to advance care planning process. (Attitude)	2.2.4 How can digital self-management support patients to reflect on values, preferences and wishes about their needs of care 2.2.5 What type of tools support better patient self-efficacy in ACP process and what are the main enablers and barriers to their use.	Recorded presentation expert. Interactive PowerPoint Reading Review relevant website on ACP	
2.3 Digital interprofessional work models in cancer care	Upon completion of this sub-module, the learner will: -Be able to describe different digital tools and technologies for interprofessional collaborative processes, and for co-construction and co-	2.3.1 Different types of digitalised interprofessional work models in cancer care for health care professionals (HCP) and used in HCP (and patient) communication. 2.3.2 Use of digital tools and technologies for	Interactive PowerPoint(s) Case studies Audio podcast	MCQs Checklist peer review/self-review Submodule evaluation questions

	creation of resources and knowledge (Knowledge) -Be able to share data, information, and digital content through appropriate digital technologies with the appropriate safety and ethical precautions (Skills) -Be motivated to execute positive, sensitive, and professional attitudes and behaviours in communicating, collaborating, and participating in digital health (Attitude)	interprofessional collaborative processes, and for co-construction and co-creation of resources and knowledge. 2.3.3 Safety and ethical precautions in sharing data, information, and digital content through digital technologies in interprofessional collaboration. 2.3.4 The benefits of using digital tools for interprofessional collaboration for patients and professionals.		

Module 3 Cancer Nurses

Specialist Module (Nurses)		**Learning outcomes**		
3. Cancer Nurses **Total workload = Max 40 hours**		Upon completion of this module, learners will: • Be able to identify appropriate digital interventions in providing person-centred care in the cancer care pathway (Knowledge) • Be able to appropriately use PROMs and PREMs in remote monitoring and eConsultations in the cancer care pathway (Skill) • Be motivated to adopt appropriate use of digital interventions in the cancer care pathway (Attitude/Value)		
Sub Module	**Learning outcomes**	**Content**	**Proposed Teaching & Learning strategies**	**Proposed Assessment**
3.1 Person-centred care and digital self-management support in cancer	Upon completion of this sub module, learners will: - Be able to explain the principles of person-centred care in digital cancer care. (Knowledge) - Assess relevant digital interventions and tools for person-centred care and digital self-management support in direct patient care and caregivers'	3.1.1 Digital interventions in empowerment, teaching, coaching, mentoring, and supporting patients' and caregivers and evaluation of the feasibility of such interventions. 3.1.2 Common benefits and barriers on the use of digital interventions in person-centred care and self-management	Interactive PowerPoint Video presentation Reading Case studies	Case study checklist Questionnaire Submodule evaluation questions

	support, and implement at least one digital intervention safely (Skill) - Motivated to use and promote digital interventions in provision of person-centred care and digital self-management support. (Attitude)	support. Using appropriate assessment tool(s) 3.1.3 Assessing patient's and caregiver's/family members individual situation and support needs, and their capabilities, resources and willingness to use digital health services. 3.1.4 Provision of sufficient and relevant information by tailoring of digital content and information according to patients' and caregivers' situation and needs.		
3.2 Patient involvement in PROMs and PREMs for care and management (health database) (revised, new title)	Upon completion of this sub-module, the learner will: -Describe what is meant by a digital PROM and a PREM, and outline current evidence on their benefits and barriers to their implementation in the cancer care pathway (Knowledge)	3.2.1 Overview of PROMs and PREMs. 3.2.2 Nurse consultation using PROMs & PREMs 3.2.3 Implementation and administration of PROMs and PREMs.	Interactive PowerPoint presentations Readings Simulation video(s)	Knowledge Quiz Submodule evaluation questions

	- Identify the key moments when to use digital PROMs and PREMs in the cancer care pathway (Skill) - Understand the importance of using appropriate skills when providing timely, structured feedback of PROMs and PREMs to patients (Attitude)	3.2.4 How to provide patient feedback	Videos (expert(s)/ simulation)	
3.3 Remote monitoring and eConsultation in oncology nursing practice (Nurse to Nurse consultation services)	Upon completion of this sub-module, the learner will: -Be able to explain what is meant by remote monitoring and eConsultations and the different ways of using remote monitoring and eConsultations and its benefits and barriers in oncology nursing practice (Knowledge) - Be able to apply remote monitoring and eConsultations to their oncology nursing practice (Skill) - Be confident and motivated to introduce or use remote monitoring and in eConsultations in their oncology nursing practice(Attitude)	3.3.1 What is patient remote monitoring and eConsultation 3.3.2 What are the benefits and barriers in using patient remote monitoring and eConsultation 3.3.3 Nurses' roles in remote monitoring and eConsultations	Recorded PowerPoint Presentation Interactive Presentation Reading Recorded interviews (experts) Simulated scenarios	MCQs Submodule evaluation questions

Module 4 Specialist Module (Clinical Oncology, Radiology, Surgery) & General Medicine

Specialist Module (Clinical Oncology, Radiology, Surgery) & General Medicine	**Learning outcomes**
4. Specialists (Clinical Oncology, Radiology, Surgery & General Medicine; nurses and allied health professionals non direct target group) **Total workload = Max 40 hours**	Upon completion of this module, learners will: • Be able to explain current digital interventions, digital tools and AIs commonly used in oncology (Knowledge) • Be able to apply different types of digital interventions, digital tools and AI as part of cancer treatment (Skill) • Understand benefits and barriers of using different types of digital interventions, digital tools and AI as part of cancer care (Attitude)

Sub Module	**Learning outcomes**	**Content**	**Proposed Teaching & Learning strategies**	**Proposed Assessment**
4.1 Digital tools and artificial intelligence (AI) technology in cancer diagnostics	Upon completion of this sub module, learners will: - describe the digital tools and AI commonly used in oncology, its latest developments and possibilities in cancer diagnostics (Knowledge) - be able to adopt digital tools and AI technology that are used in cancer diagnostics when available in their work unit (Skill)	4.1.1 Introduction of the whole module contents 4.1.2 Commonly used digitals tools and AI technology in cancer diagnostics 4.1.3 How digital tools and AI technology can be used in cancer diagnostics	PowerPoint presentation Interactive presentation(s) Reading(s) Patient scenarios	Knowledge Quiz Submodule evaluation questions

	- Understand the value of digital tools and AI Technology in cancer diagnostics (Attitude)	4.1.4 Role of digital tools and AI technology in pathology and radiology 4.1.5 Barriers and enablers to using digital tools and Ai in cancer diagnostics		
4.2 AI methodology as a part of modern radiotherapy planning	Upon completion of this sub-module, learners will: -Be able to explain how AI methodology has been introduced in radiation oncology, latest developments and possibilities in modern radiotherapy planning (Knowledge) - Be able to apply AI methods in radiotherapy planning when the technology is available in the radiotherapy unit (Skill) - Be able to recognize AI methods prospects in radiotherapy planning (Attitude)	4.2.1 What is AI technology in radiotherapy planning 4.2.2 Role and use of AI in radiotherapy planning 4.2.3 Barriers and enablers to AI methods in radiotherapy planning	PowerPoint presentation Interactive presentation(s) Reading(s) Patient scenarios	Checklist (Peer to peer/ Self-assessment) Submodule evaluation questions
4.3 Digital decision supporting systems as working environments implementing genomics to cancer treatment and prevention (Tumor DNA as well as genetic risk for hereditary cancer)	Upon completion of this sub-module, learners will: -Be able to describe the basics of genomics, particularly as it relates to cancer. (Knowledge) - Be ablet to Interpret digital genomic data, which may include DNA sequencing results and genetic risk assessments and how to integrate this data into patient care, treatment decisions, and prevention strategies. (Skill) - Will understand the value of digital decision support systems and how these systems work in cancer treatment and prevention. (Attitude)	4.3.1 Genomics and Cancer: Key concepts of genomics and its relevance in cancer. The role of genetic mutations in cancer development. How genomics can be applied to personalize cancer treatment and prevention 4.3.2 Data Interpretation and Integration: genetic mutations, their role in cancer development, and the impact of genomics on personalized treatment and prevention strategies. DNA sequencing results and genetic risk assessments. Genomic data integration	PowerPoint Presentations Readings Interactive PowerPoint Patient scenarios	Quiz Submodule evaluation questions

		into patient care plans and decision-making processes. 4.3.3 Role of Digital Decision Support Systems: the function and operation of digital decision support systems in genomics. the capabilities and limitations of these systems in clinical practice. 4.3.4 Potential benefits and limitations of genomics in cancer care		
4.4 Electronic patients records and real-world data in supporting treatment decisions	Upon completion of this sub-module learners will: -Be able to describe latest developments and possibilities of electronic patients records and real-world data in supporting treatment decisions (knowledge) - Know how to use digital information in treatment decisions (skill) - Understand benefits and barriers of real-world data for making treatment decisions (Attitude)	4.4.1 The latest developments in real-world data and electronic patients records in supporting treatment decisions 4.4.2 How real-world data and electronic patients' records can be used in supporting treatment decisions 4.4.3 Barriers and enablers of the use of real-world data and electronic patients records in supporting treatment decisions (ethical perspectives, technical limitation, skills needed)	PowerPoint Presentation(s) Reading(s) Patient scenarios	MCQs Submodule evaluation questions

4.5 eHealth and digital tools in patient surveillance	Upon completion of this sub-module learners will: -Be able to describe current digital interventions commonly used in oncology and latest developments in cancer patient surveillance (Knowledge) - Be able to apply different types of digital interventions in cancer patient surveillance (Skill) - Understand value and opportunities of digital interventions in cancer patient surveillance (Attitude)	4.5.1 Current digital interventions used in cancer patient surveillance 4.5.2 How digital interventions can be used in cancer patient surveillance – using examples 4.5.3 Barriers and enablers to eHealth and digital tools in cancer patient surveillance	Interactive PowerPoint(s) Reading(s) Video presentation using examples	Quiz Submodule evaluation questions

Module 5 Non-clinical Module (Staff working in health systems and/or health authorities and or NGO)

Non-clinical Module (Staff working in health systems and/or health authorities and or NGO)	**Learning outcomes**
5 Non-Clinical Staff **Total workload = Max 40 hours**	Upon completion of this module, learners will: • Be able to describe the role of cancer organisations, analyse their influence on patient experiences, and propose strategies for improving digital patient-centred care (Knowledge) • Be able to apply skills in diverse digital communication and collaboration strategies, securely and effectively at local, national, and international levels and capable of facilitating the use of digital tools for patient care during various crises that may affect cancer care. (Skills) • Be able to comprehend knowledge management principles and key efficiency metrics/indicators for enhancing digital cancer care leadership and organisational success.

Sub Module	**Learning outcomes**	**Content**	**Proposed Teaching & Learning strategies**	**Proposed Assessment**
5.1 Cancer organisations in person-centred digital cancer care **New Title**	Upon completion of this sub module, learners will: - Be able to describe the role, needs and structure of cancer organizations in person-centered digital care. (Knowledge) -Be able to propose strategies for improving digital patient-centered care through collaboration with	5.1.1 Key concepts of person-centred care. 5.1.2 Specific needs of cancer organizations in digital care	Recorded video expert Case studies Designing effective collaborative strategies (from toolkit)	Concept map Case study critique Submodule evaluation questions

	cancer organizations. (Skills – Application) - Be aware of the influence and role of cancer organizations on the patient experience and continuous improvement of care (Attitude)	5.1.3 Digital technologies applied to person-centred cancer care 5.1.4 Evaluating quality of digital patient-centred care 5.1.5 Effective collaboration between cancer-organizations		
5.2 Collaborative models in building organisation resilience in oncology	Upon completion of this sub-module, learners will: -Be able to explain different types of digital communication, collaboration and participation strategies, forms, and channels that are important for building organisation resilience in oncology. (Knowledge) - Be able to choose and utilise suitable digital communication, collaboration and participation strategies when operating within and across digital networks at the local, national, and international levels and apply guidelines, regulations and best practices when working with personal, public, professional and/or confidential digital information, data, and content in collaboration across different actors in oncology (Skills)	5.2.1 Different types of digital communication, collaboration and participation strategies, forms, and channels in building resilience in organizations and how to choose suitable one. 5.2.2 Guidelines, regulations and best practices when working with personal, public, professional and/or confidential digital information, data, and content while collaborating. 5.2.3 The benefits of using digital tools for collaborative models in building resilience in oncology.	Interactive Presentation(s) Peer to peer/self-checklist Audio Podcast	Quiz Submodule evaluation questions

	- Be able to execute positive, sensitive, and professional attitudes and behaviours in communicating, collaborating, and participating in digital health (Attitude)			
5.3 European Crises response model in oncology	Upon completion of this sub-module, learners will: - Be able to recognize and describe the characteristics associated with the different crises in the context of cancer care and explain the role of digital tools in cancer care crises. (Knowledge) -Be able to assess the needs of cancer patients in crises situations and identify/apply strategies to support their care. (Skills) - Be able to describe case study examples involving cancer care crises and discuss possible solutions to improve patients care during such situations (Values)	5.3.1 Main crises that can have an impact on cancer care. 5.3.2 Key needs of cancer patients and cancer care in crisis situations 5.3.3 Addressing specific needs of cancer patients and cancer care in crisis situations. 5.3.4 What is the role of digitalization in the cancer care crisis and which type of tools are encouraged (e.g., telemedicine, translation technology). 5.3.5 Case study examples (e.g., Italy and Turkey during earthquakes, former Yugoslavia during 1990s conflict COVID-19 pandemic, Russia's attack to Ukraine, Israel-Palestine conflict).	Interactive Presentation(s) Reading(s) Video [expert discussion] PowerPoint presentation Case studies	Case study critique Submodule evaluation questions

5.4 Digital support in healthcare system resilience and leadership (Utilisation of data pools in clinical settings and leadership)	Upon completion of this sub-module learners will: -Be able to describe key efficiency metrics used in own organisation and identify key development areas (Knowledge) -Be able to critically evaluate quality and efficiency indicators produced information and how to implement the information to improve current cancer care services (Skill) -Be able to explain knowledge management principles in digital cancer care leadership and its value on organisation success (Attitude)	5.4.1 Knowledge management in leadership & integration of AI. 5.4.2 What are different types of healthcare efficiency and quality indicators. Digital metrics to assess the health system 5.4.3 Using digital healthcare data in clinical care and leadership.	Interactive Presentations Reading Video interviews Case descriptions	Quiz Submodule evaluation questions

Appendix 2. Mapping of the programme's learning outcomes across the developed competence framework

	Module 1	Module 2	Module 3	Module 4	Module 5
Digital health literacy					
Knowledge			X	X	X
Skills			X	X	X
Attitudes and Values	X		X		
Communication, collaboration and participation					
Knowledge		X		X	X
Skills	X	X			X
Attitudes and Values					X
Information technology and digital health systems					
Knowledge			X	X	
Skills		X	X	X	
Attitudes and Values			X		X
Person-centred virtual cancer care					
Knowledge			X	X	X
Skills				X	
Attitudes and Values				X	X
Digital solutions in cancer care					
Knowledge				X	
Skills	X		X	X	X
Attitudes and Values				X	
Safety and ethics related to digital solutions and data management					
Knowledge	X			X	
Skills				X	
Attitudes and Values		X			X

Appendix 3. Digital competence framework mapped across module learning outcomes (learning outcomes in blue)

Competence area	Knowledge	Skills	Attitudes and Values
Digital health literacy	understands the use of digital information and services to inform health- and care related decisions and actions. • Be able to explain the principles of person-centred care in digital cancer care. (Knowledge - Module3) • Be able to recognize and describe the characteristics associated with the different crises in the context of cancer care and explain the role of digital tools in cancer care crises. (Knowledge – Module 5)	operates in various digital platforms. analyses, interprets, and critically evaluates health data, information, and digital content. evaluates trustworthiness, credibility, and applicability of digital health information. • Be able to appropriately use PROMs and PREMs in remote monitoring and eConsultations in the cancer care pathway (Skill – overall Module 3) • Assess relevant digital interventions and tools for person-centred care and digital self-management support in direct	possesses awareness of cultural and generational diversity in digital environments. intents to use health information technology in own work. demonstrates willingness to explore opportunities for digital health. demonstrates positive, sensitive, and appropriate attitudes and behaviours in communicating, collaborating, and participating with anybody and everybody. • Be aware of their own views and the views of others on the relevance of digital health literacy (Attitude- Module 1)

	• Be able to describe key efficiency metrics used in cancer settings and recognize metrics and explain knowledge management principles in digital cancer care leadership (Knowledge – Module 5) • Be able to explain current digital interventions, digital tools and AIs commonly used in oncology (Knowledge – Overall Module 4) • Describe the digital tools and AI commonly used in oncology, its latest developments and possibilities in cancer diagnostics (Knowledge – Module 4) • Be able to describe the basics of genomics, particularly as it relates to cancer. (Knowledge – Module 4)	patient care and caregivers' support, and implement at least one digital intervention (Skill - Module 3) • Be able to apply remote monitoring and eConsultations to their oncology nursing practice (Skill – Module 3) • Be able to assess the needs of cancer patients in crises situations and identify/apply strategies and tools to support their care. (Skills – Module 5) • Be able to critically evaluate quality and efficiency indicators produced information and how to implement the information to improve current cancer care services (Skill – Module 5) • Know how to use digital information in treatment decisions (skill – Module 4)	• Be motivated to adopt appropriate use of digital interventions in the cancer care pathway (Attitude/Value – overall Module 3) • Motivated to use and promote digital interventions in provision of person-centred care and digital self-management support. (Attitude - Module 3) • Be confident and motivated to introduce or use remote monitoring and in eConsultations in their oncology nursing practice (Attitude - Module 3)

	• Be able to describe current digital interventions commonly used in oncology and latest developments in cancer patient surveillance (Knowledge – Module 4)		
Communication, collaboration and participation	understands the different nature, purpose, and function of digital communication. knows different types of digital communication strategies, forms, and channels. • Be able to recognize the different nature, purpose and function of digital communication, collaboration and	use digital technologies to communicate respectfully and appropriately. uses digital tools and technologies for collaborative processes, and for construction and co-creation of resources and knowledge. work collaboratively with others using digital technologies and tools. participates actively in and across digital networks. adapts communication strategies to the specific audience.	demonstrates positive, sensitive, and appropriate attitudes and behaviours in communicating, collaborating, and participating. seeks opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies. participates in society through the use of public and private digital services. • Be confident in implementing different types of digital communication, collaboration and participation

	participation (Knowledge- Module 2) • Be able to explain different types of digital communication, collaboration and participation strategies, forms, and channels that are important for building organisation resilience in oncology. (Knowledge – Module 5) • Be able to describe latest developments and possibilities of electronic patients records and real-world data in supporting treatment decisions (knowledge – Module 4)	provides sufficient and relevant information, and address concerns of people affected by cancer. tailors' information according to patients' situation and needs, structures information, and is able to deal with emotions in digital environment. uses a wide range of digital technologies and tools in teaching, coaching, mentoring, and supporting others. • Be able to apply strategies that create and maintain multidisciplinary peer engagement, communication and support (Skills- Module 1) • Be able to explain profession-specific roles, competences, and responsibilities in support of digitalization of oncology services (Knowledge- Module 1) • Be able to describe different digital tools and technologies for interprofessional collaborative	strategies, forms, and channels for healthcare professionals (HCP) and used in HCP and patient communication (Attitude- Module 2) • Be able to comprehend the value of cancer organisations and the principles and key efficiency metrics/indicators for enhancing digital cancer care leadership and organisational success.(Attitude – Overall Module 5) • Be able to understand the value of cancer organizations on the patient experience and continuous improvement of care (? Attitude – Module 5) • Be able to execute positive, sensitive, and professional attitudes and behaviours in communicating, collaborating, and participating in digital health (Attitude – Module 5)

		processes, and for co-construction and co-creation of resources and knowledge (Knowledge-Module 2) • Be able to apply skills in diverse digital communication and collaboration strategies, securely and effectively at local, national, and international levels and capable of facilitating the use of digital tools for patient care during various crises that may affect cancer care. (Skills – Overall Module 5) • Be able to propose strategies for improving digital patient-centered care through collaboration with cancer organizations. (Skills – Application – Module 5) • Be able to choose and apply suitable digital communication, collaboration and participation strategies when operating within and across digital networks (Skills – Module 5)	

Information technology and digital health systems	knows main evidence-based online information sources of own specialty. knows how to articulate information needs, search for data, information, and content in digital environments, how to access them and navigate between them. understands how copyright and licences apply to data, information, and digital content. • Be able to explain what is meant by remote monitoring and eConsultations and the different ways of using remote monitoring and eConsultations and its benefits and barriers in oncology nursing practice (Knowledge - Module 3)	analyses, compares, and critically evaluates the credibility and reliability of sources of data, information, and digital content. organises, stores, and retrieves data, information, and content in and from digital environments. shares data, information, and digital content with others through appropriate digital technologies. • Be able to share data, information, and digital content through appropriate digital technologies with the appropriate safety and ethical precautions (Skills-Module 2) • Be able to apply remote monitoring and eConsultations to their oncology nursing practice (Skill – Module 3)	beliefs concerning the benefits or barriers of technology recognises one's responsibility to not engage in or allow others to engage in inappropriate, irresponsible, offensive, or harmful communication activities. • Understand the importance of using appropriate skills when providing timely, structured feedback of PROMs and PREMs to patients (Attitude - Module 3) • Be able to recognize key efficiency metrics used in own organization and identify key development areas and its value on organisation success (Attitude – Module 5)

	• Be able to describe latest developments and possibilities of electronic patients records and real-world data in supporting treatment decisions (knowledge – Module 4)	• Be able to apply different types of digital interventions, digital tools and AI as part of cancer treatment (Skill – Overall Module 4) • Be able to apply different types of digital interventions in cancer patient surveillance (Skill – Module 4)	
Person-centred virtual cancer care	knows eHealth technology of own specialty used in direct patient care. understands the principles of person-centred care in virtual cancer care. • Be able to discuss the use of appropriate digital interventions in providing person-centred care in the cancer care pathway (Knowledge – Overall module 3) • Describe what is meant by a digital PROM and a PREM, and outline current evidence on their benefits and barriers to their implementation in the	uses a wide range of technical devices and software in a professional context relevant for own specialty and multidisciplinary cancer care. evaluating the patient's situation through digital means; obtains relevant patient information during remote symptom assessments, ensures the accuracy of patient medical history and medication details. evaluates the patient's digital capabilities and willingness to use digital health services.	evaluates and promotes equality of virtual care services for people affected by cancer. values person-centred care regardless of the environment. • Be able to interpret different case study examples involving cancer care crises and discuss possible solutions to improve patients care during such situations (Attitude/Value – Module 5) • Will understand the value of digital decision support systems and how these systems work in cancer treatment and prevention. (Attitude – Module 4) • Understand value and opportunities of digital interventions in cancer patient surveillance (Attitude -Module 4)

	cancer care pathway (Knowledge – Module 3) • Be able to describe the role of cancer organisations, understand their influence on patient experiences, and propose strategies for improving digital patient-centred care (Knowledge – Overall Module 5) • Be able to describe the role, needs and structure of cancer organizations in person-centered digital care. (Knowledge – Module 5) • Be able to describe current digital interventions commonly used in oncology and latest developments in cancer patient surveillance (Knowledge – Module 4)	Incorporates the patient's and his/her caregivers/family members needs on delivering virtual care. • Be able to apply AI methods in radiotherapy planning when the technology is available in the radiotherapy unit (Skill – Module 4) • Know how to use digital information in treatment decisions (skill – Module 4) • Be able to apply different types of digital interventions in cancer patient surveillance (Skill – Module 4)	
Digital solutions in cancer care	knows digital tools relevant for one's own practice.	demonstrates technical and computer proficiency.	sees digital solutions as part of one's work.

	updates own knowledge on developments of digital solutions. critically evaluates existing digital solutions and considers options and further development of eHealth. understands fundamentals of AI and its latest developments and clinical validation of AI applications. • Describe the digital tools and AI commonly used in oncology, its latest developments and possibilities in cancer diagnostics (Knowledge – Module 4) • Be able to explain how AI methodology has been introduced in radiation oncology, latest developments and	uses efficiently and correctly the digital tools relevant for own practice. identifies technical problems when operating devices and using digital environments and is able to solve them. critically evaluates the feasibility of digital tools in cancer care. creates and edits digital content in different formats. uses digital tools and technologies to create knowledge and innovate future processes. • Be able to apply new education technology (apps, available software) in cancer care education (Skills-Module 1) • Be able to adopt digital tools and AI technology that are used in cancer	demonstrates willingness to learn new digital solutions. • Understand benefits and barriers of using different types of digital interventions, digital tools and AI as part of cancer care (Attitude – Overall Module 4) • Understand the value of digital tools and AI Technology in cancer diagnostics (Attitude – Module 4) • Will understand the value of digital decision support systems and how these systems work in cancer treatment and prevention. (Attitude – Module 4)

	possibilities in modern radiotherapy planning (Knowledge – Module 4) • Be able to describe the basics of genomics, particularly as it relates to cancer. (Knowledge – Module 4) • Be able to describe current digital interventions commonly used in oncology and latest developments in cancer patient surveillance (Knowledge – Module 4)	diagnostics when available in their work unit (Skill – Module 4) • Be able to apply remote monitoring and eConsultations to their oncology nursing practice (Skill – Module 3) • Be able to Interpret digital genomic data, which may include DNA sequencing results and genetic risk assessments and how to integrate this data into patient care, treatment decisions, and prevention strategies. (Skill – Module 5) • Know how to use digital information in treatment decisions (skill – Module 4)	
Safety and ethics related to digital	to understand risks and threats in digital environments.	ensuring privacy, technology check and technology back-up plan.	demonstrates a positive attitude in seeking out appropriate and innovative digital technologies to enhance learning for self and others.

solutions and data management	knows the safety and security measures of own organisation. understands how to use and share personally identifiable information while being able to protect privacy of oneself and others. is aware of the environmental impact of digital technologies and their use. understands and acts upon appropriate guidelines, protocols, regulations, and safeguards in the use of health data and content to meet legal, ethical, cultural and security rules, requirements, and expectations. understands the guidelines, regulations and best practices when working with personal, public, professional and/or confidential information, data, and content.	protects personal data and privacy in digital care environments. avoids health-risks and threats to physical and psychological well-being while using digital technologies. recognises and act upon digital situations and events that might compromise personal, professional, or organisational security. • Know how to safely and securely use digital information in treatment decisions (skill – Module 4) • Be able to assess the effects of mobile health (mHealth) apps on patients' self-efficacy in the advance care planning process, considering both enablers and barriers factors to their use (Attitude-module 2)	provides collegial and organisational support for building positive experiences in virtual cancer care. demonstrates ethical, positive, healthy, and appropriate attitudes and behaviours in relation to digital identity, wellbeing and safety of self and others. • Understand the value of digital tools and AI Technology in cancer diagnostics (Attitude – Module 4) • Be able to recognize the value of AI methods prospects in radiotherapy planning (Attitude – Module 4) • Understand benefits and barriers of real-world data for making treatment decisions (Attitude – Module 4)

	• Be able to apply skills in diverse digital communication and collaboration strategies, securely and effectively at local, national, and international levels and capable of facilitating the use of digital tools for patient care during various crises that may affect cancer care. (Skills – Overall Module 5) • Understand the basics of cybersecurity as essential to protect patient data (Attitude – Module 1)		

Appendix 4. Template for modules and submodules

<u>Template for Submodule –Please follow the format below when writing your submodules</u>

Submodule name:

A submodule of the following module:

Coordinator:

Partner organizations:

Target group:

Level of education: EQF level 7 (See 'Clarification of Terminology' in WP3 files)

Learning outcomes for the submodule: (See below guidance on writing learning outcomes)

1.	By the end of this submodule,
2.	By the end of this submodule,
3.	By the end of this submodule,

Main Content of the submodule (i.e. what students will learn)

Content	How much time will be spent on this content

Teaching and learning methods (what methods will be used in the submodule)

Assessment methods

Template for (full) Module –[Please follow the format below when writing your module]

Module name:

Module coordinator:

Submodules	**Partner Organisations**

Target group:

Level of education: EQF 7

Credits:

ECTS (Nursing)	**CME** (Medicine)	**Micro credential** (Non-Clinical Professionals)

(See Micro-credentials (MC) Equivalence document)

Learning outcomes of the full module (max 2-3)
• **Use clear statements with bullet points when writing module learning outcomes** • **The module learning outcomes should integrate all submodules' learning outcomes** • **Each learning outcome should be a clear statement of what a learner is expected to be able to do *(skills)*, know about *(knowledge)* and/or value *(responsibility and autonomy)* at the completion of a unit of study** • **Learning outcomes should be action phrased: i.e. Remembering, understanding, applying, analysing, evaluating, creating (Based on Bloom's taxonomy; see below an adaptation of Bloom's taxonomy which provides guidance on writing learning outcomes).** • **Check the document named European Qualification Framework in WP3 files (pp.18-19)**
Teaching and learning methods (what methods are used in the module)

Assessment methods used in the module
Time equivalent for module will be agreed when content and methods confirmed

Guidance on writing learning outcomes:

A) A learning outcome is:

- A clear statement of what a learner is expected to be able to do ***(skills)***, know about ***(knowledge)*** and/or value ***(responsibility and autonomy)*** at the completion of a unit of study
- Is action phrased: i.e. Remembering, understanding, applying, analysing, evaluating, creating (Based on Bloom's taxonomy; see below an adaptation of Bloom's taxonomy which provides guidance on writing learning outcomes).

B) There should be a maximum of 4 learning outcomes per submodule

Bloom's Taxonomy (Adapted)

	Activities	**Action Verbs**	**Suggested Assessments**
1. **REMEMBER**-Retrieve relevant knowledge from long-term memory (The ability to recall previously learned material)			
1.1 Recognizing 1.2 Recalling	Lecture Visuals Video Audio Examples Illustrations Analogies	Arrange Define Identity Label List Order Outline Recall State	Quizzes with multiple choice Fill in the blank questions

2. **UNDERSTAND**- Construct meaning from instructional messages, including oral, written and graphic communication (The ability to grasp meaning, explain and restate ideas)			
2.1 Interpreting 2.2 Exemplifying 2.3 Classifying 2.4 Summarizing 2.5 Inferring 2.6 Comparing 2.7 Explaining	Questions Discussion Review Test Assessments Reports Learner presentations Writing	Classify Explain Give example Restate Summarise Illustrate Match Classify	Short-answer questions Comparison chart Mapping concepts
3. **APPLY-** Carry out or use a procedure in a given situation (The ability to use learned material in new situations)			
3.1 Executing 3.2 Implementing	Practice exercises Demonstrations Projects Sketches Simulations Role play Teach back	Choose Dramatize Explain Organise	Simulation Case studies Problem solving
4. **Analyze-** Break materials into constituent parts and determine how the parts relate to one another and to an overall structure or purpose (The ability to separate material into component parts and show relationships between parts)			
4.1 Differentiating 4.2 Organising 4.3 Attributing	Problems Exercises Case studies Discussions Questions Test	Categorise Classify Compare Differentiate Distinguish Point out Select Subdivide Survey	Case studies Debate Discussions Presentations
5. **Evaluate-**Make judgements based on criteria and standards (The ability to judge the worth of material against stated criteria)			
5.1 Checking 5.2 Assessing 5.3 Critiquing 5.4 Concluding	Projects Problems Case studies Simulations Appraisals Critiques Debates	Appraise Judge Criticise Defend Compare	Projects Case studies Appraisals Critiques

6. **Create-**Put elements together to form a coherent or functional whole; recognise elements into a new pattern or structure (The ability to put together the separate idea to form a new whole)			
6.1 Generating 6.2 Planning 6.3 Producing 6.4 Designing 6.5 Constructing	Develop plans Creative exercises Projects Constructs	Construct Create Design Formulate Hypothesise Invent Make up Originate Plan Produce	Projects Presentations Guidelines

Adapted from:

Hokkanen, L. *Bloom Taxonomy Action Verbs and Activities.* Licenced under Creative Commons Attribution-Non Commercial 4.0 International Licence.

Anderson, L.W. (2014) *A taxonomy for Learning, Teaching, and Assessing: A revision of Bloom's*. Pearson, Essex, UK.

Appendix 5. Project team members responsible for each submodule

COO= coordinator of the submodule, BEN= Beneficiary working on the submodule

Code	MODULE 1: Train the Trainees	Teams
1.1	Pedagogical Approaches on Digital Health Literacy and Education	UTU (COO), Turku UAS (BEN)
1.2	Blended Learning Approach in the Era of Digitalisation	GAL (COO)
1.3	The Future Operating Environments and Education Technology	Turku UAS (COO),
1.4	Remote Learning and Teaching in Oncology	GAL (COO)
1.5	Virtual Reality and Simulation in Post-pandemic World	TURKU UAS (COO)
1.6	Digital skills – the Educator's toolkit	Turku UAS (COO), UOC (BEN)
1.7	Interprofessional Education in the Support of Digitalization of Oncology Services	Turku UAS (COO)
	MODULE 2: Interprofessional education	
2.1	Communication Training for HCPs in Digital Care Environment (HCP and patient coms.)	Turku UAS (COO), CSF (BEN)
2.2	Advance Care Planning and Digital self-management support in cancer. (revised, new title)	ICO (COO), CSF (BEN)
2.3	Digitalised Interprofessional Work Models in Cancer Care	THL (COO)

	MODULE 3: Cancer Nurses	
3.1	Person-centred Care and Digital Self-Management Support in Cancer	Turku UAS (BEN), ICO(BEN) EONS(BEN)
3.2	Patient Involvement on PROMs and PREMs for care and management (health data base) (Revised, new title)	GAL (COO), NCCP (BEN), ICO (BEN), EONS(BEN)
3.3	Remote Monitoring and eConsultation in oncology nursing practice (Nurse to Nurse consultation services)	Turku UAS (COO), ICO(BEN) EONS(BEN)
	MODULE 4: Specialists (clinical oncology, radiology, surgery) and general medicine	
4.1	Digital tools and artificial intelligence (AI) technology in cancer diagnostics	TUH(COO), Turku UAS (BEN)
4.2	AI methodology as a part of modern radiotherapy planning	TUH(COO)
4.3	Digital decision supporting systems as working environments in implementing genomics to cancer treatment and prevention (Tumor DNA as well as genetic risk for hereditary cancer).	TUH (COO), THL (BEN), Turku UAS(BEN), ICO(BEN)
4.4	Electronic patients records and real-world data in supporting treatment decisions	TUH (COO), ICO (BEN)
4.5	eHealth and digital tools in patient surveillance	TUH (COO), ICO (BEN)
	MODULE 5: Non-clinical staff working in health systems and/or health authorities and or ? non-governmental organisation	
5.1	Cancer Organisations in Digital Cancer Journey	CSF (COO), ICO (BEN)
5.2	Collaborative models in building organisation resilience in Oncology	THL (COO)

5.3	European Crises Response Model in Oncology	ECO (COO)
5.4	Digital Support in Health Care System Resilience and Leadership (Utilization of Data pools in Clinical Settings and Leadership)	TUH (COO), Turku UAS (BEN)