Train4Health

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White paper for implementation of education on behaviour change support in chronic disease

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Pushing the boundaries of behaviour change support education in chronic disease

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Infographic Summary

RECOMMENDATIONS FOR IMPLEMENTATION OF TRAIN4HEALTH EDUCATIONAL PRODUCTS

ACADEMIC EDUCATORS

1.1 **Assess the fit with students' knowledge, needs and preferences**

Assess the degree to which the Train4Health educational products match with students' knowledge, needs and preferences.

1.2 **Make the best use of available resources**

Use the Train4Health resources in its full potential to build capacity on behaviour change support education.

1.3 **Use a stepwise approach that engages students**

Start with small steps and expand based on monitoring that actively involves students.

1.4 **Seek a support network**

Engage with the user community and peers.

STUDENTS

2.1 **Pursue independent study in behaviour change support in chronic disease**

Use the Train4Health MOOC and simulation software independently.

ACADEMIC LEADERS

3.1 **Provide incentives to implementation**

Allocate human, material and financial resources to facilitate innovation in teaching and learning.

3.2 **Reward independent use by students**

Create incentives for students to use the Train4Health MOOC.

Introduction

Background

Chronic diseases are a worldwide problem, responsible for 71% of all deaths globally (WHO, 2022). The impact of chronic diseases and the paradigm of person-centred care are key factors contributing to the wide endorsement of self-management, defined as "tasks performed by an individual to minimise the impact of one's disease, with or without the support of health professionals (Lorig & Holman, 2003).

Lifestyle and clinical management (e.g., medication use and adherence) have been listed as expected self-management behaviours in taxonomy of self-management interventions for chronic conditions (Orrego et al., 2021). Further, this taxonomy lists health and other professionals as providers of self-management interventions, using support techniques to help patients coping with stress and changing behaviour (Orrego et al., 2021). Knowledge and skills underpinning these competencies should be gained in undergraduate education.

Digital education, endorsed by the European Union (2021), offers multiple avenues for enabling student-centred learning. A systematic review on digital tools in behaviour change support education (Gosak et al., 2022) uncovered a relatively small number of studies (n=15) in nursing, sports science, and pharmacy students, albeit with promising results in terms of, for example, self-confidence, practical experience and skills.

The Train4Health project

The Train4Health (https://www.train4health.eu) is a European Union funded partnership among six European higher education institutions (HEIs) and the European Students' Union. Consortium partners are spread across five countries (Portugal, Ireland, Slovenia, the Netherlands, and Belgium) and involved in the education of nursing, pharmacy, and sports science students. The project aims to improve students' competencies on behaviour change support, to effectively promote self-care[1] in people with chronic diseases.

As depicted in Figure 1, firstly a European competency framework for health and other professionals to support behaviour change in persons self-managing chronic disease was

[1] Self-care is a broader concept than self-management, involving all actions of the person to manage his or her own health with or without a long-term condition (Jones et al., 2011). In the project context, self-care in people with chronic disease refers to self-management of chronic disease, and therefore this term was used at an operational level.

developed (Guerreiro et al., 2021). The competency framework was linked to a learning outcomes-based curriculum (Cadogan et al., 2021), which then informed the development of three novel educational products: case studies, a Massive Open Online Course (MOOC) and a simulation software with virtual humans.

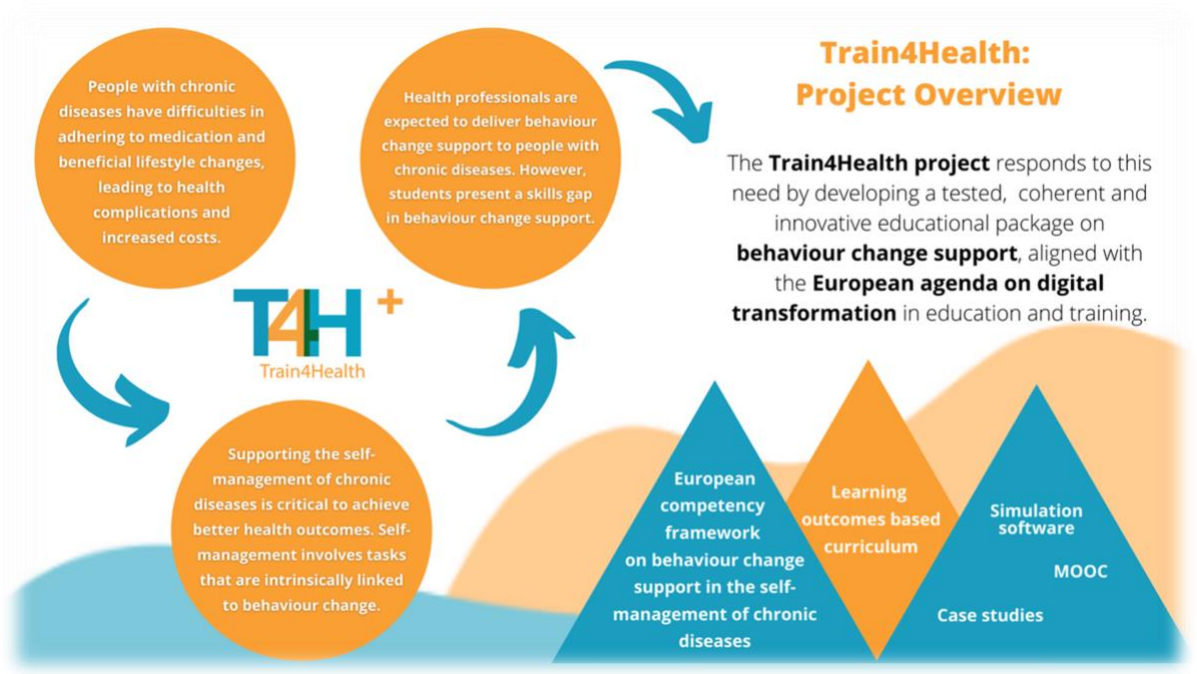


Figure 1 | Overview of the Train4Health project

Activity 4.3, part of work package 4 of the project, addressed recommendations for implementation of the educational products, which are summarised in this White Paper.

Data underpinning recommendations for implementation of behaviour change support education in chronic disease

In the project context, implementation of behaviour change support education in chronic disease was conceptualised as the adoption and sustained use of the Train4Health educational products, as part of a learning outcomes-based curriculum.

Data for recommendations were gathered from different sources, as depicted in Figure 2. These data were integrated through the lens of learnings gained by the authors with testing of the Train4Health products, early adoption and interaction with the early adopters community.

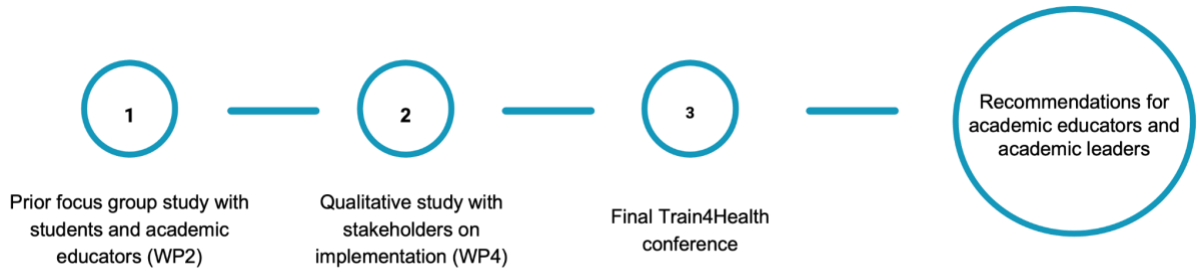


Figure 2 | Data sources for the White Paper

Twelve focus groups with a total of 39 students and 27 academic educators were held[2] as part of work package 2 (Figure 3). The study aim was to define unmet needs and requirements for the Train4Health educational products on behaviour change support. The topic guide included questions on implementation aspects; data elicited with these questions were considered for the White Paper.

[2] Approval was granted by the Ethics Committee of IPSantarém (reference number: 092020Desporto).

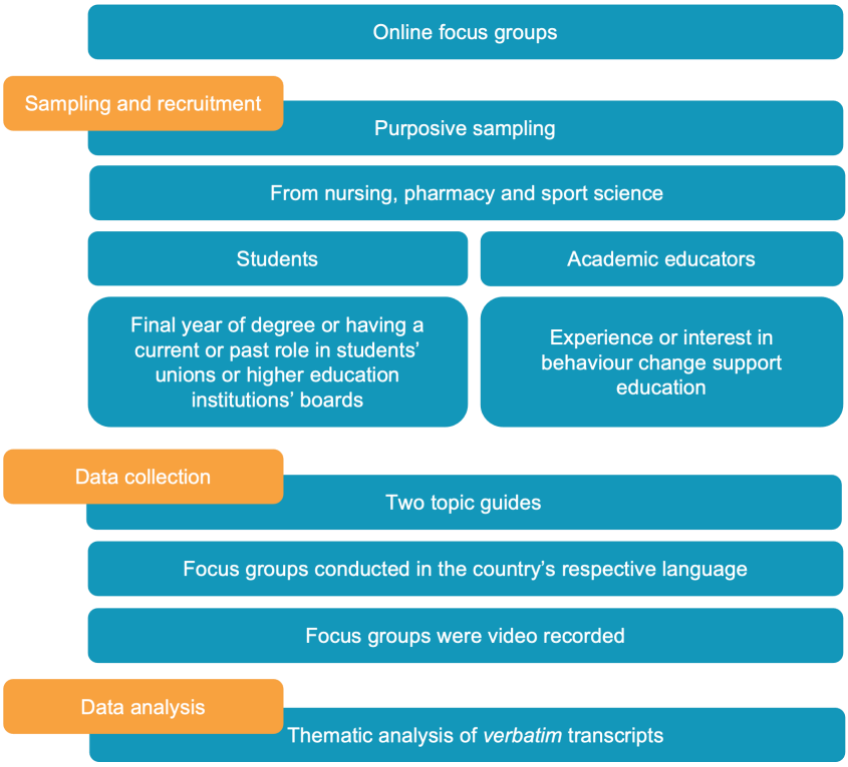


Figure 3 | Overview of methods of the prior focus group study (WP2)

After the development and testing phases, stakeholders who were users or potential users of the Train4Health products were asked about their perspectives on implementation. This study is detailed in the next section.

Finally, the Train4Health final conference, corresponding to the second multiplier event of the project, was used to discuss perspectives and learnings on implementation. This encompassed a round table, in which preliminary findings of the qualitative study (WP4) were presented by the Train4Health team and commented by representatives of educators (European Federation of Educators in Nursing Science) and students (European Pharmaceutical Students' Association). It also encompassed a session in which two early adopters[3] shared their experiences with the Train4Health products in a partner institution (ESEL) and a higher education institution outside the consortium (Faculty of Pharmacy, University of Marmara, Turkey).

[3] The **Train4Health Early Adopters Programme** seeks to engage educators or institutions in the early adoption of the project educational products. Envisaged benefits for early adopters include the opportunity for implementing innovative products in behaviour change support education in chronic disease and streamlining the digital transformation of teaching and learning. Early adopters are expected to contribute to educational products testing and iterative improvement, and to provide input to the project White Paper on implementation. For more information, see the project website (https://www.train4health.eu/).

Qualitative study with stakeholders on implementation

A literature search on implementation theories, models and frameworks was conducted to inform this study (Nilsen, 2015). The search uncovered approaches such as the RE-AIM framework (Glasgow et al., 1999; Glasgow et al., 2019) and the PRECEDE-PROCEED model (Green, 2005), which have been employed in the implementation of health interventions. Other approaches, such as Intervention Mapping (Fernandez et al. 2019) and the Planning and Evaluation Framework of the Middlesex-London Health Unit, have been used to develop implementation strategies. Further, the Theoretical Domains Framework (TDF) (Atkins et al., 2017) and the Capability, Opportunity, Motivation and Behaviour (COM-B) model (Michie et al., 2011) have been used to understand factors and behaviours relating to implementation (Atkins, 2017, Nilsen, 2015).

The reasons for selecting the COM-B model (Michie et al., 2011) and the TDF (Cane et al., 2012) to guide this study are three-fold. Firstly, no compelling reasons were found to select a particular approach to implementation. Secondly, the Train4Health is a capacity building project for students, and not a health intervention *per se*. Finally, there was expertise among team members in applying the COM-B model and the TDF.

The COM-B model posits that a behaviour occurs when a person is physically and psychologically capable to perform the behaviour (C), has the opportunity (O) to engage in the behaviour and is motivated (M) to demonstrate it (Michie et al., 2011). This model recognises that behaviour is influenced by many factors, and that behaviour changes are induced by modifying at least one of these components (capability, opportunity and motivation).

The Theoretical Domains Framework (TDF) is an integrative framework synthesising key theoretical constructs used in relevant theories, represented by 14 domains (e.g., knowledge, skills, goals) (Cane et al., 2012). TDF provides a more granular understanding of factors influencing the behaviour and can be linked to the COM-B model (Michie et al., 2014).

In the current study, “the behaviour” was conceptualised as adopting the Train4Health educational products; the COM-B model and the TDF were used to explore factors influencing this behaviour.

An overview of the qualitative study[4] with stakeholders on implementation is presented in Figure 4.

[4] Approval was granted from the Commission for Ethical Issues in Nursing at the Faculty of Health Sciences, University of Maribor (number: 05/2I-2021).

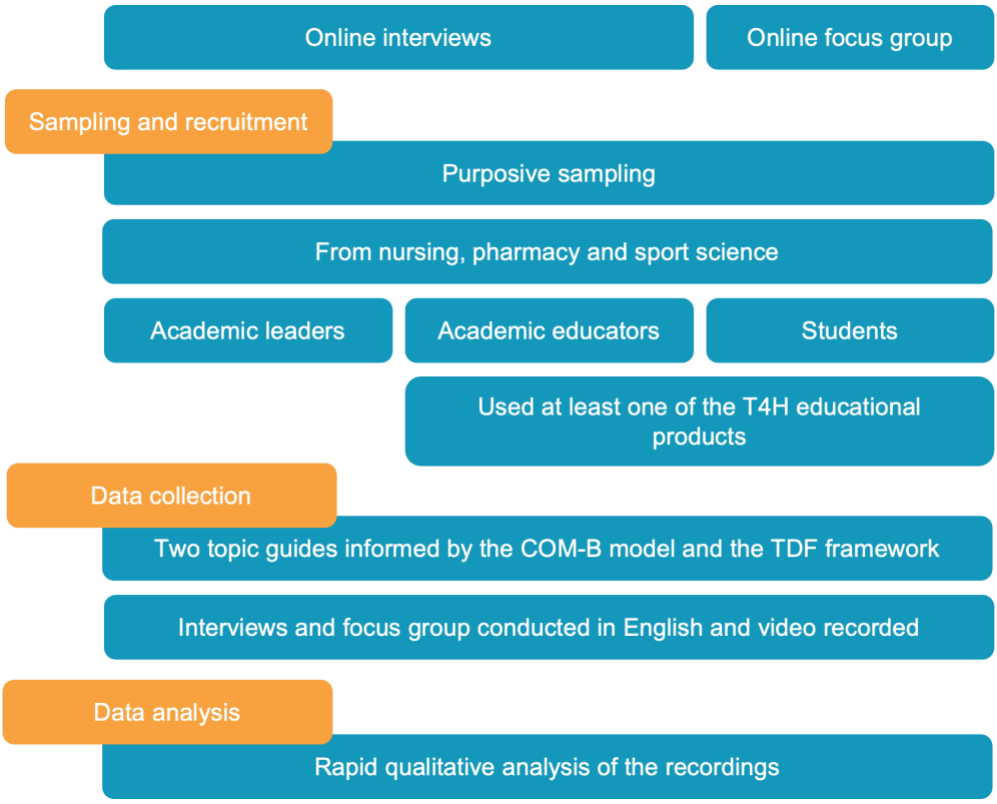


Figure 4 | Overview of methods of the qualitative study with stakeholders (WP4)

Sampling and recruitment

Purposive sampling of European academic leaders, academic educators and students was used. To ensure informed opinions, academic educators and students from nursing, pharmacy or sport science, who had to have experience with the Train4Health case studies, were recruited. The criteria for recruiting academic leaders were having a current leader role in higher education institutions in nursing, pharmacy or sport science.

Semi-structured online interviews were chosen to collect educators and academic leaders' views, as this technique allows more in-depth exploration of topics (Rossetto, 2014) and is flexible for one-to-one scheduling.

Based on learnings gained in a prior study (WP2), an online focus group was selected for students, as interaction among participants was deemed to result in richer data (Stalmeijer et al., 2014; Traynor, 2015).

For the focus group, a minimum of five participants was sought (Guest, Namey, & McKenna, 2017). Seven interviews with academic leaders and educators and a focus group with students were conducted (Table 1).

Table 1 | Characteristics of participants in the qualitative study

Participant interview	Role	Country	Area of Expertise
TU-AE-P	Academic educator/ early adopter	Turkey	Pharmacy
SL-AE-N1	Academic educator	Slovenia	Nursing
NL-AE-SS	Academic educator	Netherlands	Sport Sciences
GR-AL-N	Academic leader	Greece	Nursing
MA-AL-N	Academic leader	Malta	Nursing
SL-AE-N2	Academic educator	Slovenia	Nursing
PT-AE-N	Academic educator	Portugal	Nursing
Participant focus group	**Role**	**Country**	**Area of education**
PT-S-N	Student	Portugal	Nursing
TU-S-P1	Student	Turkey	Pharmacy
TU-S-P2	Student	Turkey	Pharmacy
TU-S-P3	Student	Turkey	Pharmacy
SL-S-N	Student	Slovenia/ Montenegro	Nursing

Abbreviations: TU: Turkey; SL: Slovenia; NL: Netherlands; GR: Greece; MA: Malta; PT: Portugal; AL: academic leader; AE: academic educator; S: student; N: nursing; P: pharmacy; SS: sports science

Participants were recruited with the aid of consortium partners, including members of the Train4Health early adopters programme. All participants signed an informed consent form.

Personal data were processed in compliance with General Data Protection Regulation (GDPR) from each site.

Developing the data collection instrument

Topic guides for academic leaders, academic educators and students were informed by the COM-B and the TDF.

Table 2 | Examples of topic guide questions (A4.3)

Topic guide in relation to the COM-B components and TDF domains		
Academic leaders	Academic educators	Students
What strategies would you recommend fostering implementation of the T4H educational products in Higher Education Institutions? *(Opportunity | Environmental Context and Resources)*	What knowledge and skills are needed for an academic educator to use the T4H educational products? *(Capability | Knowledge and Skills)*	What are the positive and negative aspects of using the T4H educational products? *(Motivation | Belief about consequences)*

The topic guide was discussed within the A4.3 team, pre-tested with two team members of the larger Train4Health team, and adapted based on the feedback received.

Data collection

Interviews and the focus group session were conducted online using videoconference technology (e.g., MS Teams). This approach allowed data collection in real time from geographically dispersed participants, whilst securing fruitful interaction between participants and the researcher (Tuttas, 2015; Flynn et al., 2018).

Recordings and data were stored securely in a protected folder with restricted access. Only the A4.3 team had access to these data.

Data analysis

The interviews and focus group conversations were analysed thematically, using a rapid mapping approach (Green & Thorogood, 2017).

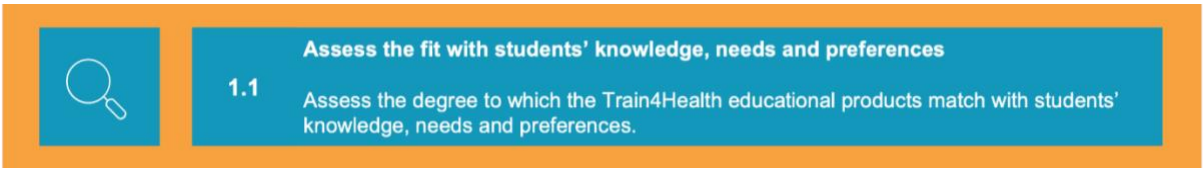
First, the interviews recordings were reviewed by two team members (LG and KB), to become familiar with the data. Thereafter, notes were made, and time stamped; similarities and differences between the accounts of interviewees were then identified, leading to the generation of themes. These themes were then discussed in light of the remaining data sources (Figure 2) and recommendations were agreed on.

To enhance value for readers we decided to report recommendations based on the group of stakeholders to which they will matter most: academic educators, who typically can decide on changes in the modules they are responsible for, students and academic leaders.

Recommendations for implementation of education on behaviour change support in chronic disease

1. Recommendations for educators

1.1 Assess the fit with students' knowledge, needs and preferences



Behaviour change support education is placed in different stages of the students' learning journey, depending on factors such as the country and discipline; further, implementation may be pursued at a larger scale (e.g., entire degree) or a smaller scale (e.g., single module or parts of a module). To implement the Train4Health educational products in a specific setting, academic educators are advised to consider:

- Whether students have achieved foundational learning outcomes in behaviour change support education.
- Students' needs in relation to learning outcomes they should master to be adequately equipped to practice.
- Students' preferences concerning instructional methods and their learning journey.

Firstly, to ensure a smooth learning journey for students, existing knowledge of foundational topics in behaviour change support education should be considered. This includes knowledge of clinical hallmarks, progression and complications of selected chronic diseases, as well as effective communication in practice. Implementing behaviour change support education in chronic disease in the absence of this background knowledge requires additional content topics, which may aggravate cognitive load and jeopardise the achievement of behaviour change learning outcomes.

> *"I think in the basics we need knowledge about the diseases, about chronic diseases and the focus on the patients' needs." (SL-AE-N1, WP4)*

Secondly, adoption of the Train4Health products should consider students' needs in relation to expected learning outcomes and behaviour change competencies, as set by professional standards or, at a more granular level, by the European Competency Framework for health and other professionals (Guerreiro et al., 2021).

> *" (...) the presented situation [in the case study] is sometimes quite complex for first year or second year students. It needs to fit to support the students in achieving the desired learning objectives." (SL-AE-N2, WP4)*

This can be pursued by becoming knowledgeable about the features of the Train4Health educational products and the learning outcomes they can contribute to. Appendix 1 presents an overview of case studies, the MOOC and the simulation software with virtual humans; more information can be found in the "resources" tab of the Train4Health website.

For instance, the MOOC offers convenient self-paced learning for achieving lower-level cognitive learning outcomes. For higher level cognitive learning outcomes, involving application and evaluation, case studies provide a starting point using interactive group work.

> *"When we start an internship, we usually don't have experience to discuss things in real cases, case studies help us to understand more what we need to know to assess the person in the right way. It helps students to strengthen their knowledge and gives them background to use in a real case". (PT-S-N, WP4)*

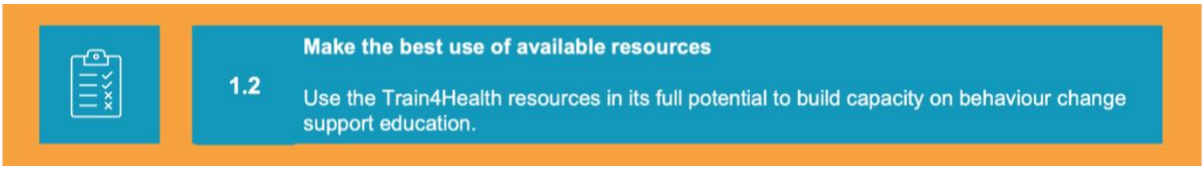
The simulation software may be ideal for training person-centred behaviour change communication by single students, without time and place restrictions.

> *"The use of the Train4Health products and virtual reality technology matches student-centred approaches and needs in blended education, which is embraced even faster nowadays, since students became used to computer-based learning as a result of the COVID-19 pandemic." (TU-AE-N, T4H Final conference)*

Thirdly, adoption of the Train4Health products should consider students' preferences concerning instructional methods and their learning journey. This may be unknown at the very beginning of the implementation process but monitoring data can help unveiling these preferences (see recommendation 1.3).

> *"I think that people could still have the flexibility to choose the way to go, because people have different learning times and some people will be more comfortable in having, for example, the theoretical approach with the MOOC and then move on with the case study and the simulation, while some people, [may wish to try] the case studies or the simulation before going the other way, (...) if there could be flexibility that would be nice."* (EUSN13, WP2)

1.2 Make the best use of available resources



To implement the Train4Health products, academic educators are advised to build capacity on behaviour change support education, by getting familiar with these products and their approach to content topics. For example, this may involve completing the full MOOC and engaging in meaningful use of the simulation software.

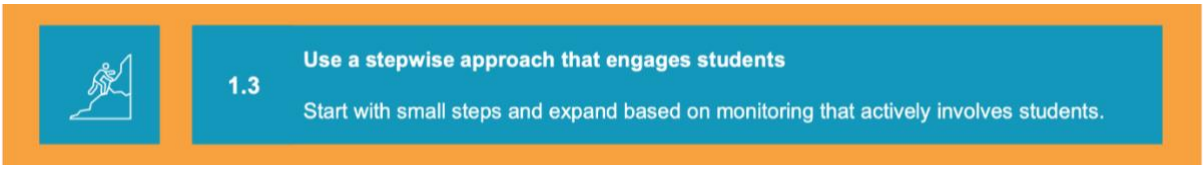
> *"This is a very comprehensive programme…we do need… whoever is going to implement it will need many skills and knowledge on the topic and educational products."* (EUAEN4, WP2)

Toolkits have been developed to help academic educators using case studies in-class; they offer an overview of persons' profiles and their complexity and present guidance and tips.

Further, the book "A Practical on behaviour change support for self-managing chronic disease" (ISBN 978-3-031-20009-0) can support the preparation of answers to selected questions for group work. This exercise, followed by reflection on different viewpoints provided by students, is also a strategy for building capacity on behaviour change support education.

> *"You need quite advanced knowledge on changing behaviour"* (NL-AE-SS, WP4)

1.3 Use a stepwise approach that engages students



To implement the Train4Health educational products in a specific setting, academic educators are advised to:

- Consider resources required.
- Monitor implementation.

The demands of adopting and managing change in curricula or instructional methods can exceed the available resources, which encompasses not only human resources but infrastructure (e.g., classrooms facilitating group work) and facilities (e.g., WiFi coverage, students' access to mobile devices or laptops). Demands, particularly those related to educators' workload, can be influenced by aspects such as their experience, instructional methods in place and permeation of digital education. For instance, those more experienced in behaviour change support education may take less time to implement the Train4Health products; adopting the Train4Health case studies in-class may be facilitated if case-based learning in groups is already used.

"(...) we have to have facilities where students can work…having group work or where they can access (...) to a computer". (PTAEP5, WP2)

To keep demands manageable, a stepwise approach is recommended. A practical example is incorporating one Train4Health product in one or two sessions of a module and then expanding based on monitoring processes that actively involve students.

"When you have influence in your own module, you can use the products in just one session, or two or three sessions and pick one of the cases (...) If you want to use the full package of the products, this will mean a substantial change in the curriculum in which you need all the colleagues. Then the implementation of the products needs frontrunners and people who have the influence to change the curriculum. (…) You then need to go through the procedural steps of changing the curriculum and that will take much longer than using the products as parts at the start." (NL-AE-SS, WP4)

As described in the case studies toolkits, this product can be used in a flexible fashion. Questions for group work can be selected based on expected learning outcomes, contact hours and time for independent study, and expanded, by adding additional tasks or questions. It is also important to bear in mind that the Train4Health educational products are open-access, under a Creative Commons attribution, which allows adapting or remixing, provided that the output is licensed under the same attribution.

The MOOC and the simulation software offer less flexibility for sectoral use, as both require the completion of early parts to progress to additional content.

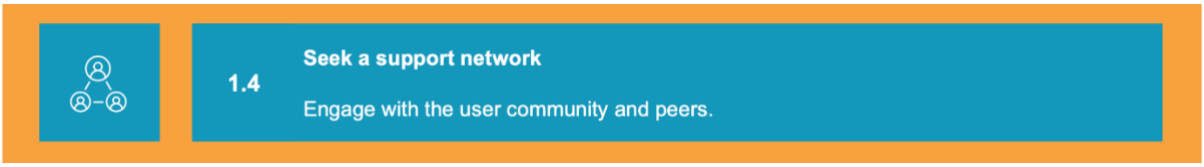
Assessment data is one of the inputs for monitoring. Assessment in the form of scores is provided by the MOOC and the simulation software whilst assessment criteria have been developed for in-class use of case studies (see case studies toolkits). These may be supplemented or replaced with assessment modalities chosen by educators.

> *"[we can monitor the effect] in two ways. In sort of formal assessment when we can see wider, they have knowledge on a higher cognitive level. And reflection tasks to see if they have a different view and change their view." (NL-AE-SS, WP4)*

Other suggested monitoring inputs from students is their feedback, either informally (e.g., by debriefing at the end of a class) or through surveys or other inquiry methods.

From the educators' side, monitoring may encompass perceptions on the use and estimates of the workload involved.

1.4 Seek a support network



Implementing the Train4Health educational products will predictably lead to issues and doubts. To smooth this process, academic educators are advised to seek a support network. This is expected to contribute to capacity building and increase motivation.

One form of support network is the user community, which can be intramural (e.g., Colleagues in the educator's institution) or transmural (e.g., members of the early adopters programme - see the Train4Health website). This community can provide a space to air doubts and shared learnings gained from the experience of other educators.

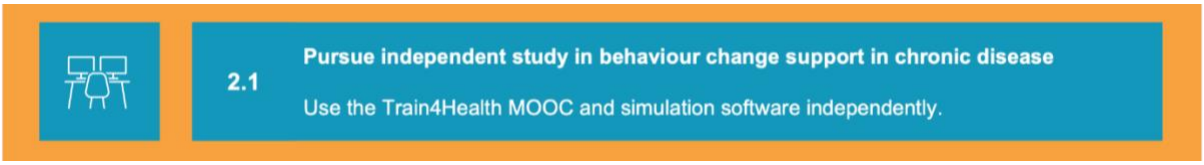
"We need to share experiences." (TU-AE-P, WP4)

Like a community with a contact person where you can clarify some doubts if you have it, like an online community, like a form, where you can put your doubts and someone share their experience about the use of the tools (PT-AE-N, WP4).

For matters related to instructional aspects only, which are not content-specific (i.e., not related to behaviour change support), the support network can include peers not belonging to the user community, or institutional support structures (e.g., teaching and learning centres, pedagogical support offices).

2. Recommendations for students

2.1 Pursue independent study in behaviour change support in chronic disease



Both the MOOC and the simulation software offer self-paced learning without time and place restrictions. Students are advised to use these products for:

- Independent study related to curriculum subjects or
- Supplementary education on behaviour change support.

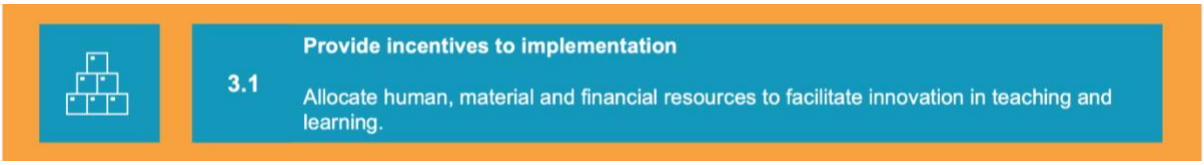
"The MOOC (...) I think it's also a very handy method, as we managed to have more material to work at home and we managed to have a much more beneficial independent study (...)." (PTSN14, WP2)

The MOOC and the simulation software address seven chronic diseases considered "high priority" for self-management: type 2 diabetes, chronic obstructive pulmonary disease, obesity, heart failure, asthma, hypertension and ischemic heart disease.

Students should be cognisant that foundational knowledge on aspects such as clinical hallmarks, progression and complications of these chronic diseases is required to achieve learning outcomes using the MOOC and the simulation software, as well as knowledge and skills on effective communication in practice. The stage at which students gain this foundational knowledge depends on their course and the higher education institution attended.

3. Recommendations for academic leaders

3.1 Provide incentives to implementation



As previously mentioned, the demands of adopting and managing change in curricula or instructional methods can exceed the resources educators have (e.g., time, infrastructure, facilities). Academic leaders typically have the power to decide on the allocation of human, material and financial resources, and can therefore hugely influence innovation in teaching and learning. As part of this overarching objective, academic leaders are advised to facilitate the implementation of the Train4Health educational products by, for example, keeping the workload of educators manageable, reengineering classrooms for group work and providing facilities for digital education (e.g., WiFi coverage, access to plug sockets or power banks). Financial resources can also be used to fund awards on innovation in teaching and learning, which may increase educators' motivation to adopt the Train4Health educational products.

> *"(...) the academic staff has to have the time."* (EUAESS6, WP2)

Academic leaders are also advised to provide a support network for educators embracing innovation. This can take the form of adequately staffed teaching and learning centres or pedagogical support offices. It can also take the form of a train the trainer programme, in which educators receive training from experts on behaviour change support, to enable them to go on to train other educators within their institutions.

3.2 Reward independent use by students

3.2 Reward independent use by students

Create incentives for students to use the Train4Health MOOC.

Some students are keen to pursue education beyond what is offered by the course curriculum. The Train4Health MOOC offers an opportunity for independent study and issues a certificate for those who successfully complete it.

Academic leaders are advised to allow this certificate to be evidenced as a diploma supplement.

"The certificate can help you because you can put it in your cv ..." (SL-S-N, WP4)

Concluding remarks

This report outlines the work undertaken for obtaining recommendations for implementing the Train4Health educational products. It presents a total of seven recommendations, targeting academic educators (4 recommendations), academic leaders (2 recommendations) and students (1 recommendation). These recommendations are expected to raise awareness in higher education institutions about the need to change teaching and learning in behaviour change support in chronic disease. Raising awareness on this topic may ultimately contribute to improve behaviour change education in other areas, such as primary prevention. Moreover, this White Paper is also expected to contribute to the efficient use of the Train4Health products by European higher education institutions.

Data underpinning recommendations was provided by academic educators, academic leaders and students in nursing, pharmacy, and sport science, from a range of countries, ensuring transferability to much broader audiences than the Train4Health consortium. The Train4health educational package is transferable to other disciplines, as shown by case studies testing, which encompassed a broader range of disciplines, and by the “Transforming Health Education” agreement, a sustainability and exploitation initiative of the Train4Health project, signed by European students’ representatives in dentistry, medicine, nursing, pharmacy, and psychology. Therefore, recommendations presented in this White Paper may be equally useful for stakeholders in disciplines other than nursing, pharmacy, and sport science.

Recommendations provided in this White Paper suggest that implementation is influenced by individual factors of educators (e.g., knowledge and skills, motivation) and factors pertaining to the environment in which they work, including financial and material resources, and interactions with other people in the organisation. Tackling both individual and environmental factors is more likely to be successful in fostering large scale implementation.

Notably, the paradigm of students as partners in teaching and learning, implies that students and academic educators work in collaboration. Students, when actively engaged in decision-making processes about teaching and learning, can influence the adoption of the Train4Health products, leading to a more effective behaviour change education in chronic disease in course curricula.

References

Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., Foy, R., Duncan, E. M., Colquhoun, H., Grimshaw, J. M., Lawton, R., & Michie, S. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation science: IS, 12*(1), 77. https://doi.org/10.1186/s13012-017-0605-9

Cadogan, C., Strawbridge, J., Cavaco, A., Kerkstra, A., Baixinho, C., Félix, I. B., Marques, M. M., & Guerreiro, M. P. (2021). *Report on the development of a European competency framework for health and other professionals to support behaviour change in the self-management of chronic disease and the associated learning outcomes-based curriculum*. Train4Health Project. ISBN 978-989-53445-0-5

Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation Science, 7*(37), 1–17. https://doi.org/10.1186/1748-5908-7-37

European Union (2021). Digital education action plan (2021-2027). Available at https://ec.europa.eu/

Fernandez, M. E., Ruiter, R., Markham, C. M., & Kok, G. (2019). Intervention Mapping: Theory- and Evidence-Based Health Promotion Program Planning: Perspective and Examples. *Frontiers in public health*, *7*, 209. https://doi.org/10.3389/fpubh.2019.00209

Flynn, R., Albrecht, L., & Scott, S. D. (2018). Two approaches to focus group data collection for qualitative health research: Maximizing resources and data quality. *International Journal of Qualitative Methods*, *17*(1), 1–9. https://doi.org/10.1177/1609406917750781

Glasgow, R. E., Harden, S. M., Gaglio, B., Rabin, B., Smith, M. L., Porter, G. C., Ory, M. G., & Estabrooks, P. A. (2019). RE-AIM Planning and Evaluation Framework: Adapting to New Science and Practice With a 20-Year Review. *Frontiers in public health*, *7*, 64. https://doi.org/10.3389/fpubh.2019.00064

Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American journal of public health*, *89*(9), 1322–1327. https://doi.org/10.2105/ajph.89.9.1322

Gosak, L., Štiglic, G., Budler, L. C., Félix, I. B., Braam, K., Fijačko, N., Guerreiro, M. P., & Lorber, M. (2021). Digital Tools in Behavior Change Support Education in Health and Other Students: A Systematic Review. *Healthcare (Basel, Switzerland)*, *10*(1), 1. https://doi.org/10.3390/healthcare10010001

Green J. & Thorogood N. (2017) *Qualitative methods for health research* (4th edition). London: Sage Publications.

Green, L.W., & Kreuter, M.W. (2005) *Health program planning: an educational and ecological approach.* 4. New York: McGraw-Hill Companies

Guerreiro, M. P., Strawbridge, J., Cavaco, A. M., Félix, I. B., Marques, M. M., & Cadogan, C. (2021). Development of a European competency framework for health and other professionals to support behaviour change in persons self-managing chronic disease. *BMC medical education*, *21*(1), 287. https://doi.org/10.1186/s12909-021-02720-w

Guest, G., Namey, E., & McKenna, K. (2017). How Many Focus Groups Are Enough? Building an Evidence Base for Nonprobability Sample Sizes. *Field Methods*, *29*(1), 3–22. https://doi.org/10.1177/1525822X16639015

Jones, M. C., MacGillivray, S., Kroll, T., Zohoor, A. R., & Connaghan, J. (2011). A thematic analysis of the conceptualisation of self-care, self-management and self-management support in the long-term conditions management literature: A conceptual analysis of self-care. *Journal of Nursing and Healthcare of Chronic Illness*, *3*(3), 174–185. https://doi.org/10.1111/j.1752-9824.2011.01096.x

Lorig, K. R., & Holman, H. R. (2003). Self-management education: History, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*, *26*(1), 1–7. https://doi.org/10.1207/S15324796ABM2601_01

Michie, S., Atkins, L., & West, R. (2014). The Behavior Change Wheel: A Guide To Designing Interventions (First edit). London: Silverback Publishing.

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science: IS*, *6*, 42. https://doi.org/10.1186/1748-5908-6-42

Middlesex-London Health Unit., n.d. Planning and Evaluation Framework. Available at: https://www.healthunit.com/planning-and-evaluation-framework

Nilsen P. (2015). Making sense of implementation theories, models and frameworks. *Implementation science. IS, 10*, 53. https://doi.org/10.1186/s13012-015-0242-0

World Health Organization (2022). Noncommunicable diseases. Available at https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.

Orrego, C., Ballester, M., Heymans, M., Camus, E., Groene, O., Niño de Guzman, E., Pardo-Hernandez, H., Sunol, R., (2021). Talking the same language on patient empowerment: Development and content validation of a taxonomy of self-management interventions for chronic conditions. *Health Expectations*, *24*, 1626–1638. https://doi.org/10.1111/hex.13303

Rossetto, K. R. (2014). Qualitative research interviews: Assessing the therapeutic value and challenges. *Journal of Social and Personal Relationships*, *31*(4), 482–489. https://doi.org/10.1177/0265407514522892

Stalmeijer, R. E., Mcnaughton, N., & Van Mook, W. N. (2014). Using focus groups in medical education research: AMEE Guide No. 91. *Medical teacher*, *36*(11), 923–939. https://doi.org/10.3109/0142159X.2014.917165

Traynor M. (2015). Focus group research. *Nursing standard (Royal College of Nursing (Great Britain): 1987)*, *29*(37), 44–48. https://doi.org/10.7748/ns.29.37.44.e8822

Tuttas C. A. (2015). Lessons learned using Web conference technology for online focus group interviews. *Qualitative health research*, *25*(1), 122–133. https://doi.org/10.1177/1049732314549602

Appendix 1 | Overview of case studies, the MOOC and the simulation software