**Theoretical, Evidence-informed And Co-designed Health Innovation Teamwork (TEACH-IT)**

**Joy C MacDermid PhD**

1. **Define Potential Users, Problems and Intervention Scope and Goals**
	1. Identify Target Users (Patients and providers)
		1. Relationships, patient partners1,2, early adopters, opinion leaders and stakeholders
	2. Identify Internal/external Context Factors
	3. Identify Gaps to be addressed, Clinical Goals, Scope of Innovation Plan
2. **Identify relevant conceptual frameworks, theories, research evidence and mechanisms for**:
	1. Intervention targets (Physical, Psychological, Social Health), Skills, Knowledge and Attitude Targets
	2. Learning /Behaviour Change Mechanisms3–5
	3. Pedagogical Theory
	4. Implementation Theory
3. **Establish Co-design Process, Needs/Preferences**
	1. Engage knowledge user partners and define co-design process and roles6–10.
	2. Use qualitative and quantitative methods to define target Users Needs, Preferences and Priorities for content/delivery),
	3. Define intersectional equity concerns.
	4. Iterative Content and Technical Expert consultations on content, format and learning strategies
	5. Refine Therapeutic Goals, Intervention Targets and Target Audience
4. **Embed Values in Co-design Processes**11–15
	1. Co-learning to achieve shared understanding
	2. Shared ownership
	3. Shared decision-making, a voice for all team members
	4. Patient-centered
	5. Trust and relationship strengthening
5. **Establish a Specific Intervention Model-** **Concept mapping**16,17**, intervention mapping**18–23 **and/or logic models**24 to define:
	1. Scope and target audience
	2. Specific objectives
	3. Skills, Knowledge and Attitude Targets;
	4. Therapeutic interventions/content and their expected mechanisms.
	5. Content/component weighting and organization
	6. Process and outcome measures that can monitor uptake and impact.
		1. Design an outcome strategy and select indicators/measures.
	7. Map intervention components and mechanisms to expected outcomes.
	8. Select outcome measures and strategy
		1. Adherence, fidelity and process outcomes
		2. Quintuple Aims
			1. Patient Experience
			2. Patient outcomes
			3. Provider experience outcomes
			4. Costs
			5. Equity Outcomes
		3. Review measurement properties of potential tools/measures
		4. Select and document outcome measurement strategy (measures, timing, delivery, scoring)
6. **Prototype Creation -Generative Design**
	1. Prioritize and develop content
	2. Designate chunks/modules.
	3. Develop scripts, story boards and structural templates.
	4. Produce components
	5. Obtain iterative expert, user, stakeholder feedback on scripts and produced components.
7. **Useability**25–28**, Equity**29,30 **and Inclusion Strategy**
	1. Define “who might be left behind” and needs of diverse subgroups (equity and clinical experts and target user consultations)
	2. Determine capacity and priority for adaptive responsive design features, versions or content to improve equity.
	3. Health literacy evaluations and content clarification
	4. Useability Analysis (e.g., Observational, cognitive interviews, surveys, qualitative).
8. **Pedagogical Design**31
	1. Design and embed learning strategies and interactivity (e.g., teach-back, audit and feedback, self-tests, community of practice, FAQ).
9. **Optimization through Revision/ Adaptation**
	1. Iterative consultation with target audience, experts, users, and other stakeholders to refine.
10. **Implementation**32–40 **and Sustainability**41
	1. Develop an implementation plan (e.g., champions, implementation personnel, process, timing), resources (training materials, funding, facilities), strategies (training, incentives, procedures) and monitoring (uptake and use indicators).
	2. Evaluate implementation and adapt, including feedback into iterative improvement/optimization.
	3. Evaluate impact.
	4. Develop and implement sustainability plan.
		1. Resources Needs and Plan
		2. Personnel Needs and Plan
		3. Authorities, Roles, Processes and Management Plan
	5. Monitoring and Reporting Plan

**Quality standards**

The ultimate goal is better quality of health care interventions considering the Quintuple Aims42,43 of patient experience and outcomes, provider work role experience, cost efficiency and equity. In interim evaluation of an innovation during development we assess the quality of the content (evidence-based) and the 3U’s of Usebability (Useful, Useable, Unbiased).

1. **Quality of Content**
	1. **Theoretical** and basic science mechanisms are clear and articulated.
	2. Best clinical evidence integrated.
	3. Clear user engagement: mapped to end-user needs.
2. **The 3 Us of Useability**
	1. **Useful**
		1. Content relevant to users
		2. Customizable to individual variation/priorities
		3. Perceived benefit to users (potential for impact)
		4. Change in health outcomes.
	2. **Useable**
		1. Accessible
		2. Understandable (literacy and health literacy)
		3. Fidelity-implemented/performed efficiently and accurately by different users.
		4. Used (adherence)
	3. **Unbiased**
		1. Equity, Inclusion and Diversity (considers socioeconomic, regional, cultural, sex/gender, age, and other sources of diversity) in access, approach and content.

Examples of methods for different stages of development:

1. Needs and content assessments: consultations, surveys, consensus techniques, qualitative research, patient- clinician expert co-design.
2. Best practices or evidence-informed content: evidence synthesis, expert consensus
3. Useability: consultations, cognitive interviews, text analysis, observational analysis of use, and user ratings
4. Equity - equity assessment/consultation; examination of data using intersectional lens

References

1. Bird M, Ouellette C, Whitmore C, et al. Preparing for patient partnership: A scoping review of patient partner engagement and evaluation in research. *Heal Expect*. 2020;23(3):523-539. doi:10.1111/hex.13040

2. Mrklas KJ, Boyd JM, Shergill S, et al. Tools for assessing health research partnership outcomes and impacts: a systematic review. *Heal Res Policy Syst*. 2023;21(1):1-30. doi:10.1186/s12961-022-00937-9

3. Yardley L, Spring BJ, Riper H, et al. Understanding and Promoting Effective Engagement With Digital Behavior Change Interventions. *Am J Prev Med*. 2016;51(5):833-842. doi:10.1016/j.amepre.2016.06.015

4. Araújo-Soares V, Hankonen N, Presseau J, Rodrigues A, Sniehotta FF. Developing Behavior Change Interventions for Self-Management in Chronic Illness: An Integrative Overview. *Eur Psychol*. 2019;24(1):7-25. doi:10.1027/1016-9040/a000330

5. Teixeira PJ, Marques MM, Silva MN, et al. A classification of motivation and behavior change techniques used in self-determination theory-based interventions in health contexts. *Motiv Sci*. 2020;6(4):438-455. doi:10.1037/mot0000172

6. Millard D, Howard Y, Gilbert L, Wills G. Co-design and co-deployment methodologies for innovative m-learning systems. *Mult E-Learning Syst Technol Mob Devices Ubiquitous ICT-Based Educ*. Published online 2009:147-163. doi:10.4018/978-1-60566-703-4.ch009

7. Jessup RL, Osborne RH, Buchbinder R, Beauchamp A. Using co-design to develop interventions to address health literacy needs in a hospitalised population. *BMC Health Serv Res*. 2018;18(1):1-13. doi:10.1186/s12913-018-3801-7

8. Castro EM, Malfait S, Van Regenmortel T, Van Hecke A, Sermeus W, Vanhaecht K. Co-design for implementing patient participation in hospital services: A discussion paper. *Patient Educ Couns*. 2018;101(7):1302-1305. doi:10.1016/j.pec.2018.03.019

9. Spina G, Verganti R, Zotteri G. Factors influencing co-design adoption: Drivers and internal consistency. *Int J Oper Prod Manag*. 2002;22(12):1354-1366. doi:10.1108/01443570210452048

10. Sumner J, Chong LS, Bundele A, Wei Lim Y. Co-Designing Technology for Aging in Place: A Systematic Review. *Gerontologist*. 2021;61(7):E395-E409. doi:10.1093/geront/gnaa064

11. Sumner J, Tan SY, Wang Y, et al. Co-Designing Remote Patient Monitoring Technologies for Inpatients: Systematic Review. *J Med Internet Res*. 2024;26:e58144. doi:10.2196/58144

12. Slattery P, Saeri AK, Bragge P. Research co-design in health: A rapid overview of reviews. *Heal Res Policy Syst*. 2020;18(1). doi:10.1186/s12961-020-0528-9

13. Peters S, Guccione L, Francis J, et al. Evaluation of research co-design in health: a systematic overview of reviews and development of a framework. *Implement Sci* . 2024;19(1). doi:10.1186/s13012-024-01394-4

14. Masterson D, Josefsson KA, Robert G, Nylander E, Kjellstrom S. Mapping definitions of co‐production and co‐design in health and social care. *Heal Expect*. 2022;25(1):902-913.

15. Baker A, Cornwell P, Gustafsson L, Stewart C, Lannin NA. Developing tailored theoretically informed goal-setting interventions for rehabilitation services: a co-design approach. *BMC Health Serv Res*. 2022;22(1):1-21. doi:10.1186/s12913-022-08047-6

16. Trochim WMKE. Concept Mapping for Evaluation and Planning.PDF. *Eval Program Plann*. 2006;12:216.

17. Trochim WM, McLinden D. Introduction to a special issue on concept mapping. *Eval Program Plann*. 2017;60:166-175. doi:10.1016/j.evalprogplan.2016.10.006

18. Direito A, Walsh D, Hinbarji M, et al. Using the Intervention Mapping and Behavioral Intervention Technology Frameworks: Development of an mHealth Intervention for Physical Activity and Sedentary Behavior Change. *Heal Educ Behav*. 2018;45(3):331-348. doi:10.1177/1090198117742438

19. Jones. Taryn M, Dear BF, Hush J, Titov N, Dean CM. Application of Intervention Mapping to the Development of a Complex Physical Therapist Intervention. *Phys Ther*. 1994;96(12):1994-2004.

20. Bartholomew LK, Parcel GS, Kok G. Intervention Mapping: A Process for Developing Theory- and Evidence-Based Health Education Programs. *Heal Educ Behav*. Published online 1998. doi:10.1177/109019819802500502

21. Kok G, Gottlieb NH, Peters GJY, et al. A taxonomy of behaviour change methods: an Intervention Mapping approach. *Health Psychol Rev*. 2016;10(3):297-312. doi:10.1080/17437199.2015.1077155

22. Fernandez ME, ten Hoor GA, van Lieshout S, et al. Implementation mapping: Using intervention mapping to develop implementation strategies. *Front Public Heal*. 2019;7(JUN):1-15. doi:10.3389/fpubh.2019.00158

23. Bakhuys Roozeboom MC, Wiezer NM, Boot CRL, Bongers PM, Schelvis RMC. Use of intervention mapping for occupational risk prevention and health promotion: A systematic review of literature. *Int J Environ Res Public Health*. 2021;18(4):1-19. doi:10.3390/ijerph18041775

24. Smith JD, Li DH, Rafferty MR. The Implementation Research Logic Model: A method for planning, executing, reporting, and synthesizing implementation projects. *Implement Sci*. 2020;15(1):1-12. doi:10.1186/s13012-020-01041-8

25. Hach S, Alder G, Stavric V, Taylor D, Signal N. Usability Assessment Methods for Mobile Apps for Physical Rehabilitation: Umbrella Review. *JMIR Mhealth Uhealth*. 2024;12:e49449. doi:10.2196/49449

26. Alhasani R, George N, Radman D, Auger C, Ahmed S. Methodologies for Evaluating the Usability of Rehabilitation Technologies Aimed at Supporting Shared Decision-Making: Scoping Review. *JMIR Rehabil Assist Technol*. 2023;10:e41359. doi:10.2196/41359

27. Saare MA, Hussain A Bin, Jasim OM, Mahdi AA. Usability evaluation of mobile tracking applications: A systematic review. *Int J Interact Mob Technol*. 2020;14(5):119-128. doi:10.3991/IJIM.V14I05.13353

28. Cavalcanti VC, De Santana MI, Da Gama AEF, Correia WFM. Usability assessments for augmented reality motor rehabilitation solutions: A systematic review. *Int J Comput Games Technol*. 2018;2018. doi:10.1155/2018/5387896

29. Sayani A, Maybee A, Manthorne J, et al. Equity-Mobilizing Partnerships in Community (EMPaCT): Co-Designing Patient Engagement to Promote Health Equity. *Healthc Q*. 2022;24(Speacial Issue):86-92. doi:10.12927/hcq.2022.26768

30. Latulippe K, Hamel C, Giroux D. Co-Design to Support the Development of Inclusive eHealth Tools for Caregivers of Functionally Dependent Older Persons: Social Justice Design. *J Med Internet Res*. 2020;22(11). doi:10.2196/18399

31. Mukhalalati BA, Taylor A. Adult Learning Theories in Context: A Quick Guide for Healthcare Professional Educators. *J Med Educ Curric Dev*. 2019;6:238212051984033. doi:10.1177/2382120519840332

32. May CR, Johnson M, Finch T. Implementation, context and complexity. *Implement Sci*. 2016;11(1):141. doi:10.1186/s13012-016-0506-3

33. Atkins L, Francis J, Islam R, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implement Sci*. 2017;12(1):1-18. doi:10.1186/s13012-017-0605-9

34. Damschroder LJ, Reardon CM, Opra Widerquist MA, Lowery J. Conceptualizing outcomes for use with the Consolidated Framework for Implementation Research (CFIR): the CFIR Outcomes Addendum. *Implement Sci*. 2022;17(1):1-10. doi:10.1186/s13012-021-01181-5

35. Pfadenhauer LM, Gerhardus A, Mozygemba K, et al. Making sense of complexity in context and implementation: The Context and Implementation of Complex Interventions (CICI) framework. *Implement Sci*. Published online 2017. doi:10.1186/s13012-017-0552-5

36. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implement Sci*. 2009;4(1):1-15. doi:10.1186/1748-5908-4-50

37. Nilsen P. Making sense of implementation theories, models and frameworks. *Implement Sci*. 2015;10(1). doi:10.1186/s13012-015-0242-0

38. May C, Finch T, Mair F, et al. Understanding the implementation of complex interventions in health care: The normalization process model. *BMC Health Serv Res*. Published online 2007. doi:10.1186/1472-6963-7-148

39. Carroll C, Patterson M, Wood S, Booth A, Rick J, Balain S. A conceptual framework for implementation fidelity. *Implement Sci*. 2007;2(1):1-9. doi:10.1186/1748-5908-2-40

40. Bauer MS, Kirchner J. Implementation science: What is it and why should I care? *Psychiatry Res*. 2020;283:112376. doi:10.1016/j.psychres.2019.04.025

41. Hailemariam M, Bustos T, Montgomery B, Barajas R, Evans LB, Drahota A. Evidence-based intervention sustainability strategies: A systematic review. *Implement Sci*. 2019;14(1):1-12. doi:10.1186/s13012-019-0910-6

42. Itchhaporia D. The Evolution of the Quintuple Aim. *J Am Coll Cardiol*. 2021;78(22):2262-2264. doi:10.1016/j.jacc.2021.10.018

43. Nundy S, Cooper LA, Mate KS. The Quintuple Aim for Health Care Improvement: A New Imperative to Advance Health Equity. *JAMA*. 2022;327(6):521-522. doi:10.1001/jama.2021.25181