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EISEN

Building the **implementation workforce**
for health and social care

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Development of a Curriculum Framework for Implementation

Implementation, variously referred to as knowledge translation, knowledge mobilisation, or knowledge utilisation, is a nascent and growing field focused on closing the gap between evidence of ‘what works’ from research and the services that are provided for citizens (Eccles, 2009).

The increasing impetus across health and social care to improve patient and service user outcomes and increase citizen participation prompts a review of the knowledge and skills which signify proficiency in both implementation and the research that underpins its structures and processes. This report summarises the work from first part of a three-year international project to develop a European implementation curriculum framework and associated pedagogical resources. The purpose of the curriculum framework is to capture and articulate what is it that implementation practitioners and students need to know in order to achieve and assess proficiency.

Efforts to develop the implementation capabilities of health and social care staff currently involves providing learning resources in areas such as evidence location and appraisal, the development of guidelines, and the organisational and psychological barriers to and facilitators of implementation. Currently, there is little consistency across the various overlapping disciplinary realms which make up the field, and implementation educational and doctoral programmes remain few and far between, both within the partner nations and across Europe more widely.

To inform the future development of a comprehensive implementation curriculum, we carried out a scoping review of the literature and policy to identify key competencies and capabilities. We used a nominal group technique with international experts and stakeholders to clarify and prioritise these findings to inform the development of a European implementation curriculum.

This scoping review has three components:

1. Clarification of the current state of play of implementation curricula, paying particular attention to (a) existing models and frameworks, (b) key findings of recent implementation research, (c) approaches to delivery and facilitation of competencies and capabilities, in order to generate an overview of items to be considered for inclusion within a future European implementation science curriculum.
2. Review of the existing courses providing by higher education institutions in the partner countries (Norway, Sweden, UK and Portugal) on implementation to identify component subjects and skills.
3. Consensus development with key national stakeholders from the participating countries to clarify items for inclusion in a European implementation curriculum.

Operational definitions

As indicated earlier, there is no unified literature relating to implementation. Consequently, this project adopted an inclusive stance. The EISEN ambition, as it is for all those who work

in related fields, is to improve the experiences (and lives) of citizens. By ‘experience’, we refer to the full range of impacts of the health and care services that are provided which enable citizens to improve health and well-being. These impacts may include the ‘felt’ experience of the service, the reliability and safety of processes that comprise the service, and the changes in health and well-being status of those who receive the service, directly or indirectly. Our key focus in EISEN is the role that *all forms of knowledge*, not just scientific knowledge, do and can play in enhancing these experiences, and the competencies and capabilities that those supporting this require or can develop.

As this project is focussed on postgraduate education at EQF Level 7 (master’s) and Level 8 (doctoral), our interests included those who are doing implementation work in practice, and those who are engaged in research activities which are developing the knowledge-base on implementation itself. Put simply, the EQF Level 8 descriptor focuses on the demonstration of leadership through “substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research”. Although there is a recognition of the relevance of specialist knowledge at the forefront of a discipline, this focus on leading the development of original knowledge about implementation is not included in the Level 7 descriptor. Here the focus is on critical application in order to develop the conditions for research and the generation of new (implementation) knowledge.

The literature does not make explicit any distinction between implementation and implementation research. Consequently, our searching of the literature, policy engagement, and interactions with stakeholders did not attempt to make any distinction between the two. Rather, we sought to address this through the application of the EQF Level 7 and Level 8 descriptors as we translated potential curricula themes into tangible learning outcomes.

Procedure

Scoping review

A broad range of literature (e.g., research, policy, best practice guidance) was reviewed to map key concepts relating to the range of theories, models, frameworks, knowledge, and skills that currently provide the benchmark for implementation science scholarship. Relevant stakeholders, identified as those individuals who play an instrumental role in delivering the national health and social care agenda across the partner countries, were invited to discuss and summarise the findings and agree key items/content to be considered for inclusion within a future implementation curriculum in nominal group meetings.

The scoping review was guided by the principles initially set out by Arksey and O’Malley (2005), paying attention to the recommendations later proposed by Levac, Colquhoun, and O’Brian (2010). Six stages were observed: identifying the review question; identifying relevant studies; study selection; charting the data; collating, summarising, and reporting results. The final stage (consultation) was expanded as above to include a nominal group technique to develop consensus in relation to items for inclusion within an implementation science curriculum.

An initial review of the literature included a preliminary search of relevant digital databases. Policy and other key documents were also sought to encompass various aspects of ‘grey’ literature. The search strategy was iterative, encompassing searches of interrelated literature, including knowledge mobilisation, knowledge utilisation, knowledge translation, and quality improvement, alongside wider searches of information relating to implementation course structure and content of current programmes on offer. Keywords included (competenc* or curriculum or proficienc* or teaching or education or instruction) together with (implementation science or knowledge mobilisation or knowledge translation or knowledge utilisation), limited to health or care settings. The following databases were searched: CINAHL, Medline, Scopus, and web of science, alongside a wider Google search of grey literature to search for publicly accessible reports and other publications. The electronic search was also limited to literature published in English within the last five years (2014-2019), substituted by within-country targeted searches of databases and grey literature. The output of this search is summarised in this scoping review report.

Establishing consensus

Drawing on the scoping review report, consensus about the knowledge, skills, and attitudes for implementation science was established through within-country nominal group meetings. Key stakeholders were invited to participate in a modified nominal group (Rycroft Malone, 2001). The nominal group technique is a mixed-method approach which we used to synthesise and distil information yielded within the scoping review in order to agree ideas and concepts around which a framework of implementation competencies and capabilities could be developed and evaluated by a wider group of stakeholders. Key stakeholders were identified as those who lead and influence policy and practice in health and social care across the partner nations. Stakeholders were selected to represent a wide range of perspectives which together typified the national approach to increasing capacity and capability of the health and social care workforces. These are generic descriptions, and it was recognised that there would be differences according to country and organisation in the way in which health and social care education and policy are commissioned and implemented. Stakeholders for nominal group meetings were selected to represent a range of roles as outlined in the Table below.

EISEN Partner Countries				
Category	Wales	Norway	Sweden	Portugal
Commissioner – a strategic or national commissioner of health or care professional education	Executive Director of Nursing, Health Education and Improvement Wales	Head of Institute of Health and Care Sciences, Western Norway University of Applied Sciences		Head of Department of Nurse Education
Health care provider organisation – a major health care	Director of Nursing and Midwifery, Betsi Cadwaladr University		Health and Wellness Consultant, Swedish Agency for Health	Member of the Joanna Briggs Institute

provider and employer	Health Board (BCUHB)		Technology Assessment and Assessment of Social Services	
Social care provider organisation – a major social care provider and employer	Chief Executive, Denbighshire County Council	Managing director Centre for Development of Institutional and Home Care Services	Senior Adviser, Sweden's Municipalities and County Councils	
Health or care professional education – a representative of health and care education providers	Chair, Council of Deans for Health, Wales	Director of R&D, Haukeland University Hospital	Vice Chancellor for Education, Dalarna University	Professor of Psychology for Nurses
National policy – a national policy lead for health or care education policy	Chief Nursing Officer, Welsh Assembly Government	Senior Adviser Department for Quality Improvement and Patient Safety, Norwegian Health Directorate	Strategy and Planning Manager, Swedish Higher Education Authority	Chief Nurse Officer

Table 1. Stakeholders for within-country nominal group meetings

Stakeholders from across these categories were invited to participate in a nominal group to explore the initial list of items generated as an outcome of the scoping review. The groups were facilitated by national coordinators across the partner countries. The results from the groups were collated to ensure consistency across the consensus development process.

FINDINGS

Scoping review

The searches and review of identified papers were completed by LM and an information scientist. An initial search returned 3,059 papers which were reduced to 1195 through the exclusion of 'education or teaching or instruction' (Figure 1). The first 100 papers were sampled and included 14 duplications. Excluding 'curriculum' brought the number down to 979. Further screening resulted in the inclusion of 34 papers. These were read and reviewed by LM, extracting and tabulating data relating to potential curriculum content in the form of students' knowledge, skills, and attitudes. An essential summary of this is provided below.

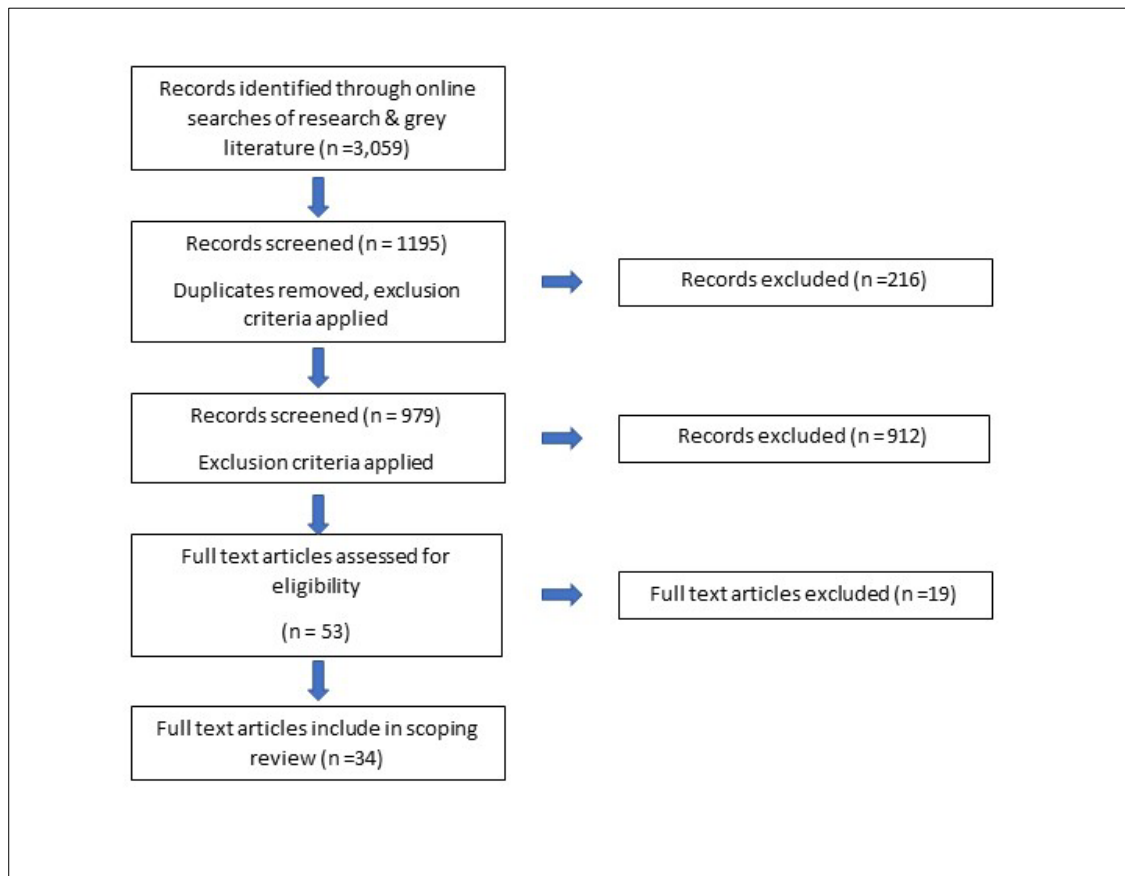


Figure 1 – Evidence generation

Knowledge for implementation

The knowledge-base that underpins implementation is influenced by a diverse range of academic disciplines, theories, and approaches. Attempts to pin down the precise essence of what is required in terms of the knowledge to engage in implementation produced a wide-ranging list of topics and subjects, from anthropology to statistics, and included various research methodologies. The task of elucidating items which specifically related to what a student of implementation science needs to know was made more difficult by the way in which many of the subjects naturally overlapped into the domain of skills, for example, knowledge of research methods, and principles and practice of co-production.

A number of papers explicitly referred to the types of knowledge that were embedded within programmes founded on the principles of implementation, such as using data for improvement, drawing on an array of theoretical perspectives to ensure an interdisciplinary foundation for learning (Means *et al.*, 2016; Riner, 2014). Riner (2014) reports how implementation science was used to guide the curriculum development of a Doctor of Nursing Practice programme (DNP) in the United States. Here, implementation science is used to direct the student's learning with the purpose of ensuring that all DNPs will graduate with the necessary knowledge and skills to undertake improvement work within their organisations. A course map provides

an overview of the structure of the curriculum illustrating the students' journey through a range of topics and assignments devised to develop their ability to critique implementation science theory, integrate research evidence, and apply knowledge by designing an implementation plan in which elements of measurement and evaluation are embedded.

Similarly, Means *et al.* (2016) report on the role of implementation training from the viewpoint of graduates of a doctoral program in global health. The core curriculum incorporates knowledge and skills from an extensive list of disciplines and methodologies including epidemiology, statistics, qualitative research, policy analysis, health services research, quantitative impact evaluation, economics, systems engineering, anthropology, and computer science. Those working in implementation also require competency across a range of “*essential implementation science skills and methods*” (p2), such as generating and synthesising evidence within context, and translating appropriate findings into practice thereby driving the evidence generation cycle. Means *et al.* (2016) propose that an underpinning of knowledge and skills in the application of theoretical frameworks, citing the Consolidated Framework for Implementation Research (Damschroder *et al.*, 2009) as an example, are required. The importance of ensuring that implementation science scholars are knowledgeable about the role of theory is a feature found across the papers reviewed (Bertram, Choi & Elsen, 2018; Birken, 2017; Carlford *et al.*, 2017).

Ullrich *et al.* (2017) report on curriculum development in the context of the University of Heidelberg's two-year full-time MSc programme in Health Services Research and Implementation Science. Following a survey of students, teaching staff, and national experts, the curriculum was structured around five work streams: generic academic skills and research methods, health services research and healthcare systems, implementation science, fields of application, and key competences including communication skills. In their evaluation of an annual implementation course delivered by Linköping University, Carlford *et al.*, (2017) present a curriculum outline that is focused on developing knowledge about the theories, models, and frameworks of implementation science. The course applies a systems approach and endorses multidisciplinary collaboration to address implementation challenges at multiple levels. Citing the findings of Ullrich *et al.*'s (2017) study, Carlford *et al.* (2017) conclude that stakeholders can tend to rank implementation *practice* above implementation *research*, demonstrating a persistent schism between these two aspects of the discipline.

Moving away from implementation science per se, Royer *et al.* (2018) evaluate an evidence-based practice scholar programme. Differing from the programmes described above, their programme is hospital-based and aims at engaging health care staff in evidence-based practice. The curriculum is delivered through eight one-day workshops focused on key topics such as finding and appraising the evidence, project proposal writing, measuring outcomes, data collection, analysis, display, and interpretation, and dissemination. Scholars then design and deliver an evidence-based practice project and present their findings at the end of the year to the next cohort.

In the United Kingdom, Gabbay *et al.* (2014) have written extensively on the types of knowledge and skills from an improvement science perspective. In their report *Skilled for Improvement*, they draw together evidence from a number of studies across the United Kingdom and conclude that effective improvers possess and apply an assortment of knowledge.

This ranges from the possession of ‘local knowledge’ which enables an improver to gauge the context and understand the values, priorities, concerns, and practices of a population; an awareness of the psychological and emotional consequences of change; knowledge of the research process, qualitative and quantitative methods and data analysis; and aspects of sociology, including the role of professional identities and organisational structure and hierarchies. Horton, Illingworth and Warburton (2018) further explore the local and social dimensions, looking at models of social franchising and the influence of peer communities on implementation outcomes. Communities of practice and interest are referred to by Wood and Henderson (2016) and Ejbye and Holmen (2016) respectively, and it is expected that those involved in implementation will be knowledgeable about the role of co-design (Pereira & Creary, 2018) and co-production (Wood & Henderson, 2016).

Knowledge associated with implementation	
<i>Issues</i>	<i>Explanation</i>
Anthropology	The study of human societies and cultures and their development, specifically in relation to the cultural aspects of initiating, hampering, and sustaining change and behaviours.
Co-design	A participatory, needs-led approach in which all stakeholders are involved (e.g., employees, partners, customers, patients, citizens, end users) in aspects of implementation.
Communities of practice Communities of interest	Groups of people who share a concern or a passion for aspects of implementation, and who learn as they interact regularly.
Continuing the evidence generation cycle	Evidence changes, improves, evolves, and is superseded as a consequence of emerging new knowledge.
Economics	A social science concerned with the production, distribution, and consumption of goods and services.
Epidemiology	The study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems.
Evaluation	Establishes whether an (service or implementation) intervention or initiative is effective, clarifying how and why it works in order to enable replication.
Health Services Research	A multidisciplinary field of inquiry that examines access to, and the use, costs, quality, delivery, organisation, financing, and outcomes of health care services to produce new knowledge about the structure, processes, and effects of health services for individuals and populations.
Health systems	A configuration of services and activities whose purpose is to promote, restore, or maintain health. Requires financing, a well-trained and adequately paid workforce, reliable information on which to base decisions and policies, well-maintained facilities, and logistics to deliver medicines and technologies.
Implementation models, theories, and	Understanding and applying theories, models, and frameworks to enable appropriate selection and application of relevant approaches in implementation research and practice.

frameworks/using theory/logic models	
Improvement methodologies, tools, and techniques	Examples include the PDSA cycle of improvement, six sigma, and Lean.
Local knowledge	Contextualised, insider knowledge, particularly in relation to practice behaviours and beliefs, cultural values, priorities, and norms.
Patient and public involvement	A way of thinking and doing things that sees the people using health and social services as equal partners in planning, developing, and monitoring health care interventions, services, policy, and practice to ensure it meets their needs.
Policy analysis	Study and evaluation of the design, adoption, and implementation of a principle or action intended to tackle economic, social, or other public issues
Psychology, emotions, and change	Psychological and emotional factors, consequences of change
Research methods	Philosophically underpinned approaches to the generation of knowledge, which may be described as qualitative or quantitative.
Social innovation approaches	Innovations that are social in both their ends and their means. A way of understanding a wide range of activities and practices oriented to addressing social problems or meeting human needs.
Sociology	The study of the development, structure, and functioning of human societies, for example professions/professional identities, organisational behaviour, hierarchies, and politics and power - including the politics of different knowledges.
Statistics	A branch of mathematics dealing with the collection, analysis, interpretation, and presentation of numerical data.
Systems engineering – whole systems approach	An interdisciplinary approach to enabling the realisation of complex systems or analysis of interactions.
Understanding planning/decision-making in organisations	Understanding the influence and motivation of individual and group decisions, for purposes of effectiveness, e.g., resource management or productivity.
Using data for improvement	The use of both qualitative and quantitative data to guide and evaluate service improvements.

Skills for implementation

There is consensus that those working in implementation require honed interpersonal skills including communication, boundary spanning, and the ability to engage relevant stakeholders, together with the necessary technical, research, organisational, and project management skills to design, deliver, and evaluate implementation projects (Albarquoni *et al.*, 2018; Behar-Horenstein & Zhang; 2018; Bullock, Barnes & Warren, 2014; Carlford *et al.*, 2017; Crisp, 2017; Gabbay *et al.*, 2014; Kim *et al.*, 2017; Mazurek *et al.* 2018; Nandiwada & Kormos, 2018;

NHS Wales, 2014; Riner, 2014; Royer *et al.*, 2018; Spiva *et al.*, 2017; Ullrich *et al.*, 2017). A willingness to learn from others and through reflective practice is also called for (Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Pien *et al.*, 2018).

Authors across the research, as well as the grey literature, share the consensus that knowledge of the research process alongside practical research skills are essential components of any programme aimed at increasing the uptake of EBP (evidence-based practice) across the health and social care workforce (Birken *et al.*, 2017; Belita *et al.*, 2018; Bertram, Choi & Elsen, 2018; Bullock, Barnes & Warren, 2014; Carlford, Roback & Nilsen, 2017; Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Lal *et al.*, 2015; Lucas & Nacer, 2015; Mean *et al.*, 2016; Riner, 2015; Royer *et al.*, 2018; Spiva *et al.*, 2017).

Gabbay *et al.* (2014) present the most comprehensive description of skills necessary for successful improvement work. Negotiation skills are encompassed in the skill set described as ‘soft skills’. The emphasis is that this descriptor is ‘soft’ in name not nature, acknowledging “that ‘soft’ has ‘touchy-feely’ connotations that may be misleading, given that the leadership, structures and political wrangles involved in achieving genuine and lasting improvements can call for real toughness.” Navigating multiple boundaries can have implications for those working within implementation such as encountering conflict, being perceived with suspicion, and requiring the resilience to work towards reconciliation. They recognise these pressures and add that stress management is a vital skill for those engaged in implementation. In their conceptualisation, soft skills accompany technical skills and learning skills which together represent a triple-pronged skillset necessary for effective improvement. Technical skills provide a ‘general toolkit’ for appraising, interpreting, and displaying research findings such as process mapping, benchmarking, and PDSA (Plan-Do-Study-Act) cycles. Although learning skills are discussed in the context of improvement, these skills can be expanded to encompass learning about implementation as a whole, with the suggestion that those working in or studying implementation are ready and willing to engage in communities of practice.

Leadership is identified as a key element of implementation (Bullock, Barnes & Warren, 2014; Gabbay *et al.* 2014; Horton, Illingworth & Warburton, 2018; Polanich *et al.*, 2017; Spiva *et al.*, 2017). Whilst leadership can be defined as a skill which can be taught, it also implies a characteristic or quality possessed by individual who leads by example, using peer leadership skills and personal influence to galvanise individuals, communities, and resources around implementation (Birken, 2017; Gabbay *et al.*, 2014; Polanich *et al.*, 2017). Leadership skills and attitudes are the hallmark of knowledge champions, knowledge translation brokers, mentors, and other change agents who play a crucial role in igniting interest and sustaining engagement in implementation projects and programmes.

Implementation is inherently interdisciplinary in nature (Lal *et al.*, 2015). Polanich (2017) and Pien *et al.* (2018) endorse leadership skills as integral to the development and success of interdisciplinary team working. Taking a multidisciplinary approach or working across professional boundaries is cited as a decisive factor influencing the successful outcome of implementation (Albarqouni *et al.*, 2018; Horton, Illingworth & Warburton, 2018; Means *et al.*, 2015; Nandiwada & Kormos, 2018; Pereira & Creary, 2018). Overall, there is a global consensus that embedding an interdisciplinary ethos and fostering the boundary spanning skills of those engaged in implementation is essential. Nandiwada and Kormos (2018) urge that

“Evidence-based practice should not be silo’d in each discipline; instead health professionals should understand how other disciplines use [evidence] in clinical care.” Leadership skills also relate to and overlap with knowledge brokering, being a change agent, mentoring, and supervision.

Possessing an understanding of the influence of contextual factors such as the ability to identify and assess barriers and enablers to implementation work is recognised by numerous authors as an essential skill (Albarquoni *et al.*, 2018; Bullock, Barnes & Warren, 2014; Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Means *et al.*, 2016; Pereira & Creary, 2018; Redding, 2016). Aligned to this is the ability to tailor evidence and interventions to local needs, engaging relevant stakeholders, working with multiple communities, and brokerage skills (Ejbye & Holman, 2016; Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Redding, 2016; Wood & Henderson, 2016). These skills dovetail with those around the ability to synthesise and translate research evidence into an appropriate format tailored to the needs of specific target audiences, mobilising the necessary resources to initiate and sustain change, ultimately improving successful dissemination and uptake (Ahmad *et al.*, 2014; Bourgault, 2018; Bullock, Barnes & Warren, 2014; Gabbay, May & Connell, 2014; Horton, Illingworth & Warburton, 2018; Iongh, Fagan, Fenner & Kidd, 2015).

Skills associated with implementation	
<i>Issues</i>	<i>Explanation</i>
Adapting for local context/understanding context/identifying barriers and facilitators	Appreciating the influence and impact of context on implementation methods, interventions, and outcomes
Brokerage skills	Sharing examples of positive implementation outcomes, communicating knowledge to different audiences, negotiating between multiple agendas and priorities.
Communication skills	The ability to convey information to another person or group effectively and efficiently. Verbal, non-verbal, and written communication skills to help facilitate the sharing of information and knowledge between people.
Dissemination	The distribution, diffusion and spread of innovations, idea, knowledge, or practice.
Interdisciplinary	Taking an approach to implementation and research that draws on multiple disciplines with overlapping concerns.
Education and knowledge management skills	Finding, storing, and maintaining up-to-date knowledge in the context of teaching and learning, professional development, research, and practice.
Finding and appraising evidence	Ability to search sources of evidence including databases and published literature; ability to critique evidence yielded as an outcome, using appraisal tools and technique to evaluate a study design, findings, and results.
Galvanising resources	Identifying and mobilising resources for implementation purposes.

Identifying clinical questions	Understanding what needs to be changed, improved, or introduced within a clinical setting, and articulating this as a question for investigation.
Implementing practice change	Change agency, facilitation, knowledge brokerage, championing, influencing
Information technology	Computers, devices, internet, and associated communication services technologies, applications, and innovations. General ITC competency, i.e., use of hardware, software, and web-based services and applications.
Inter-professional work/boundary spanning	Capacity to navigate and bridge boundaries, including research and practice, different organisations, professions, groups, and other social entities.
Leadership of inter-professional work	Encouraging and influencing boundary-spanning work.
Learning skills	Critical thinking, creative thinking, communicating, and collaborating; the art of collectively learning how to improve services.
Mentoring	A supportive learning relationship between a typically senior individual who shares knowledge and experience with another who is ready and willing to engage in the process.
Negotiation	Find a way over or through boundaries; to bring about by discussion established consensus or achieve compromise or reconciliation.
Organisation and administration skills	Of workload and projects, including time and resources management, delegation, and clerical duties and tasks.
Political skills	Understanding the system, managing vested interests, navigating and exploiting power bases, people reading, shrewd timing of interventions, listening to and taking into account other people's views.
Process mapping	The act of creating a workflow diagram with the goal of gaining a clearer understanding of how a process and its parallel processes work.
Reflective practice/experiential learning	Is a way of studying your own experiences to improve the way you work?
Reporting guidelines	Using tools while writing to provide a minimum list of information needed to ensure a manuscript can be, for example, understood by a reader, replicated by a researcher, used by a clinician to make a clinical decision, and included in a systematic review.
Soft skills	Include assertiveness, communication, negotiation, time management, stress management, leadership and team skills, administrative and political skills, educational and knowledge-handling skills, and local knowledge.
Spreading change	See brokerage skills and dissemination above.

Stakeholder consultation	Involving stakeholders in discussion to determine and integrate their perspectives, for example, about implementing an innovation, intervention, or service.
Stress management	The ability to apply cognitive, psychological, physical, and spiritual tools, techniques, approaches, and resources to improve resilience and cope with persistent and/or acute pressures and stressors.
Sustaining change	Maintaining the momentum of innovation, ensuring continued uptake and ongoing impact.
Synthesising evidence	Identifying, collating, and presenting data from multiple sources.
Team-working	Working within a group to achieve shared goals.
Technical skills	Ability to use and apply care bundles, models of improvements, process mapping, critical appraisal, outcome measure, statistical analysis, and other technical skills.
Time management and prioritising	See organisational skills above; the ability to manage time alongside resources to deliver a project or manage a service effectively and efficiently.
Translating appropriate evidence into practice	Being able to interpret evidence and incorporate it in one's own behaviour.
Working with multiple communities	Working across boundaries to engage all relevant stakeholders.

Attitudes for implementation

The third dimension of competency relates to the affective domain: attitudes that should be demonstrated by those engaged in implementation. This domain determines the way in which an implementer should 'be' in terms of behaviour and values. The literature is less specific about this domain; indeed, it is absent from the recent competency framework proposed by Albarquoni *et al.* (2018). Whilst capturing the knowledge and skills in which proficiency is expected has been comparatively straightforward, defining the qualities of the implementer is less clear cut. This is due in part to the way in which those items identified as representing the affective often overlap. For example, the concept of leadership occupies both the skills domain (it can be taught), and the attitudes domain (it is a quality recognised as important in those who lead by example and influence the thinking and behaviour of others). Likewise, being multidisciplinary in one's approach to implementation work could be described as a state of mind, whereas it overlaps with possessing the skills to work across boundaries and professions.

The role of leadership as a desirable and beneficial quality of those who succeed in generating change, sustaining improvement, and cultivating a culture of implementation is well documented, and is strongly linked to traits including personal influence, supporting the learning of others through mentoring relationships, and the possession of well-developed networks and relationships (Birken *et al.*, 2017; Beckett & Melnyk, 2018; Bourgault, 2018; Bullock, Barnes & Warren, 2014; Carlford *et al.*, 2017; Ejbye and Holman, 2016; Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Iongh *et al.*, 2015; Melnyk & Fineout-Overholt, 2015; Pereira and Creary, 2018; Polancich *et al.*, 2017; Spiva *et al.*, 2017).

Possessing a spirit of inquiry and being willing and able to learn through reflection, learning from others, and participating in learning communities or communities of practice is also at the core of being an effective implementer (Ejbye & Holman, 2016; Gabbay *et al.*, 2014; Horton, Illingworth & Warburton, 2018; Lucas & Nacer, 2015; Nandiwada & Kormos, 2018; Pereira and Creary, 2018; Pien *et al.*, 2018; Polancich *et al.*, 2017; Iongh *et al.*, 2017; Wood & Henderson, 2016;).

Gabbay *et al.* (2014) identified assertiveness as a characteristic of those involved in successful implementation work; similarly, Pereira and Creary (2018) highlight personal resilience as a necessary attribute. Being orientated to patient perspectives, being patient-centred, and taking a value-driven approach are also recognised as important features of those who undertake implementation (Ejbye & Holman, 2016; Horton, Illingworth & Warburton, 2018; Nandiwada & Kormos, 2018; Redding, 2016; Wood & Henderson, 2016). As it currently stands there is no definitive set of qualities or traits that have been proposed, and this domain of implementation science competency remains under explored and under articulated. The reviewed papers revealed that there are certain elements that fulfil the criteria as desired attitudes, but more work is required to develop and define what is the qualitative hallmark of a competent implementation scientist.

Attitudes associated with implementation	
<i>Issues</i>	<i>Explanation</i>
Assertiveness	Confident and forceful demeanour and behaviour.
Being multidisciplinary	Endorsing an approach that embraces knowledge, skills, and expertise from across multiple, separate bodies of scholarship and practice.
Cultures for improvement	Fostering an organisational culture/spirit of inquiry.
Habits of mind	Thinking like an engineer: pattern sniffer, experimenters, describers, tinkerers, inventors, visualizers, conjecturers, guessers.
Influencing	Encouraging, motivating, prompting, promoting, provoking, and persuading changes in another's thinking and/or behaviour
Leadership	Leading by example; possessing an approach and disposition that motivates and support others to change and achieve.
Mentoring/peer support/groups – formal/informal	The willingness to initiate or engage in a relationship, interaction, or process with another/others by sharing wisdom, knowledge, skills, and experiential learning with another with the intention to foster their personal and professional development.
Patient-centred/person-centred	Placing patient and people at the centre of decision-making, planning, designing, and delivering; co-producing interventions, ideas, tools, products, services, polices, etc.
Personal resilience/personal development	Commitment to developing the skills and mechanisms for self-care in stressful or demanding situations.
Relationships and networks	Interactions between individuals and groups based on trust, respect, credibility, and affection.

Reflective	Learning from experience.
Job satisfaction, morale, and burnout	The feeling of achieving a positive outcome as result of one's work, in opposition to a sense of apathy, failure, disengagement, and despair that typifies stress and subsequent burnout.
Willingness and capacity for learning	Insight, motivation, and aptitude to change and develop.
Value-driven	Being motivated and driven by core social, emotional, or psychological qualities and opinions that are important to an individual or represent a shared, collective, or organisation concern. Embracing what is important to others and using metrics beyond economics to determine the worth of an outcome, object, intervention, idea, service, etc.

Moving towards curriculum themes and learning outcomes

The curriculum content emerging from the scoping review has been themed into a limited range of curriculum concepts, as listed below. These themes coalesce around four domains: knowledge, implementation, organisations, and the self.

Aspects of knowledge

- Sources of knowledge, their validity, and their potential contribution to improving health and care
- Accepted rules and guidance for the conduct and reporting of different forms of knowledge relevant to improving health and care
- Appreciating and building the power of 'communities of practice' to build knowledge within implementation

Aspects of implementation

- The contributions of different academic disciplines (e.g., sociology, psychology, and anthropology) to implementation
- The nature, content and application of models, theories, and frameworks for implementation
- Skills in the use of tools and techniques associated with improving health and care where these are knowledge, and the role that knowledge plays in these
- Appreciating, evaluating, and working through context within implementation
- The roles that people can play at the interface of knowledge and service planning and delivery (e.g., change agents, knowledge brokers, champions, influencers)
- Evaluation of implementation at different levels, and for different audiences
- The outcomes for service staff from engagement in implementation (Staff satisfaction, morale, and burnout)

Aspects of organisations

- Understanding and working through networks and complex systems
- The characteristics of different organisational cultures and their role in supporting (or not) implementation
- The roles that stakeholders, including service users and service leaders, can play in implementation, and strategies for engaging with them productively

Aspects of the self

- Being authentic and consistent with values associated with implementation
- Appreciating and demonstrating language and cultural competence
- The ability to navigate, negotiate and work across organisational and professional boundaries, building credibility with different stakeholders
- Political skills, including managing vested interests, navigating, and exploiting power bases, people reading, shrewd timing of interventions, listening to, and taking into account, other people's views
- Understanding the different dimensions of leadership within implementation
- Developing a reflective and reflexive approach to personal growth and learning about issues related to implementation

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