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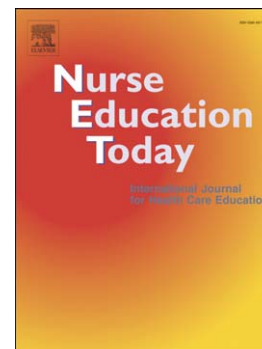
Making it easy to do the right thing in healthcare: Advancing improvement science education through accredited pan European higher education modules

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## Title page

MAKING IT EASY TO DO THE RIGHT THING IN HEALTHCARE: ADVANCING IMPROVEMENT SCIENCE EDUCATION THROUGH ACCREDITED PAN EUROPEAN HIGHER EDUCATION MODULES

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## MAKING IT EASY TO DO THE RIGHT THING IN HEALTHCARE: ADVANCING IMPROVEMENT SCIENCE EDUCATION THROUGH ACCREDITED PAN EUROPEAN HIGHER EDUCATION MODULES

### INTRODUCTION

The urgent need to improve patient care and address the challenges of quality care and unintended harm in complex healthcare systems is well documented. A 2013 UK report on serious failings in the Mid Staffordshire NHS Trust pointed to a culture of fear, a prioritisation of targets, an acceptance of poor standards and a lack of transparency (Francis, 2013). Moreover, healthcare systems globally are facing a series of challenges related to the need to respond efficiently and effectively to an increasing ageing population, multiple complex morbidities and chronic diseases. There are health, moral and economic reasons for spending less time, energy and money on technological advances and more on improving systems for delivering care. Healthcare Improvement Science is one such vehicle for achieving this. Having a healthcare workforce skilled in improvement tools and techniques in everyday practice will help prevent failings and contribute to the delivery of safe, effective and person-centred care and high quality education must underpin this ambition. This paper discusses the development of evidence-based accredited inter-professional education in Healthcare Improvement Science for healthcare students at both undergraduate and postgraduate levels by Higher Education Institutions (HEIs) across Europe.

### BACKGROUND

The Improvement Science Training for European Healthcare Workers or ISTEW project was informed by a raft of evidence from practice, research and policy outlining the need to improve the quality of care delivered internationally. Ever since the landmark publications on the quality of healthcare systems (Institute of Medicine, 2001, Kohn, Corrigan and Donaldson, 1999, The World Health Organisation, 2000), healthcare providers have endeavoured to improve so that healthcare is safe, effective and person-centred (Chochinov, 2007, Firth-Cozens and Cornwell, 2009, Maben, Cornwell and Sweeney, 2010, The Parliamentary and Health Service Ombudsman, 2011). Responding to this demand, a number of quality improvement campaigns have been launched in the last decade (Olsson, Elg and Linblad, 2007). However it has been suggested that these efforts have produced mostly inconsistent and variable results demonstrating significant room for improvement (De Vries, Ramrattan and Smorenburg et al., 2008, Shekelle, Pronovost and Wachter et al., 2011). Insufficient knowledge or application of clinical-care standards and protocols, lack of

guidelines and inadequate supervision were all identified by Chisholm and Evans as a key reason for this inefficiency (2010). One study reports that patient safety structures, activities and outputs are less well developed in Europe than they are in the United States (Sunol, Vallejo and Groene et al., 2009).

Improvement Science education has the potential to equip healthcare professionals with the tools and techniques they need to improve systems for delivering care. Improvement Science is a rapidly developing field and many healthcare professionals are not yet skilled in the application of improvement strategies. Thus, the aim of the ISTEW project was to address a gap in the provision of accredited Improvement Science education across Europe. By accredited we mean education that is validated by a UK HEI which has degree awarding powers recognised by the UK authorities. The qualification is then recognised in the UK and credits can be transferred between learning courses, educational institutions and occupations. Much of the literature and discourse about Healthcare Improvement Science (HIS) comes from the United States of America (USA) and preliminary discussions with the European project partners from Italy, Spain, Romania, England, Poland, Slovenia and Scotland highlighted that HIS was at very different stages of development within these countries compared to the USA. HIS has been a feature of American healthcare since the late 1980's whereas HIS appeared to be in its infancy in most of the participating European countries. In terms of current HIS education, it appeared to be fragmented and only beginning to be included in the education of healthcare professionals in the participating countries. Anecdotal information suggested that HIS education was an optional extra, a non-essential part of professional education or if improvement techniques were being used they tended to be applied from the 'top down' by specialists in practice settings. All of this anecdotal information indicated that the theory, tools and techniques of Improvement Science were far from being a staple part of healthcare education in much of Europe.

That is not to say that there is no HIS education available. The Institute for Healthcare Improvement (IHI) have developed an extensive online curriculum in Quality Improvement and Patient Safety.<sup>1</sup> The World Health Organisation (WHO) has developed a multidisciplinary patient safety curriculum designed to assist effective capacity building in patient safety education by healthcare academic institutions.<sup>2</sup> NHS Scotland also has the Quality Improvement Hub with many education resources available.<sup>3</sup> However, none of these online curricula are currently accredited by Higher Education Institutions. They offer

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<sup>1</sup> <http://www.ihi.org/education/ihiopenschool/course/pages/default.aspx>.

<sup>2</sup> <http://www.who.int/patientsafety/education/curriculum/en/>

<sup>3</sup> <http://www.qihub.scot.nhs.uk/default.aspx>

online resources that healthcare professionals can choose to use as part of their continuous professional development. Although the content of these resources is of high quality and evidence informed, those who participate are not assessed, thus completion cannot be shown to contribute to or translate into increased knowledge or skills or result in participants obtaining under- or postgraduate qualifications. In terms of HIS education delivered in Higher Education Institutions, the scope and type of provision was unknown, thus one of the objectives of the projects was to undertake a mapping exercise to ascertain the nature of provision in the seven participating countries. The aim of our project was to develop Higher Education modules that would be suitable for a range of healthcare professionals, to equip them with the HIS knowledge, skills, tools and techniques to deliver high quality healthcare.

### THE ROLE OF HIGHER EDUCATION INSTITUTIONS IN IMPROVEMENT SCIENCE EDUCATION

Higher Education Institutions (HEIs) are a major provider of education for health professionals internationally; they clearly have a key role in the provision of HIS education both currently and in the future. Three forms of support are needed to close the quality gap, one of which is 'systematic improvement support for providers' (The Health Foundation, 2014: 6). In order to provide such support there is a need to systematically build capacity and capability in HIS through education. Delivering the best care, constantly improving the care delivered and the experience for patients and families requires healthcare professionals to have knowledge and skills in improvement and change management. Healthcare environments are complex and face significant challenges such as a changing demography with an increasing ageing population many of whom are living with chronic diseases, coupled with increased public expectation as well as a challenging economic climate due to austerity measures (The Healthcare Quality Strategy for NHS Scotland, 2010). Individuals living with chronic or long-term illnesses require support from healthcare professionals to self-manage their conditions, they also require those healthcare professionals to communicate and collaborate with them and their colleagues effectively to a significant extent. Healthcare professionals need high levels of understanding about healthcare systems and the organisational culture they operate in if they are to respond to these challenges. This reinforces the imperative to commit to continuous quality improvement through applying what we know. There are health, economic, and moral reasons that make the case for spending less on technological advances such as a new drug or piece of equipment and more on improving systems for delivering care, such as the right patient getting the right drug at the right dose at the right time (Wolff and Johnstone, 2005).

## IMPROVEMENT SCIENCE

In 2015 the National Institute for Health Research in collaboration with improvement scientists from London universities and NHS Trusts came together to debate the nature of Improvement Science. These deliberations highlighted how Improvement Science is an emerging nascent field of science in the UK that is evolving to improve healthcare quality and safety. The Institute for Healthcare Improvement (IHI) was founded in 1991 and has become an influential leader in the science of improvement field. Yet the Improvement Science Research Network (ISRN), a national Institutes of Health supported improvement research network in the USA argues that Improvement Science is still an emerging field there too (ISRN, 2016).

Despite the emergent nature of the field, healthcare professionals need to be educated in the “how to” of Improvement Science, as it is they who are central to making continued improvements to the care provided to patients and families. If we are to learn from the experiences of patients and families, improve their care and understand what drives improvement then all healthcare professionals need to have the knowledge, skills and behaviours to apply the concepts, tools, and techniques of Improvement Science so that sustainable safe, effective and person-centred improvements can be achieved (Marshall, Pronovost and Dixon-Woods, 2013). We know that when healthcare professionals apply best practice examples it can have a positive influence on the quality and reliability of healthcare provision, improve patient outcomes, and reduce variation in healthcare provision and costs (Melnik, Fineout-Overholt, Gallagher-Ford & Kaplan, 2012). Thought leaders have endorsed quality improvement education; however a systematic literature review on the effectiveness of quality improvement education found that quality improvement education tended to focus on increasing knowledge rather than equipping students with the skills and confidence to implement changes to systems (Boonyasai, 2007)

## DEVELOPING EVIDENCE BASED IMPROVEMENT SCIENCE EDUCATION

The aim of this European Union Lifelong Learning Erasmus project was to develop shared academic and practice-based educational programmes that would enable the seven participating HEIs to build improvement capacity and capability within their own healthcare workforce. The aim of the European Lifelong Learning Erasmus funding stream is to build capacity in the field of education and to facilitate the modernisation and internationalisation

of Higher Education in the partner countries involved.<sup>4</sup> To align the education developed with the Bologna Process, the modernisation agenda for European HEIs, we needed to undertake a number of research activities to ensure the education developed was addressing a gap, based on contemporary evidence and suited to the diverse and disparate healthcare systems of Scotland, England, Spain, Italy, Slovenia, Romania and Poland.

A multi-method design was adopted. The first two parallel activities that took place were a modified Delphi process and a narrative literature review. The Delphi offered us a unique opportunity to garner the views of over 80 experts from seven countries to reach a shared understanding and consensus on a definition of Improvement Science (Meskell, Murphy, Shaw and Casey, 2014). Reaching a shared understanding of HIS across the partners was fundamental as the definition would inform the design of the four modules. After two Delphi iterations, through which 86% agreement was reached, and a consensus group involving all partner teams' a contemporary definition of HIS was reached.

*“Healthcare Improvement Science is the generation of knowledge to cultivate change and deliver person-centred care that is safe, effective, efficient, equitable and timely. It improves patients’ outcomes, health system performance and population health.”*

It is our hope that this concise contemporary consensus definition contributes to the development of a working definition of HIS which at the time of writing remains elusive. We contend that a strength of our definition is that it reflects the views of over 80 people from seven European countries who are involved in Improvement Science education, policy, research or practice, all of whom engaged in a process of developing their own and others understanding of HIS. The process helped to develop a common language and meaning of the concept of Improvement Science both inside and outside of academia within the European context, this was important given the concept of HIS was in its infancy or did not exist in some of the participating countries. This shared definition has the potential to inform the development of Improvement Science curricula internationally.

A narrative literature review regarding the experience of Improvement Science and its specific nature in the seven partner countries was undertaken, it included articles written in English, Slovene, Polish, Romanian, Italian and Spanish published between 2004 and 2014 that were listed in 26 databases. The parameters of the search did not extend to the extensive American literature on the subject or articles written in other languages due to the

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<sup>4</sup> <https://www.erasmusplus.org.uk/higher-education-projects>



funder defined strategic context and time constraints of the project. The review, which was to explore how Improvement Science was understood, practiced and taught found that the meaning of Improvement Science was fragmented, diverse and developing rapidly. It revealed that a variety of terms were used to describe HIS in the six languages. The reasons for this were that either there was no direct translation of the term and or it had not yet been integrated into the literature of that country or that other terms such as translational research or quality improvement were more common. The intercultural differences and a more detailed discussion of the findings is the subject of another manuscript. Some literature suggested that the theory of Improvement Science needed to be translated into practice but there appeared to be no agreed model or method about how this could be done. We also found evidence that some professionals were using Improvement Science tools and techniques in practice but these did not appear to link back to a conceptual framework or common definition. In relation to education, the review found a paucity of literature directly describing the education of healthcare professionals. We acknowledge that Improvement Science education may be happening in less formal ways in other countries but this was beyond the scope of the review. It may also be happening through academic-practice partnership models but our search produced very few results that discussed these activities. One of the few articles found on the subject was from the UK and it suggested that 'many nurses lack the knowledge, skills and attitude to improve the systems within which they work, calling for a radical redesign of nursing education to integrate quality improvement science' (Jones, Williams and Carson-Stevens, 2013, p44). The cumulative findings would suggest that HEIs have a key role to play in equipping the current and future healthcare workforce with the knowledge and skills to deliver safe, high quality healthcare.

The project also reviewed the literature on capability and competency requirements in relation to the knowledge, skills and behaviours necessary for healthcare professionals to practice Improvement Science. From this we created categories of competencies and capabilities which were mapped to create the proposed content of the four modules, whilst paying attention to the six domains of quality healthcare (safe, effective efficient, person-centred, timely and equitable). This produced a framework that detailed the types of knowledge, skills and behaviours health professionals need to practice Improvement Science, and describes the specific aspect of the competence or capability. If educators wish to prioritise a particular skill or knowledge gap to address an identified area of need either within the professional group they are educating or the healthcare context they are working in they can opt to focus on specific competencies and capabilities within the framework. This potentially allows them to adapt the educational content so it addresses the differences in health profiles, and health and educational contexts of each partner country.

We also mapped current HIS education programmes available in each partner country. In addition to the programmes offered by WHO, IHI and some of the National Improvement agencies, we found that HEIs offered a variety of modules, courses or programmes that contained elements of HIS education such as patient safety, quality improvement and leadership. The findings of the mapping exercise added weight to the findings of the literature review and the Delphi process. Although this was largely a web based search the results suggested that although there was a variety of provision, the majority was post graduate, often aimed a specific disciplines such as physicians and or nurses and the content itself appeared to cover only some elements of Improvement Science. We could not identify any provision that taught all the key elements of Improvement Science or equipped students with the knowledge, skills and the opportunities for experiential learning.

#### ADVANCING IMPROVEMENT SCIENCE EDUCATION IN EUROPE

The cumulative findings of the project underlined the need to create a unified core curriculum in a way that valued each partner country's educational experience and knowledge and was adaptable to the particular cultural, socio-economic and health challenges found in each country. Thus the modules are structured and designed so that they can be embedded into existing programmes of study at the appropriate academic level within all seven HEIs. The modules have been designed to allow partner countries to adapt the delivery to their particular educational and operational contexts. For the most part there was consensus about the content of the modules as it had been informed by the collaborative activities such as the literature review, the Delphi and the review of competencies and capabilities. However there were some contested areas. For example, one partner wished the communication and managing change module to contain more generic content on communication skills. Whereas the lead partner felt no need to include generic communication skills as this features in the content of the degree programmes run within their institution. The solution was that extra content was written and it can be included if partners wish. The pedagogical approaches and the style of delivery also varied, with the UK and Spain taking a much more experiential approach to learning and offering more blended and online delivery. The module design will allow each partner to take their own pedagogical approach and decide on their own delivery mode so it aligns to their own educational context.

In response to the Bologna priorities for reforming HEIs through providing more accessible and flexible learning opportunities, all the modules have been translated into five languages

other than English and students can undertake a module in any of the partner countries. The modules also take account of the Framework for Action on Inter-professional Education and Collaborative Practice (WHO, 2010) in that they are designed for students from different professions to learn about, from and with each other to enable effective collaboration and improve health outcomes.

The four modules are:

- Systems thinking
- Models for improvement
- Measurements of improvement
- Communication and managing change

At the time of writing all of the modules have been validated in the lead institution with plans in place for validation in the other six HEIs. The modules will be offered as part of both undergraduate and postgraduate educational pathways thus placing Improvement Science education in the HE curricula of seven EU countries. The lead partner is delivering the 'Systems Thinking' module (SCQF level 9/ EQF level 6/ 1<sup>st</sup> cycle) online as part of the BSc in Professional Health Studies. The plan is to deliver the other three modules as an Honours pathway; BSc Professional Health Studies (Improvement Science) this would be at SCQF level 10 / EQF level 6/ 1<sup>st</sup> cycle). The other partners will either offer them as individual stand alone modules or embed them into existing programmes of study at the appropriate academic level within their institution.

The content of each module has been designed to address the gaps the project identified in accredited Improvement Science education. The content reflects the identified capability and competency requirements in relation to the knowledge, skills and behaviours necessary for healthcare professionals to practise Improvement Science. Picking up on the findings of a systematic literature review, all of the modules have work-based learning as a central component and a focus on the application of knowledge and skills in the workplace so that students not only know about Improvement Science but also have the skills and confidence to implement change (Boonyasai, 2007). A central aim is to educate the students in the 'how to' of Improvement Science, so work-based learning is a key central component of the formative and summative learning experience and assessment. Experiential learning is used throughout all of the modules, students are asked to undertake activities and exercises designed to bridge the academic-practice gap. For example, students learning activities involve asking the students to read, watch, reflect and write throughout the modules. They may be asked to read an article on human factors, then watch a video that illustrates an

organisations response to an adverse event, and then following this be asked to write a reflective account on the issues that are raised in relation to their own workplace context.

The first module 'systems thinking' is designed to equip healthcare students with the knowledge and understanding of a systems approach to care delivery. Students are introduced to Deming's work on 'Profound knowledge', the science of improvement, systems theory and the principles of interdependence. The focus of the module is to equip the student with the knowledge and understanding to develop, test and implement change in a system that results in improvement. It will help them understand the system of care they work in, identify how to improve the systems and prevent harm (Deming, 2000). The assessed course work asks the student to use relevant literature to provide a critical analysis of Deming's system of profound knowledge and provide a critical evaluation of their own workplace system with a view to proposing a change concept that will result in improvement.

The second module 'models for improvement' focuses on developing the student's knowledge and understanding of a range of models for healthcare improvement. They are introduced to several of these in depth and through various exercises and activities begin to apply these models of improvement to their own practice. The assessed coursework asks the student to consider how they would undertake a small change in healthcare practice in their own workplace setting which could lead to improvement. Using a minimum of three models of improvement they will be asked to demonstrate how they would go about introducing that change.

The third module 'measurements for improvement' focuses on developing the students' knowledge and understanding about a range of measurements for healthcare improvement. The student is introduced to several of these in depth, with the focus of the module being on learning where, when and how to apply measurement in practice and to measure change that demonstrates improvement. The assessed coursework asks the student to critically analyse the methods used to evaluate healthcare and appraise the importance of quality improvement to, and its influence on, the experience of patients or service users. They will also be asked to critically evaluate the key quality indicators, which apply within their own workplace and propose one small test of change to facilitate improvement in one of those indicators.

The fourth module 'communication and managing change' focuses on developing the students' knowledge and understanding of communication and managing change in the healthcare environment. The student is introduced to several types of change management

models and communication techniques. The focus of the module is on how healthcare professionals can use these to promote a culture of safety and improvement in healthcare. The assessed course work asks the student to produce a case study from their practice area that will identify the need for a change and propose an intervention. The student will provide a plan of the proposed change, which must include a plan for evaluation. The summative assignments of all the modules are assessed using the assessment processes and marking rubrics of each institution.

The effectiveness of these modules will not be able to be determined within the lifetime of the project. However the project has developed an evaluation framework to enable the HEIs to evaluate the impact and demonstrate the effectiveness of the modules on practice over time. Kirkpatrick's 4-Level Training Evaluation Model was the conceptual reference used to develop the specific framework (Kirkpatrick and Kirkpatrick, 2006). The framework consists of a minimum data set with the main variables or items corresponding to the module selected and a number of questionnaires designed for different participants at each stage of the learning process. The framework is designed to capture the impact of the different stages of the learning process from in-class learning, applying learning in practice during and after taking the module, how they are continuing to use HIS knowledge in their practice or teaching and beyond into the return on investment. The framework triangulates evaluation through gathering data from key people in the orbit of the student such as educators, healthcare professionals in practice settings and mentors / managers. The seven partner countries have piloted the questionnaires. This work has produced an easy to use evaluation framework (Figure 1) with all of the necessary data collection tools to evaluate the impact of the Improvement Science modules over time.

Insert Figure 1 here

## CONCLUSION

We contend that Improvement Science education is relevant to professionals at all stages of their professional development in whatever part of the healthcare system they work. It is our hope that these modules will go some way to making Improvement Science education less fragmented and disparate across Europe. Through offering evidence based accredited education that goes beyond conceptual knowledge and the acquisition of working knowledge this project will contribute to building the improvement capacity and capability in the European healthcare workforce. In turn this workforce has the potential to make systematic improvements through shared understandings of best practice and improvement methods in

their chosen workplace. Implementing Improvement Science education is one vehicle to infuse the principles of a safe system into healthcare organisations, to help organisations embrace change mechanisms to improve care and take a systems thinking approach to human error rather than a personal one.

Educators have an important role in supporting healthcare professionals and organisations to learn and make best use of evidence driven improvement methods. Within HEIs we argue that high quality Improvement Science education needs to be systematically integrated into undergraduate health and social care programmes. The outputs of this project go some way to making Improvement Science a staple part of healthcare education in a European context. Healthcare education needs to provide a workforce that has the confidence to improve processes and systems so that the care we deliver is safe, effective, person-centred, efficient, equitable and timely (IOM, 2001). We know that not doing so can result in suboptimal care or serious failings. For this education to be effective educators will need to be able to help students understand its value to improving their practice and ultimately the care they provide and alongside this equip them with the skills and confidence to become change agents and quality improvers in everyday practice.

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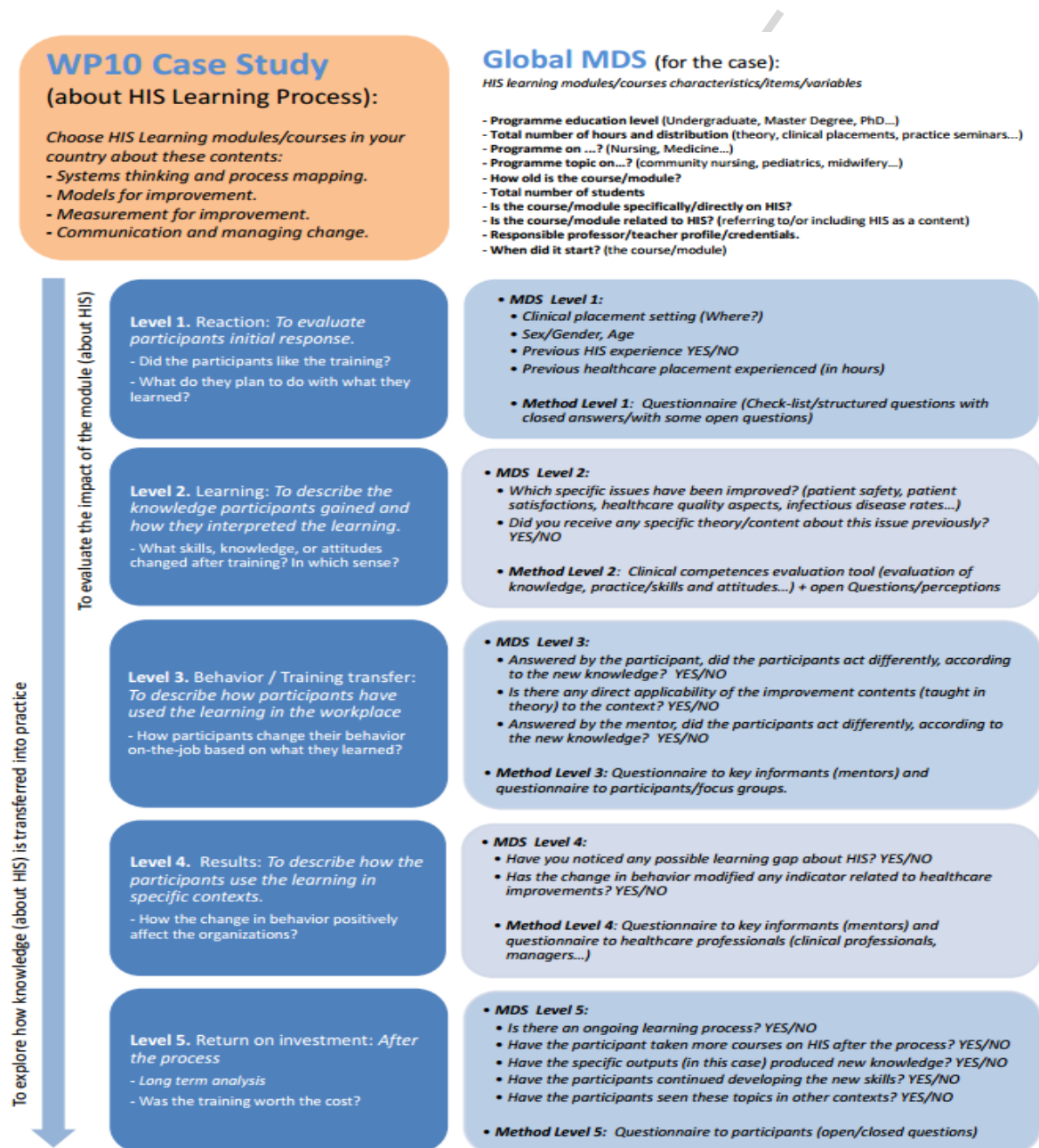
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Figure 1



## MAKING IT EASY TO DO THE RIGHT THING IN HEALTHCARE: ADVANCING IMPROVEMENT SCIENCE EDUCATION THROUGH ACCREDITED PAN EUROPEAN HIGHER EDUCATION MODULES

### Highlights

- A contemporary consensus definition of Healthcare Improvement Science is presented.
- The gaps in accredited Improvement Science education in Europe are outlined.
- Four improvement science modules suitable for European universities are presented.
- A framework for evaluating the impact of the modules is outlined.

ACCEPTED MANUSCRIPT