Articles

Using the Tuning Methodology to design the founding benchmark competences for a new academic professional field: the case of Advanced Rehabilitation Technologies

Ann-Marie Hughes, Chris Freeman, Tom Banks,
Hans Savelberg, and Mary Gobbi*

Abstract: Designing innovative high quality educational programmes to meet the workforce needs in emerging interdisciplinary areas of practice can present challenges to academics, students, employers and industrial partners. This paper demonstrates how the Tuning Process successfully helped to construct benchmark learning outcomes and competences in the area of healthcare practice where advanced technologies are used to improve movement namely Rehabilitation Technologies (RTs). The paper also discusses the engagement of patients, carers and carer organisations within the development of competences.

* Ann-Marie Hughes (A.Hughes@soton.ac.uk), PhD in Electronics and Electrical Engineering, is an Associate Professor in Rehabilitation Technologies at the Faculty of Health Sciences, University of Southampton (UK).

Chris Freeman (cf@ecs.soton.ac.uk), Ph.D. degree in applied control, is currently an Associate Professor at the University of Southampton (UK).

Tom Banks (Tom.banks0@gmail.com) is a Trainee Clinical Scientist in Cardiology at Guy's and St Thomas' NHS Foundation Trust (London, UK).

Hans Savelberg (hans.savelberg@maastrichtuniversity.nl), PhD in Medical Sciences, is a professor in Evolving Academic Education at the department of Human Movement Sciences at Maastricht University in the Netherlands.

Mary Gobbi (m.o.gobbi@soton.ac.uk), PhD in Education, is a Professor Fellow in Healthcare Education at the Faculty of Health Sciences, University of Southampton (UK). *More details on the authors are provided at the end the article.*

On behalf of the EU LLP Multilateral Project partners, namely; Adjunct prof. Ina Tarkka, University of Jyväskylä, Finland; Prof. Véronique Perdereau University Pierre & Marie Curie, France; Assoc Prof. Alessandra Pedrocchi, Politecnico di Milano, Italy; Dr Mihai Berteanu, Carol Davila University of Medicine and Pharmacy, Rumania, Prof. Philip Rowe University of Strathclyde in Glasgow, Scotland; and Prof. Panos Markopoulos, Eindhoven University of Technology, The Netherlands.

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Due to changing demographics, limited resources and the availability of technology, rehabilitation technologies are starting to be used for the assessment and treatment of patients. However there are currently no European transnational Bachelor or Master programmes targeted at educating people for the design, development, use and evaluation of these technologies. The contemporary field is predominantly staffed and resourced by engineering scientists and clinicians who were primarily educated in their primary discipline. The first generations of rehabilitation technologists have established this specialist field through invention, perseverance, and collaborative working. However, there is now a recognition that new and complementary skill sets are required by future graduates, whether engineering scientists or clinicians, so as to better meet the needs of clients and the employment market whether in the domains of industry, research, academia or clinical practice.

This project demonstrates how a group of European specialist rehabilitation technologists, supported by educationalists, collaborated to identify and develop the core competences and learning outcomes required by future Master's (second cycle) graduates in this new discipline. Building on the work of the Tuning Process and applying the principles embedded in the Bologna Process, future employability needs are determined through an imaginative, technological and cost conscious entrepreneurial approach to education.

Keywords: Rehabilitation Technology; Tuning; healthcare; engineering; patients; interdisciplinary; competences and curriculum design.

I. **Introduction**

In this paper we demonstrate how a group of European specialist rehabilitation technologists, supported by educationalists, collaborated to identify and develop the core competences and learning outcomes required by future Master's (second cycle) graduates in the new discipline of Advanced Rehabilitation Technology (ART). Building on the work of the Tuning Process, and applying the principles embedded in the Bologna Process, future employability needs were determined through an imaginative, technological and cost conscious entrepreneurial approach to education. This paper presents a case study illustration to demonstrate how the Tuning methodology was adapted successfully to elicit the core competences in a new field of practice at the intersection between engineering scientists and clinicians. The paper also discusses the involvement of patients, carers and patient organisations to help develop the core competences.

Rehabilitation Technology (RT) illustrates the challenges and trends within contemporary higher education. Higher education, and its associated graduate workforce, is characterised by increasing interdisciplinary, shifting

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boundaries within, and between, disciplines and the emergence of hybrid and new fields of study and work. The rapid advances in science and technology have already led to new disciplines being formed at the intersections of existing disciplinary research for example with biomedical scientists, biomedical engineers and interdisciplinary health research teams. While interdisciplinary education between clinical healthcare professions is not new,[1,2] interdisciplinary education between clinical professionals and engineering disciplines is a relatively new phenomena.

At the heart of this approach is the concept and application of collaborative working to develop the next generation of clinicians and scientists in the field. As Nissani argued, interdisciplinarity brings together distinctive features of two or more disciplines which are then applied to the domains of knowledge, research, education and theory and, in this case, clinical context and practice. Some of the known benefits of interdisciplinary research and knowledge are: creativity; new contributions brought by newcomers to the field; the avoidance of errors made by those from a single disciplinary field whose disciplinary knowledge/perspective may be inadequate; the capacity to address research and practical issues that lie at the intersections of the disciplines and require a more holistic approach.[3] Such interdisciplinarity needs facilitation, the use of a common framework of competence and programme development to mitigate any disciplinary discourse challenges. These challenges are themselves situated within a broader context of the skills required by a future healthcare workforce, economic trends and the health of the population.

1. *Economic, health, well-being, and educational drivers*

Within the European Union (EU) and other global economies, healthcare is one of the largest economic sectors, particularly in developed countries. The healthcare workforce absorbs a significant part of the labour force, for example within the EU-27 in 2010 there were approximately 17 million (8%)

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[1] Debra Humphris and Jill Macleod-Clark, "Shaping a Vision for a 'New Generation' Workforce" (University of Southampton: Institute for Public Policy Research Project Paper, 2002).

[2] Cath O'Halloran et al., "Developing Common Learning: The New Generation Project Undergraduate Curriculum Model," *Journal of Interprofessional Care* 20, no. 1 (2006).

[3] Moti Nissani, "Ten Cheers for Interdisciplinarity: The Case for Interdisciplinary Knowledge and Research," *The Social Science Journal* 34, no. 2 (1997).

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related jobs.[4] To supply the global workforce it has been estimated that approximately 1 million new doctors, nurses, midwives and public health professionals are trained annually. Associated global annual expenditure for health professional education has been estimated at US $100 billion for medicine, nursing, public health and allied professions - less than 2% of health expenditure worldwide.[5] Significant drivers are influencing the sector with respect to the need for new skills and competences namely, changes in demography, a rise in non-communicable diseases particularly long term conditions, the legacies of conflicts and the emergence of innovative technologies. The EU Action Plan for the Health Workforce recognises these challenges with one action line specifically focussed upon the need to anticipate future skills needs with accompanying continuous professional development and learning to update and refresh the workforce.[6]

One example of the increase in both the incidence and prevalence of long term conditions are those associated with stroke. in the EU, over six million people with stroke require care and two thirds of these have impairment of their affected arm four years post-stroke, resulting in an annual cost of €38 billion.[7] Within the field of rehabilitation, the rapid rise in the proliferation of technologies to support rehabilitation not only poses challenges for the current healthcare workforce, but also raises questions concerning the need for new roles within this sector to meet future needs. The challenges therefore was to develop new educational programmes to equip students and staff for novel healthcare roles and expertise at the interface between healthcare professionals currently assessing, delivering and evaluating rehabilitation solutions and engineers and researchers designing, developing, implementing and evaluating innovative technologies, as well as those adjusting and customising existing devices.

In essence, the field of RT has emerged through the work of pioneers with primary discipline backgrounds in science, engineering and healthcare practice (typically physiotherapy or occupational therapy). What became apparent to these pioneers was the need to 'pass on' their expertise to develop the future, and thus create an expanded specialist workforce for rehabilitation

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[4] Eurostat, "Nace Rev.2 Categories 86 & 87," (2011).

[5] Julio Frenk et al., "Health Professionals for a New Century: Transforming Education to Strengthen Health Systems in an Interdependent World," *The Lancet* 376, no. 9756.

[6] European Commission, "Commission Staff Working Document on an Action Plan for the Eu Health Workforce Report No. Contract No. Swd 93 Final," (Strasbourg2012).

[7] Nick Townsend, Mike Nichols, Ramon Luengo-Fernandez, Jose Leal, Alastair Gray, Peter Scarborough and Mike Rayner,"European Cardiovascular Disease Statistics 2012," (2012).

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technology. A group of renowned experts in the field of Rehabilitation Technology collaborated to develop the competences required in this new discipline through the Life Long Learning EU grant: (2012-3375/001-001). Facilitated by a Tuning expert, the team applied the Tuning methodology to establish the core competences for this new discipline. The paper proceeds by situating this development in the healthcare and educational context, before demonstrating the application of the Tuning methodology to competence and curriculum design. In the final section of the paper we address the barriers, obstacles and enablers that were encountered during the project.

2. *Educating for a 'new' academic discipline*

The field of RT is new. It is has been defined as the "systematic application of technologies, engineering methodologies, and scientific principles to meet the needs of, and address, the barriers confronted by individuals with disabilities. Relevant areas that are addressed are: education, rehabilitation, employment, transportation, independent living, and recreation. The term includes rehabilitation engineering, assistive technology (AT) devices, and assistive technology services".[8] Rapid technical advances are being made. Evidence is growing for the use of ATs to reduce impairments and in some cases improve function; technologies are increasingly used to augment conventional therapies, however translation into general clinical practice is still relatively limited. These advances, combined with the fragmentation caused by geographically dispersed academic and health centres, isolated disciplines and different health systems have led to the following consequences:

— Graduates entering the EU labour market were not equipped with the skills and expertise employers needed in this field.[9]
— Partly as a consequence of the first point, translation of technologies into clinical practice is limited, as stakeholder needs are not considered.
— From an education perspective, individuals working in the field of Assisted Rehabilitation Technology receive their first cycle education in their home discipline, primarily from an engineering/science base

[8] Rehabilitation Engineering and Assistive Technology Society of North America, "Resources and Definitions," http://www.resna.org/resources-definitions.

[9] European Commission, "White (Coat) Jobs: The Eu Health Workforce," in *Jobs for Europe: The Employment Policy Conference*, ed. European Commission (Brussels: European Commnission, 2012).

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or a health professional base. The individuals then practise in the field, and usually engage with second cycle education within their primary discipline. This meant that neither group gains significant understandings of the holistic needs of the stakeholders.

In light of these various drivers, it was evident that a collaborative venture was essential as there was no single academic or industrial partner sufficiently equipped to run a viable interdisciplinary education programme at European Master level. The EU Life Long Learning funding stream provided the vehicle to enable the expert group to collaborate and use the Bologna and Tuning process to develop a second cycle programme specifically geared to addressing this unmet need for an interdisciplinary Master in Advanced Rehabilitation Technologies, using the existing EU Tuning methodology. The ambition was to produce the next generation of RT leaders who could advance this growing market for clinical, research, technical and commercial purposes. In so doing, it was anticipated that the programme would bring together European partners with a track record of delivery in education and research in the field. Sharing best practice was an important goal, along with innovative methods of teaching and delivery, contributing to a high quality common standard. The process of collaboration was envisaged to facilitate cooperation and synergies between universities and companies. Through the development of benchmark competences, the transference of competencies gained within the rehabilitation industry would be possible.

3. *Interdisciplinary principles*

Interdisciplinary projects can be fraught with problems, and so the project identified key principles to underpin the collaboration. These included:

— A commitment to implement the Bologna Process through a training component to enable all partners to appropriately use the Tuning methodology and share common understandings of competences, learning outcomes and programme design.
— Ensuring that questionnaires and other key materials were amenable to translation in local languages to reflect differing educational and research cultures.
— Contributing to researcher and student mobility and transfer of qualifications.

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— Linking existing research centres, strengthening and building collaborations to design, develop, assess and evaluate technologies which will help in addressing the major challenges of coping with an ageing population.
— Sharing the educational knowledge gained with external colleagues so they could use, enhance and comment on the competences developed through the website.

The importance of improving the interaction between front line clinicians, basic scientists, and research consortia in this field to improve translation was a key finding of the Cumberland Consensus Working Group (2009).[10] Similarly, Burridge and Hughes (2010) who reviewed development and preliminary clinical testing of novel technologies including those from non-medical fields, such as the internet, virtual reality, and sensor and control engineering found that the translation of research into clinical practice has been impeded by an absence of robust clinical effectiveness and usability evidence.[11] The main users here of course are patients, their carers and front line staff. Bringing together interested stakeholders was considered a stepping stone towards addressing the hitherto lack of a strategic approach to the design, development, assessment and evaluation of new technologies. While there are economic consequences associated with competition for small grants, and reduced competitiveness of the European Industry, more crucially co-design of new technologies is critical to ensure they are appropriate for the stakeholders. This meant that the 'designers' needed not only collaborative working skills, but also skills in relating to user groups like patients and their carers. While the involvement of stakeholders is intrinsic to the Tuning Methodology, in this project the stakeholder group was extended to involve patient, carers and patient and carer organisations, students, clinicians, and small and medium sized enterprises. These groups have traditionally not been consulted about future workforce skills. Their engagement was essential to fully understand the way this discipline was emerging; to gather information about the perceived educational and skill needs of this 'new' workforce and that the users' needs were addressed positively.

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[10] Group Cumberland Consensus Working et al., "The Future of Restorative Neurosciences in Stroke: Driving the Translational Research Pipeline from Basic Science to Rehabilitation of People after Stroke," *Neurorehabil Neural Repair* 23, no. 2 (2009).

[11] Jane Burridge and Ann-Marie Hughes, "Potential for New Technologies in Clinical Practice," *Current Opinion in Neurology* 23, no. 6 (2010).

4. *Application of the Tuning Process: Programme and Competence Design*

While the Tuning methodology is well documented,[12] its use to create a new professional workforce at post-graduate level has not been reported. The Tuning methodology comprises five crucial action lines around which the project plan work packages were constructed. These were adapted to develop the programme as Table 1 demonstrates. A summary of these stages now follows.

Table 1

Application of Tuning action lines

Tuning Action Lines	Adaptation and interpretation Stages of Project
1. Generic academic competences	1. *Establishing benchmark competences and programme learning outcomes*
2. Subject-specific competences	
3. The role of ECTS as an accumulation system	2. *Establishing the ECTS modular framework* for the programme
4. Approaches to learning, teaching and assessment	3. *Programme design work packages*
5. The role of Quality enhancement in the educational process (emphasizing systems based on internal institutional quality culture)	4. *Inter-institutional Quality Governance:* Establishing institutional quality mechanisms and how they could inter-relate

The actual programme design similarly adapted the ten steps outlined by Lokhoff et al. , incorporating the five action lines.[13] Many of the activities ran concurrently, particularly once the programme learning outcomes had been developed. Step 10, which included the implementation and evaluation stage, was replaced by the Quality Framework and Inter- institutional quality governance work package which was necessary to enable a double award and European Master programme to be developed. Analysis of this component of

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[12] *Universities' Contribution to the Bologna Process. An Introduction*, ed. J; Wagenaar Gonzalez, R., 2nd ed., Tuning Educational Structures in Europe (Bilbao, Spain: University of Deusto Press, 2008).

[13] Jenneke Lokhoff et al., eds., *A Tuning Guide to Formulating Degree Programme Profiles. Including Programme Competences and Programme Learning Outcomes* (Bilbao: Universidad de Deusto, 2010): 15.

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the project is beyond the scope of this paper. The working definitions of both competence and learning outcome were those used within the Tuning methodology and European Qualifications Framework.

Step 1: Determine need and potential

While the application for funding had articulated the need for the programme, this was continually revisited with stakeholders throughout the project. For this project the partners agreed on five stakeholder groups which together included students, patients and carers, potential employers, academics and healthcare professionals (working clinically). This included verifying the existence of new or emergent programmes internationally and inviting open comments via the website to interested parties. The universities within the consortium recruited students and academics from their existing clinical or engineering disciplines. Specifically, students who might be interested in this field were sought as there were no existing interdisciplinary RT students. The consortium members and their research or professional networks were used to recruit patients using rehabilitation technologies and employers and industry partners.

Step 2: Defining the profile and the key competences & Step 3: Formulate the Programme Learning Outcomes

In these stages, the project partners generated a set of draft competences through a series of interactive workshops. In these workshops partners first established the profile of the graduate they wished to develop and then identified the programme competences from both an interdisciplinary and monodisciplinary perspective. Key generic competences were also recognised. They considered the nature of the person they wished to develop, the competences and skills that they should have, and the roles/health settings and employment environments in which the person might work. The competences were further refined to be clustered as either being specific to those with a predominantly clinical or engineering background or those that were competences core to both groups and all future RT professionals. These were expressed as simple statements that could then become either competences or intended learning outcomes. For example:

— Outcome core to all students: understands the impact of disability on people and society.

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— Outcome specific to clinicians: can use healthcare knowledge to develop advanced rehabilitation technology.
— Outcome specific to engineers or scientists: can identify the healthcare aspects of advanced rehabilitation technologies.

Prior to the questionnaire going 'live', awareness was raised at RT conferences and open days, and people were invited to leave contact details if they wanted to have further information.

Finally, a list of draft benchmark statements was formulated through consensus that would be tested with stakeholders through the on-line Tuning questionnaire. Each project partner had responsibility for identifying their key stakeholders and building relationships. The questionnaire was translated into French and Italian, and then back translated to check for accuracy. The questionnaire was piloted with a sample of 20 people, including representatives from all stakeholder groups. Subsequent refinement occurred and the final questionnaire was distributed from 11th June 2013 until the 5th August 2013. The questionnaire was administered and analysed by the University of Deusto according to the traditional Tuning methodology and the findings are found in the next section. Once the final competences had been designed, they were then converted into programme learning outcomes (PLO).

Step 4: Modularisation

It was self-evident that modularisation was necessary to enable student and staff mobility between four universities. The key issue was determining the ECTS equivalence in terms of module size and accommodating the different academic terms employed by the respective partner institutions. Finally the basic module size was agreed at 10 ECTS with a 2 year full time programme credit value of 120 ECTS. Four semesters of 30 ECTS were agreed, comprising six core compulsory modules, 30 ECTS for optional modules and a required 30 ECTS empirical research dissertation.

Step 5: Identify competences and formulate learning outcomes for each module

Using the table matrix design of Programme Competences (PC) and Progamme Learning Outcomes (PLO), the partners first clustered the PLOs into groups that represented core research, core engineering or clinical pathways, identifying any generic competences that could be developed in

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more than one area. The remaining PC and PLOs were then clustered and debated. In this debate, cognizance was taken of the development of student learning and those competences which relied on prior learning: hence the sequence of modules could then be determined. Once the modules were developed in outline, a similar programme matrix was developed for the generic competences so that specific modules were identified to include generic competence acquisition (also known as key skills).

Step 6: Determine the approaches to teaching, learning and assessment

Once the draft module learning outcomes had been identified for each module, module leaders then created the module profile identifying what their ideal learning, teaching and assessment strategies would be.

Step 7: Verifying the extent to which the key generic and subject specific competences are addressed throughout the programme

In this final validation step, a group workshop of all the partners critically reviewed the modules in their entirety and mapped the generic and subject specific competences to ensure there was constructive alignment, coherence of student progression and integrity of the programme.

Step 8: Description of the programme and modules

A programme description and module descriptions were developed on the basis of the profile, key Programme Competences, Programme Learning Outcomes, allocation of credits and the teaching, learning and assessment approaches identified.

Step 9: Balance and feasibility

Once the final pedagogies and credit structure was in place, it was possible to check the balance and feasibility of the programme ensuring that the programme was realistic in expectation of the students both in terms of their academic and clinical achievements, but also their workload and time management.

5. *Application of the Tuning Process: Analysis and determination of the benchmark competences*

The questionnaire developed can be found in Appendix 1 and the results are in the next section.

II. **Ratings and rankings of the generic and subject specific competences**

For each competence respondents were asked to rate:

a) how **important** they thought it was that a student should acquire the competences in his/her education at a level of Master of Science, using the values 1 to 4 according to the following key: 1= Not important, 2= Slightly important, 3= Moderately important, 4= Very important.
b) how **achievable** the competence was through the use of an education at MSc level, using the values 1 to 4 according to the following key: 1= Not achievable, 2= Slightly achievable, 3= Moderately achievable, 4=Very achievable.

Respondents were then asked to rank the five most important competences according to their opinion in order of importance by assigning them a score from 1 to 5 (where 1 was most important). To analyse the results, the first chosen competence was assigned 5 points, the second one 4 points, the third one 3 points, the fourth 2 points and 1 point to the fifth and last one. Competences not chosen were assigned zero points.

III. **Results**

Consent to participate was assumed following completion and submission of the online questionnaire (Appendix 1). A total of 485 questionnaires were returned. These comprised 199 (41%) academics, 36 (7%) employers, 95 (20%) students, 134 (28%) clinicians, and 21 (4%) patients and carers or patient organisations. Responses were anonymous. Not all respondents completed the questionnaire for both the subject specific and the generic competences; the numbers of respondents are presented for each in Table 2.

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Table 2

Response frequencies in groups and types of competences

Stakeholders	Competencies	
	Subject specific	Generic
Academics	199	192
Employers	36	35
Students	95	87
Clinicians	134	130
Patients	21	19
Total	485	463

1. *Ratings and rankings for Subject Specific and Generic Competences*

Ratings: Importance and achievement ratings for each competence are displayed in Figure 1. All stakeholders rated all the competencies as important with scores over 2.7, and achievable with scores over 2.1. Importance ratings were higher than achievement ratings for all competencies except for the following subject specific competences 15 (Specialise in an area of rehabilitation technology) voted by academics, clinicians, employers, and students), 14 (Knows the processes of innovation and commercialisation) voted by students alone, and 4 (Can create technologies to meet the needs of different patient populations), 12 (Can work towards commercial exploitation of advanced rehabilitation technologies) and 14 (Knows the processes of innovation and commercialisation) voted by patients, carers and patient organisations alone.

The highest rated subject specific competences in terms of importance across the different stakeholder groups were by academics 18 (Can collaborate with engineers and scientists), by employers 21 (Can collaborate with health professionals) and 6 by the group categorised as 'patients' which this included patients, carers and patient organisations (Can combine knowledge from different specialisations). The highest rated generic competencies in terms of importance were for employers 2 (Can work with experts from different professions), for patients 3 (Can problem solve, make decisions and adapt to change), and for clinicians 9 (Can work safely, effectively, and ethically).

The most striking difference of opinion for subject specific competencies was on competence 13 (Can advise policy makers in the use of rehabilitation

technologies) with patients and carers and carer organisations rating this as more important and more achievable than the other stakeholder groups especially employers. The most striking difference of opinion for generic competencies was for both importance and achievability on competence 7 (Do not impose their personal views and are sensitive to cultural differences) with patients and carers and carer organisations rating this as more important that the other stakeholder groups especially employers, whilst clinicians rated it as more achievable than all other groups, especially employers.

Ranking: The five top ranked competencies across each stakeholder group are displayed in Table 3. Across all stakeholder groups the key common top ranked subject specific competencies were: Understands the impact of disability on people and society, Can design rehabilitation technologies to meet individual's needs. Where priorities differed: Patients, carers and patient organisations prioritised a holistic approach, patient needs and health and safety. Other groups prioritised technologies to improve health outcomes (Students, academics and clinicians), combined knowledge (employers, students, academics only), using research and theory (academics and clinicians), interdisciplinary working (employers only), technologies to improve patient population needs (students only) and roles and responsibilities (clinicians only).

Across all stakeholder groups the key top common top ranked generic competencies were: can communicate effectively, can work with experts from different professions and can work safely, effectively, and ethically. Where priorities differed: patients, carers and patient organisations prioritised high standards and learning from experience to develop self and professions. Employers, students, academics and clinicians all prioritised problem solving and learning from experience to advance technology.

2. *Agreement between stakeholder groups*

For each result (importance, achievement and ranking) the correlations among the means are given by stakeholder groups in Table 4. It can be observed that the correlations across all competencies for importance, achievement and rankings between the other groups and patients, carers, and carer organisations are the lowest. For subject specific competencies: across ratings for importance and achievement, and rankings the highest correlation is between academics and clinicians and the lowest between employers and patients, carers and patient organisations. With generic competencies the case was more complex: across ratings for importance the highest correlation

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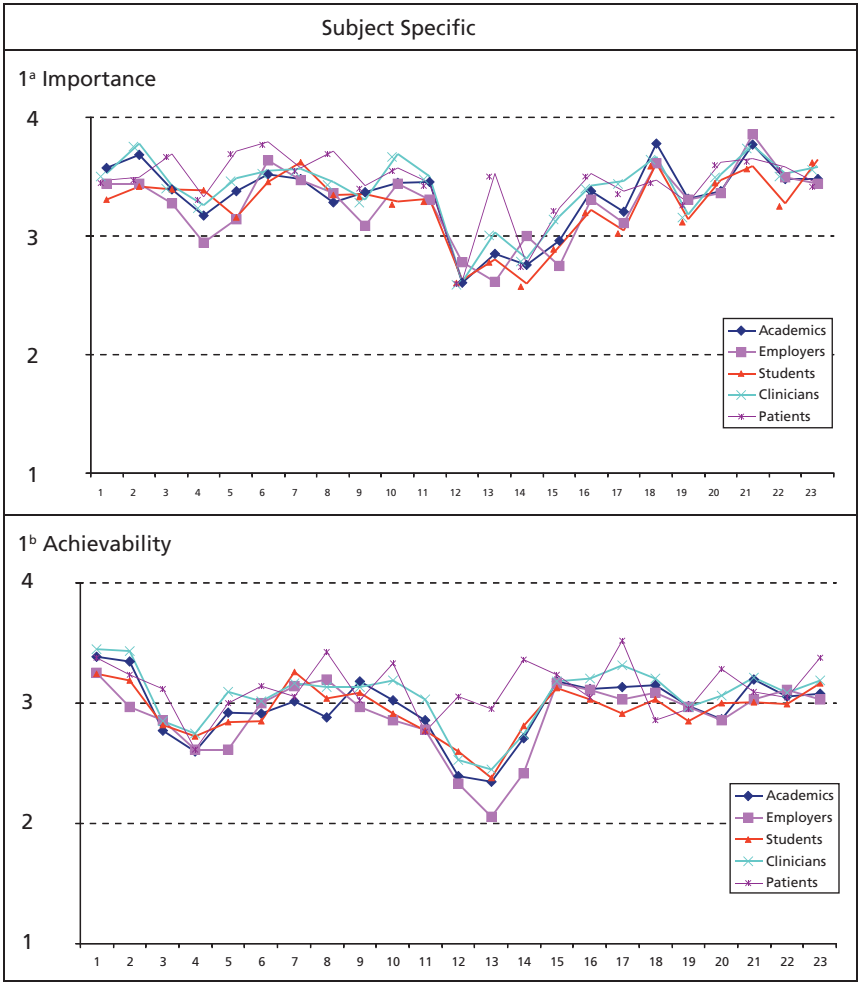
Subject Specific
1a Importance
4
3
2
1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Academics
Employers
Students
Clinicians
Patients
1b Achievability
4
3
2
1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Academics
Employers
Students
Clinicians
Patients

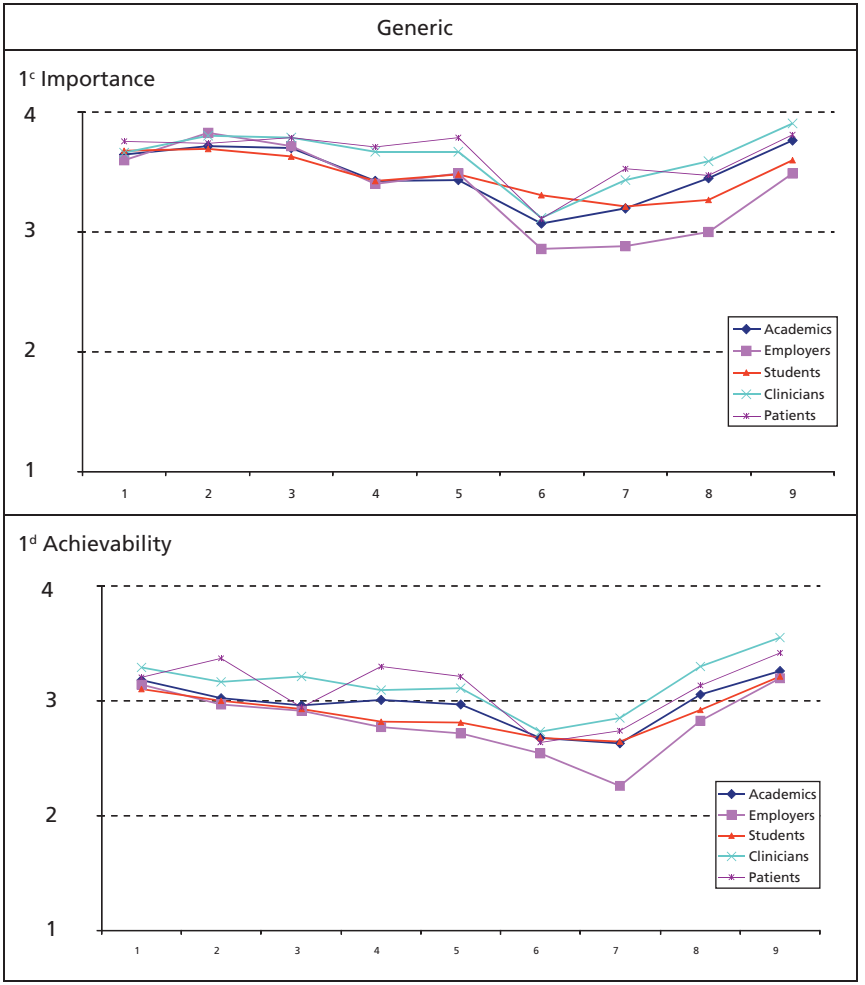

Figure 1

Mean stakeholder ratin»gs of competencies for subject specific and generic competencies: importance and achievability

(Responses were weighted so that the factors identified as most important were scored 5 and those of least importance scored 1. The competences not chosen were assigned zero points). For ease of reading "Patients, carers and patient organisations" responses are categorised as "Patients".

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Table 3

Top five ranked subject specific and generic competencies for each stakeholder group

Subject specific Rankings	Employers	Patients, carers, and patient organisations	Students	Academics	Clinicians
1	Engineering pathway: Can collaborate with health professionals	Understands the impact of disability on people and society	Can design rehabilitation technologies to meet individual's needs	Can design rehabilitation technologies to meet individual's needs	Understands the impact of disability on people and society
2	Can design rehabilitation technologies to meet individual's needs	Takes into account physical, psychological, spiritual, and social well-being. Takes into account physical, psychological, spiritual, and social well-being	Can combine knowledge from different specialisations	Can combine knowledge from different specialisations	Can use technology to improve health outcomes
3	Understands the impact of disability on people and society	Can create technologies to meet the needs of different patient populations	Can create technologies to meet the needs of different patient populations	Can use research and theory to advance the use of rehabilitation technologies in clinical practice	Understands the specific role and responsibilities of a rehabilitation technologist
4	Can combine knowledge from different specialisations	Can design rehabilitation technologies to meet individual's needs	Can use technology to improve health outcomes	Understands the impact of disability on people and society	Can design rehabilitation technologies to meet individual's needs
5	health professionals pathway: Can collaborate with engineers and scientists	Is able to conduct a health and safety risk assessment of rehabilitation technologies	Understands the impact of disability on people and society	Can use technology to improve health outcomes	Can use research and theory to advance the use of rehabilitation technologies in clinical practice

Generic Rankings	Employers	Patients, carers, and patient organisations	Students	Academics	Clinicians
1	Can problem solve, make decisions and adapt to change	Can work with experts from different professions	Can problem solve, make decisions and adapt to change	Can communicate effectively	Can problem solve, make decisions and adapt to change
2	Can communicate effectively	Can work safely, effectively, and ethically	Can work with experts from different professions	Can work with experts from different professions	Can work safely, effectively, and ethically
3	Can work with experts from different professions	Can work within relevant codes of conduct to achieve a high standard	Can communicate effectively	Can problem solve, make decisions and adapt to change	Can communicate effectively
4	Can learn from experience to improve the use of advanced rehabilitation technology in healthcare	Can communicate effectively	Can work safely, effectively, and ethically	Can work safely, effectively, and ethically	Can work with experts from different professions
5	Can work safely, effectively, and ethically	Can learn from experience for their own and their profession's development	Can learn from experience to improve the use of advanced rehabilitation technology in healthcare	Can learn from experience to improve the use of advanced rehabilitation technology in healthcare	Can learn from experience to improve the use of advanced rehabilitation technology in healthcare

Table 4

Correlation between groups for subject specific and generic competencies

	Subject specific					Generic				
	Academics	Employers	Students	Clinicians	Patients	Academics	Employers	Students	Clinicians	Patients
Importance										
Academics	1.0000					1.0000				
Employers	0.8848	1.0000				0.8707	1.0000			
Students	0.8904	0.7883	1.0000			0.8630	0.9476	1.0000		
Clinicians	0.9387	0.8098	0.8587	1.0000		0.9329	0.8137	0.7152	1.0000	
Patients	0.7247	0.5660	0.7180	0.8067	1.0000	0.8247	0.8277	0.7089	0.9299	1.0000
Achievement										
Academics	1.0000					1.0000				
Employers	0.8478	1.0000				0.9441	1.0000			
Students	0.8725	0.8684	1.0000			0.9353	0.9609	1.0000		
Clinicians	0.9605	0.8546	0.8725	1.0000		0.9439	0.8716	0.9258	1.0000	
Patients	0.3486	0.3133	0.4054	0.4134	1.0000	0.8795	0.7606	0.7599	0.7994	1.0000
Ranking										
Academics	1.0000					1.0000				
Employers	0.8478	1.0000				0.9134	1.0000			
Students	0.8725	0.8684	1.0000			0.9462	0.9796	1.0000		
Clinicians	0.9605	0.8546	0.8725	1.0000		0.9624	0.8726	0.9018	1.0000	
Patients	0.3486	0.3133	0.4054	0.4134	1.0000	0.3505	0.0823	0.1853	0.2391	1.0000

The closer the value to 1 the higher the agreement between stakeholders.
For ease of reading "Patients, carers and patient organisations" responses are categorised as "Patients".

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is between academics and clinicians and the lowest between students and patients, carers and patient organisations; for achievement the highest correlation is between employers and students and the lowest between students and patients, carers and patient organisations; and for rankings the highest correlation is between employers and students and the lowest between employers and patients, carers and patient organisations.

IV. **Discussion**

This questionnaire provides evidence of stakeholders' views on the competencies which should be used in the design of a European Master in Advanced Rehabilitation Technology (ART) and a benchmark from which future developments in the field may be compared. ARTs will become increasingly important in the drive to deliver cost-effective improvements in rehabilitation and to satisfy, for example EU legislation concerning medical devices, consumer choice, freedom of movement of staff and clients.

Despite the increasing reference to ARTs in healthcare policy, research into effectiveness and investment in commercial development, no previous questionnaire has sampled or compared what stakeholders' views are regarding course competences. Our questionnaire has generated new information about the importance and achievability of competences, and highlighted where stakeholder groups have different priorities. Based on our findings, we discuss how opportunities can be exploited and barriers overcome. We also discuss the influence our sample may have had on our findings, the strengths and limitations of the questionnaire and how it will impact on future work.

The correlations between groups for subject specific and generic competencies highlight the value of using the Tuning tool to capture views from the range of stakeholders to identify where key differences in rating and rankings lie. In this example the main differences between what is important and achievable to patients, carers and patient organisations and the other groups, particularly employers is noteworthy. The key differences in priorities for the former in terms of importance and achievability were "advising policy makers in the use of rehabilitation technologies" and "Do not impose their personal views and are sensitive to cultural differences" with patients and carers and carer organisations rating this as more important that the other stakeholder groups especially employers, whilst clinicians rated it as more achievable than all other groups, especially employers. Patients, carers and patient and carer organisations prioritised in the rankings for subject specific

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competences, a holistic approach, patient needs and health and safety. Within the generic competencies the group prioritised high standards and learning from experience to develop self and professions. It should not be taken that employers do not think that these competencies are important, however they merely prioritised other areas. The high rating and ranking of these competencies does highlight differences which a Master Programme can address.

In the introduction to this paper, we drew attention to a number of challenges that we envisaged could be addressed by using the Tuning process when developing competences for an interdisciplinary Master programme in a new academic discipline. We identified the challenges of multidisciplinarity, combining expertise in care, technology and science, and students being well prepared for the labour market. The results of the study show that different stakeholders set different priorities. Traditionally, (often monodisciplinary) programmes were designed by academics, who have their (limited) view on competences required. The discrepancy between stakeholders that we found when applying the Tuning approach makes the limitations in the view of academics explicit and shows that relying on academics alone could lead to programmes that are not optimally tuned to the wide range of societal requirements.

The second important point to note is the crucial role that interdisciplinary collaboration and dialogue plays. This is most evident when there is concurrent development of interdisciplinary competences for shared core competences and specific competences related to the student pathway as clinician or engineer. This brings a new dimension to interdisciplinary competence development as both groups of academics and students need to comprehend the pathway of their professional collaborators. It will be interesting to witness whether this change as RT emerges over the next decade.

The study has several strengths. It is based on an international questionnaire of a large number of stakeholders (n = 485). The competencies were developed using data generated by two meetings with the core group and subsequently pilot tested to ensure relevance, comprehensiveness and to minimise bias. However there were limitations. There is a selection bias in the way the questionnaires were designed and potentially how participants responded to them. The respondents, being a self-selected sample, mean that the results are biased towards the views of people interested in ARTs. Also the patient, carer and carer organisation respondents constituted only 4% of the respondents.

People may also have been more likely to look for and complete the questionnaire if they had an interest in ARTs. Additionally, the response rate cannot be specified for the online version of the questionnaire. The number

of individuals involved is uncertain, for instance we cannot guarantee that individuals have not completed more than one questionnaire. Moreover, a social desirability bias (adapting responses to meet what people believe they should be thinking) cannot be ruled out.

V. **Conclusions**

This study has enabled benchmark competences to be identified for a European Master of Science in Rehabilitation Technologies. The results of this consensus study will inform the development of a European Master ensuring the programme developed meets stakeholder needs, as well as providing a benchmark ensuring best practice for the emerging field, which can be reassessed in the future. We have also demonstrated how adapting the Tuning methodology in this context revealed the crucial role played by stakeholders in the design of new emerging fields. It is clear that the quality of programmes, and consequently the postgraduate workforce, can be strengthened through the engagement of a wide range of international stakeholders.

Bibliography

America, Rehabilitation Engineering and Assistive Technology Society of North. "Resources and Definitions." http://www.resna.org/resources-definitions.

Burridge, Jane, and Ann-Marie Hughes. "Potential for New Technologies in Clinical Practice." *Current Opinion in Neurology* 23, no. 6 (Dec 2010): 671-7.

European Commission. "Commission Staff Working Document on an Action Plan for the EU Health Workforce Report No. Contract No. Swd 93 Final." Strasbourg, 2012.

———. "White (Coat) Jobs: The Eu Health Workforce." In *Jobs for Europe: The Employment Policy Conference*, edited by European Commission, 1-4. Brussels: European Commnission, 2012.

Cumberland Consensus Working Group, B. Cheeran, L. Cohen, B. Dobkin, G. Ford, R. Greenwood, D. Howard et al. "The Future of Restorative Neurosciences in Stroke: Driving the Translational Research Pipeline from Basic Science to Rehabilitation of People after Stroke." *Neurorehabil Neural Repair* 23, no. 2 (Feb 2009): 97-107.

Eurostat. "Nace Rev.2 Categories 86 & 87." 2011.

Frenk, Julio, Lincoln Chen, Zulfiqar A. Bhutta, Jordan Cohen, Nigel Crisp, Timothy Evans, Harvey Fineberg et al. "Health Professionals for a New Century: Transforming Education to Strengthen Health Systems in an Interdependent World." *The Lancet* 376, no. 9756 (2010): 1923-58.

Lokhoff, Jenneke, Bas Wegewijs, Katja Durkin, Robert Wagenaar, Julia González, Ann Katherine Isaacs, Luigi F. Donà dalle Rose, and Mary Gobbi, eds. *A Tuning Guide to Formulating Degree Programme Profiles. Including Programme Competences and Programme Learning Outcomes*. Bilbao: Universidad de Deusto, 2010.

Macleod-Clark, Jill and Humphris Debra. "Shaping a Vision for a 'New Generation' Workforce." 14. University of Southampton: Institute for Public Policy Research Project Paper, 2002.

Nichols Melanie, Nick Townsend, Ramon Luengo-Fernandez, Jose Leal, Alastair Gray, Peter Scarborough, and Mike Rayner. "European Cardiovascular Disease Statistics 2012." 2012.

Nissani, Moti. "Ten Cheers for Interdisciplinarity: The Case for Interdisciplinary Knowledge and Research." *The Social Science Journal* 34, no. 2 (1997): 201-16.

O'Halloran, Cath., Sarah Hean, Debra Humphris, and Jill. Macleod-Clark. "Developing Common Learning: The New Generation Project Undergraduate Curriculum Model." *Journal of Interprofessional Care* 20, no. 1 (2006/01/01 2006): 12-28.

Universities' Contribution to the Bologna Process. An Introduction. Tuning Educational Structures in Europe. Edited by J; Wagenaar Gonzalez, R. 2nd ed. Bilbao, Spain: University of Deusto Press, 2008.

About the Authors

ANN-MARIE HUGHES (A.Hughes@soton.ac.uk) is an Associate Professor in Rehabilitation Technologies at the Faculty of Health Sciences, University of Southampton (UK). Her research streams are centred on her understanding of user needs, which she has used to influence engineering design and clinical evaluation of novel rehabilitation technologies including Robotics, Functional Electrical Stimulation, Internet-based motivational rehabilitation and Non-invasive brain stimulation. This has driven the design of multidisciplinary, research-led education and stakeholder engagement. Ann-Marie Hughes is a chartered Physiotherapist and holds a PhD in Electronics and electrical engineering from the University of Southampton. She is a steering committee member of the International Consortium of Rehabilitation Robotics, and the International Industry Society of Advanced Rehabilitation Technologies, and member of the International Standards Organisation (ISO/IEC SC 62D/JWG 36 —Medical robots for Rehabilitation). Ann-Marie is also a Registered EU reviewer, and within the UK, is a member of the British Standards Institution (subcommittee CH/62/4), reviewer for the UK Stroke Guidelines on rehabilitation robots and a grant panel member for the UK Multiple Sclerosis Society.

CHRIS FREEMAN (cf@ecs.soton.ac.uk) received the B.Eng. degree in Electromechanical Engineering and the Ph.D. degree in applied control from the University of Southampton, Southampton (UK) in 2000 and 2004, respectively,

and the B.Sc. degree in Mathematical Sciences from Open University, Milton Keynes (UK) in 2006. He is currently an Associate Professor at the University of Southampton. He has authored over 220 refereed conference and journal papers in his research areas, as well as two books. His current research interests include the development, application and assessment of iterative learning and repetitive controllers within both the biomedical engineering domain and for application to industrial systems.

TOM BANKS (Tom.banks0@gmail.com) is a Trainee Clinical Scientist in Cardiology at Guy's and St Thomas' NHS Foundation Trust (London). After completing his Bachelor's degree in Sport Science at the University of Southampton, he worked at the University in the development of a Masters programme in Advance Rehabilitation Technologies. He continues to be involved in curriculum development and online education for medical students at King's College London. He is currently completing a Masters degree in Clinical Science (Newcastle University) with a thesis investigating the geometric and spatial measurements of the Mitral Valve Annulus using Computed Tomography.

HANS SAVELBERG (hans.savelberg@maastrichtuniversity.nl) is a professor in Evolving Academic Education at the department of Human Movement Sciences at Maastricht University in the Netherlands. He performs research within the domains of both human movement science (HMS) and educational sciences (ES). His research in HMS focusses on understanding the relationship between muscle function and capacity in various kinds of human movement performance (e.g. plantar pressure patterns in people with diabetes, cycling) and on exploring the relationship between excessive daily sitting time and health outcomes (cardiometabolic risk factors, bone quality) and cognitive performance. His passion in the domain of ES involves assessing determinants of intrinsic motivation and creating educational settings in accordance with these determinants. Hans Savelberg earned a PhD-degree in Medical Sciences and currently is director of education for the programmes in BioMedical Sciences at the faculty of Health, Medicine and Life Sciences at Maastricht University.

MARY GOBBI (m.o.gobbi@soton.ac.uk) is a Professor Fellow in Healthcare Education at the Faculty of health Sciences, University of Southampton. Mary is an expert educational developer and evaluator, specialising in competence based education and regulation. She is the joint co-ordinator for the nursing component of the European Union Socrates Tuning Project which designed Pan European competences for nursing and other subject areas. Mary consults and works in collaboration with other health care disciplines including medicine, midwifery, occupational therapy and physiotherapy to develop national and transnational competence based frameworks. She has been involved in a range of high impact European Union funded competence related projects with regulators and accreditation agencies. She is the Founding Director of the Faculty Education Development and Scholarship Hub. She is particularly interested in learning in the workplace and the use of intuition and reflection in action.

Annexes

A) Questionnaire

EU MSc in Advanced Rehabilitation Technologies

European Questionnaire on Subject Specific and Generic Competences

This EU funded project hopes to design and implement a master's level degree in advanced rehabilitation technologies. The project team have created the following questionnaire to help capture your views on what skills and competences you believe are appropriate for a graduate of the programme in order to design a course that fits the needs of individuals, society and the healthcare industry.

The survey has been split into two parts: Subject Specific competences and Generic competences. Please complete both sections. **Please complete ALL questions, DO NOT leave any blanks.**

Many Thanks.

For further information on the EU project please visit www.rehabtech.soton.ac.uk/

We are interested in your opinions. There are no right or wrong answers. Most of the questions will require you to either tick the box, or circle the number which most accurately reflects your own opinion using a BLUE or BLACK ball-point. If you make a mistake, do not worry. Just cross through the answer you DO NOT want and make your selection as before.

European Questionnaire on Subject Specific Competences

Below are presented a series of specific competences to your area. Please answer all the questions. Please select the best option in each case by ticking the box.

1) I am a

	Student (from health/biomedical/neuro sciences, psychology, or engineering background)
	Researcher / Academic / Lecturer (from health/biomedical/neuro sciences, psychology, or engineering background)
	Clinician (any health professional working with patients)
	Patient, Carer, and Patient Support Organisation
	Current or Potential Employer / Provider (e.g. from an engineering, supplier, technology, healthcare, or industrial company)

2) Country or Region you live in:

	Finland
	France
	Ireland
	Italy
	Romania
	Switzerland
	The Netherlands
	United Kingdom

For each of the skills listed below, please indicate:

a) how **important** you think it is that a student should acquire the competence in his/her education at a level of Master of Science. Please use the values 1 to 4 according to the following key: 1= Not important, 2= Slightly important, 3= Moderately important, 4= Very important.
Please, circle the number which most accurately reflects your own opinion

b) how **achievable** you think that the competence is through the use of an education at MSc level. Please use the values 1 to 4 according to the following key: 1= Not achievable, 2= Slightly achievable, 3= Moderately achievable, 4=Very achievable.
Please, circle the number which most accurately reflects your own opinion

	Programme Competences	Importance 1 (not important) - 4 (very important)	Achievability 1 (not achievable) - 4 (very achievable)
Specific Competences			
1	Understands the specific role and responsibilities of a rehabilitation technologist.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
2	Understands the impact of disability on people and society.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
3	Can design rehabilitation technologies to meet individual's needs.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
4	Can create technologies to meet the needs of different patient populations.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
5	Takes into account physical, psychological, spiritual, and social well-being.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
6	Can combine knowledge from different specialisations.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
7	Can use technology to improve health outcomes.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
8	Can use technology to improve the overall experience of rehabilitation.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
9	Can do research in rehabilitation technologies	1 – 2 – 3 – 4	1 – 2 – 3 – 4
10	Can use practical knowledge and theory to advance rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
11	Can use research and theory to advance the use of rehabilitation technologies in clinical practice.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
12	Can work towards commercial exploitation of advanced rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
13	Can advise policy makers in the use of rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
14	Knows the processes of innovation and commercialisation.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
15	Specialise in an area of rehabilitation technology.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
16	Is able to conduct a health and safety risk assessment of rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
17	Understands legal requirements related to a rehabilitation technology.	1 – 2 – 3 – 4	1 – 2 – 3 – 4

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For each of the skills listed below, please indicate:

a) how **important** you think it is that a student should acquire the competence in his/her education at a level of Master of Science. Please use the values 1 to 4 according to the following key: 1= Not important, 2= Slightly important, 3= Moderately important, 4= Very important.
Please, circle the number which most accurately reflects your own opinion.

b) how **achievable** you think that the competence is through the use of an education at MSc level. Please use the values 1 to 4 according to the following key: 1= Not achievable, 2= Slightly achievable, 3= Moderately achievable, 4=Very achievable.
Please, circle the number which most accurately reflects your own opinion.

EITHER health professionals pathway			
18	Can collaborate with engineers and scientists.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
19	Is aware of engineering aspects of advanced rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
20	Can use healthcare knowledge to develop advanced rehabilitation technology.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
OR Engineering pathway			
21	Can collaborate with health professionals.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
22	Is aware of the healthcare aspects of advanced rehabilitation technologies.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
23	Can use engineering and science knowledge to develop advanced rehabilitation technology.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
The blank spaces below may be used to indicate any other competences that you consider important but which do not appear on the list. (optional fields)			
24			
25			
26			

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Please rank below the five most important competences according to your opinion. Please write the number of the competence (1 to 23 competences suggested) within the box. Mark on the first box the most important, on the second box the second most important and so on.

1	Competence Number	
2	Competence Number	
3	Competence Number	
4	Competence Number	
5	Competence Number	

Many thanks for your cooperation in the first part.

European Questionnaire on Generic Competences

Below are presented a series **of generic competences** to your area. Please answer all the questions. Please select the best option in each case. **For each of the skills listed below, please indicate:**

a) how **important** you think it is that a student should acquire the competence in his/her education at a level of Master of Science. Please use the values 1 to 4 according to the following key: 1= Not important, 2= Slightly important, 3= Moderately important, 4= Very important.
   Please, circle the number which most accurately reflects your own opinion
b) how **achievable** you think that the competence is through the use of an education at MSc level. Please use the values 1 to 4 according to the following key: 1= Not achievable, 2= Slightly achievable, 3= Moderately achievable, 4=Very achievable.
   Please, circle the number which most accurately reflects your own opinion

	Generic Competences	Importance 1 (not important) - 4 (very important)	Achievability 1 (not achievable) - 4 (very achievable)
1	Can communicate effectively.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
2	Can work with experts from different professions.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
3	Can problem solve, make decisions and adapt to change.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
4	Can learn from experience for their own and their profession's development.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
5	Can learn from experience to improve the use of advanced rehabilitation technology in healthcare.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
6	Able to work in different environments, organisations and countries.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
7	Do not impose their personal views and are sensitive to cultural differences.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
8	Can work within relevant codes of conduct to achieve a high standard.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
9	Can work safely, effectively, and ethically.	1 – 2 – 3 – 4	1 – 2 – 3 – 4
The blank spaces below may be used to indicate any other competences that you consider important but which do not appear on the list. (optional fields)			
10			
11			
12			

Please rank below the **five most important competences** according to your opinion. Please write the number of the competence (1 to 9 competences suggested) within the box. Mark on the first box the most important, on the second box the second most important and so on.

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1	Competence Number	
2	Competence Number	
3	Competence Number	
4	Competence Number	
5	Competence Number	

Many thanks for your cooperation.

NOW PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENVELOPE PROVIDED

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