University of Hertfordshire UH

School of Health and Social Work

PROJECT REPORT FOR THE CHARTERED SOCIETY OF PHYSIOTHERAPY

CHARTERED SOCIETY OF PHYSIOTHERAPY

KNOWBEST: The KNOWledge, BEhaviours and Skills required of the modern physioTherapy graduate including the future role of practice based learning

Report

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List of Abbreviations

AHP	Allied health professions
CAHPO	Chief Allied Health Professions Officer
CPD	Continuous professional development
CSP	Chartered Society of Physiotherapy
DBS/CRB	Disclosure and Barring Service/Criminal Records Bureau checks for safeguarding
EDI	Equality, Diversity and Inclusivity
HCPC	Health and Care Professions Council
HEE	Health Education England
HEI	Higher Education Institute
Herts	University of Hertfordshire
ICS	Integrated care systems
IST	In-service training
IT	Information Technology
MDT	Multidisciplinary Team
NHS	National Health Service
PBL	Practice based learning
RD	Role descriptor (Job descriptions/person specifications)
RSPH	Royal Society of Public Health
SBL	Simulation based learning
vPUK	virtual Physiotherapy UK Conference

Acknowledgements

Executive summary and recommendations

I - Purpose

This project examined the knowledge, skills and behaviours required of the modern physiotherapy graduate including the future role of practice based learning (PBL). The sequential design included a range of methods to allow the project team to engage maximally with key stakeholders. Methods used included: a project website with data capture, a review of empirical and documentary data, data acquired through crowdsourcing and interrogation of all of the findings in detail through stakeholder meetings, working groups, focus groups, and webinars/interviews. Recommendations are specific to physiotherapy.

II - Research team

The project was completed by physiotherapy academic and research leads in the Department of Allied Health Professions, Midwifery and Social Work, School of Health and Social Work, University of Hertfordshire (Herts) between August 2021 and March 2022 and was funded by the Chartered Society of Physiotherapy (CSP).

III - Background

III.i - Summary from call

In 2020 the CSP invited tenders for a project to review and refresh physiotherapy education guidance and its appropriateness to prepare a physiotherapy workforce fit for the future. The CSP call included the following quotations:

The demand for physiotherapy is growing and the future workforce needs to have the knowledge, skills and behaviours required for delivering effective health and social care over the next 50 years and beyond.

PBL is a central part of physiotherapy education and demands on placement capacity are high. A condition of CSP pre-registration programme accreditation is that physiotherapy students gain at least 1000 hours of PBL. There is a call from stakeholders to review the current requirements and models of PBL to ensure it strikes the balance to diversify, and maximise capacity, quality and utilisation of technology such as high fidelity simulated learning.

The team were awarded the tender with the six month project commencing on Monday 27th September 2021.

IV - Aim and Objectives

IV.i - Aim

To explore the knowledge, skills, behaviours and attributes required of the modern physiotherapy graduate including the future role of PBL

IV.ii - Objectives

1) To conduct a scoping review of contemporary approaches to PBL, including learning through simulation **(work package 1)**.

2) To undertake a content analysis of current role descriptors and map to the knowledge, skills, behaviours and attributes required for contemporary physiotherapy practice **(work package 2)**.

3) To conduct 'crowdsourcing' data collection with key stakeholders [Public Health England, CSP, Higher Education Institutes (HEIs), physiotherapy graduates, managers, service users/patients etc)] to evaluate the perceived needs (knowledge, skills, behaviours and attributes) of contemporary physiotherapy graduates **(work package 3)**.

4) To conduct focus groups of key stakeholders including academic staff in HEIs, practice educators and students to further explore and analyse data from work packages 2 and 3; informing recommendations and implementation **(work package 4)**.

5) To synthesise data from work packages 1-4, finalise recommendations and complete project report **(work package 5)**.

V - Design and Methods

A five-stage sequential design was utilised to fulfil the project's objectives.

Work package 1. A scoping review of contemporary approaches (methods, required resources, experiences and outcomes etc.) to PBL in pre-registration education. This specifically focused on simulation and use of digital technologies and with a main focus on physiotherapy education.

Work package 2. Content analysis of role descriptors from three sources was conducted (KNOWBEST website, NHS jobs website, direct approach). Data extraction and mapping of data against HCPC and CSP standards for knowledge, skills, behaviours and attributes was then undertaken.

Work package 3. Crowdsourcing data collection in the form of the KNOWBEST website and data capture forms, social media, webinars, discussion fora and vPUK conference was undertaken over 3 months.

Work package 4. Focus groups with key stakeholders and one specifically for service users/patients informed final recommendations. Data summaries were provided from the work packages and a facilitated discussion shaped and prioritised draft recommendations.

Work package 5. Data synthesis of findings from work packages 1-4, finalisation of recommendations and project report drafted, revised and finalised.

Student research placements. Five BSc (Hons) physiotherapy students each undertook a 5-week research placement during KNOWBEST.

Ethical approval: Approval from Ethics Committee at the University of Hertfordshire Ref: HSK/SF/UH/04680.

Data storage: Pseudo anonymised data is stored in a document library within a Herts private SharePoint site. Any data requests should be emailed to Catherine Minns Lowe (c.j.minnslowe@herts.ac.uk).

VI - Outcomes

VI.i - Work package 1 outcomes

There is body of empirical evidence (n=30 studies) exploring the use of simulation in pre-registration physiotherapy education. Findings reveal that simulation based learning (SBL) (e.g. role play, standardised or expert patients etc.) can usefully prepare students for clinical/hospital based placements; substituting 25-50% of clinical placement hours. Studies revealed improved student confidence and high levels of acceptability and satisfaction (students, educators and clinicians) where adjunctive SBL had been completed prior to clinical placements.

VI.ii - Work package 2 outcomes:

Nineteen role descriptors (RDs) were purposively selected for representativeness; UK home countries, role types, professional specialities, healthcare settings and rural/urban areas. Data mapping revealed that HCPC and CSP Standards were not all included. Specifically, omissions relating to digital learning and skills, research, and equality, diversity and inclusivity (EDI) were noted.

VI.iii - Work package 3 outcomes:

Data were acquired from the KNOWBEST website (n=168), vPUK congress (n=40), webinars (n=81), student Instagram (n=239), discussion fora (n=37), support worker meeting (n=9) plus individual stakeholder meetings and via email correspondence. Overall, respondents valued the available diversity of student placements but two main concerns centred on students' and employers' expectations regarding placement completion and the value of different placements. Key findings included:

- Experience in core areas (musculoskeletal (MSK), cardiorespiratory, neurology, older adults) across settings (primary, secondary, tertiary, sport, social care, etc.) was important.

- Exposure to other specialities, these included: mental health, complex and long term conditions, pelvic health, balance/vestibular, trauma, frailty, rehabilitation.

- Whilst 1000 hours is just a number, it is helpful; many respondents were supportive of including adjunctive approaches (i.e. simulation, telehealth, virtual placements) within the 1000 hours, reducing the pressure for traditional hospital/clinic based placements.

- Achieving competence was considered important as was a high quality student PBL experience.
- Experience within other pillars of practice (research, leadership) in preparation for professional practice was important (and to cease referring to them as innovative).
- There is a need for professional upskilling in SBL and provision of knowledge and skills around digital learning and remote healthcare delivery.

VI.iv - Work package 4 outcomes:

Findings from work packages 1-3 were shared at two stakeholder focus groups (n=10) and one service user focus group (n=5). Project findings and draft recommendations were discussed and agreed upon. Discussions regarding the wording of recommendations enhanced clarity and afforded further insights to inform definitive recommendations. In terms of priority, HEI respondents highlighted the need for resources in the form of a SBL library, with clinical respondents whilst supporting this, prioritising the need for a standardised Band 5 or new qualified physiotherapist RD template. Additional to these, service user respondents supported prioritised EDI and the importance of personalised care.

VI.v - Work package 5 outcomes:

Main findings from across work packages 1-4 were synthesised to provide an overview of key project findings regarding the future of PBL in the UK, preparing student physiotherapists for future professional practice. Findings support retention of the 1000 hours of PBL, along with an expansion of what are considered 'core' placements. Clinical – patient facing learning was considered extremely important although support was evident for other PBL, including SBL and Leadership, Research and Education PBL. See Figure 1.
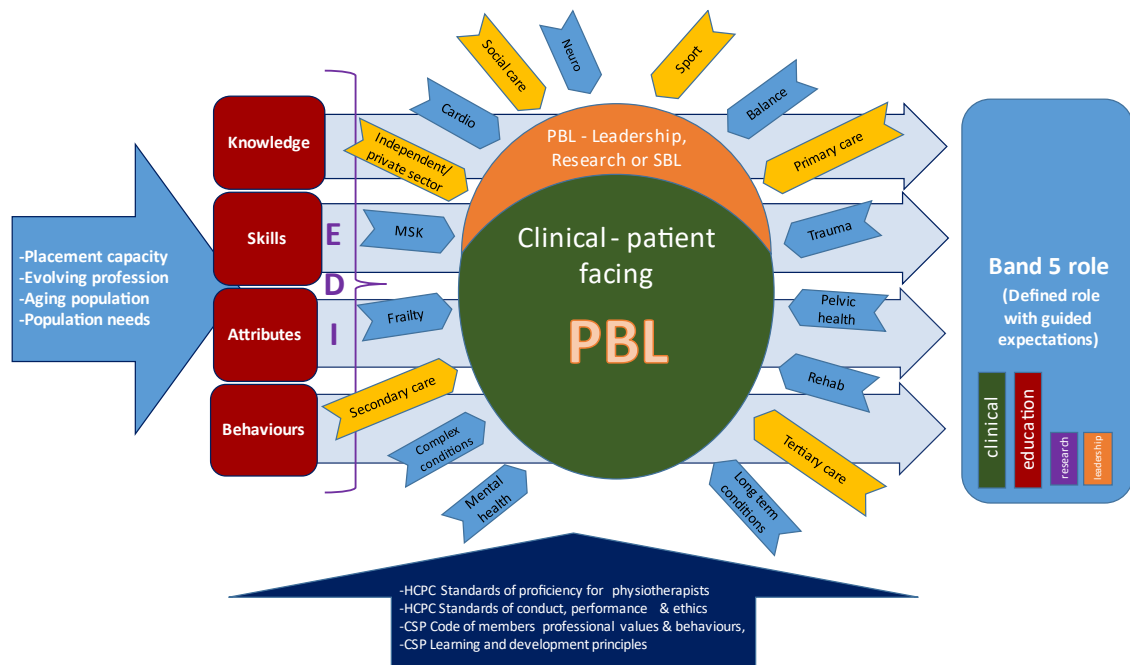
Figure 1. Summary of the findings from work packages 1-4

NB. Please remember that people chose to take part in KNOWBEST, the findings may not be fully representative of the profession and key stakeholders. Also the figure summarizes key findings; it is not to be taken as prescriptive, other settings, conditions etc. are included in the data.

VI.vi - Student research placement:

Across the life course of the project, 5 BSc (Hons) physiotherapy students undertook 5-week research placements. Students were from years 2 and 3 of the programme and either paired or joined individually. Whilst gaining substantial experience of and in research, students contributed considerably to work packages 1-3, taking a lead on discrete elements with oversight from a member of the project team. The fifth student completed an evaluation of the KNOWBEST research placement experience; using semi structured interviews to explore students' views and experiences.

VII - Recommendations from the KNOWBEST project

The following section outlines the definitive KNOWBEST recommendations. The recommendations are presented first followed by a narrative section which provides some underpinning.

Subsequent sections of the report detail the aim/s, methods, findings, analysis and summary for each work package thus underpinning the derived recommendations. Timescales for each recommendation are provided, with short term being within 6 months, medium term being 6 months to 3 years and long term 3-5 years.

Terminology: For the purpose of reporting,

   - Clinical - patient facing PBL* refers to learning taking place in a clinical health care setting with patient/client interaction either in person or virtually (e.g. ward, outpatients, community, school, occupational health, telehealth, virtual wards/consultation).

   - Other PBL includes learning via adjunctive and/or substitution approaches (e.g. SBL with student role play) and learning in other settings (e.g. research or leadership).

*Virtual assessments and treatments (e.g. a tele-rehabilitation placement) are only considered clinical - patient facing if student/s manage a clinical caseload; observation of tele-rehabilitation placement would not constitute clinical - patient facing PBL.

KNOWBEST PROJECT RECOMMENDATIONS

It is recommended that the CSP should:

1. Retain a notional 1000 hours of pre-registration PBL, where 75% or more hours should comprise clinical - patient facing PBL and up to 25% for other PBL including SBL and/or other PBL opportunities e.g. Leadership and Research (short term).

2. Champion the use of simulation as an evidence based approach to students applying knowledge and skills to the benefit of patients and carers (short term).

3. Commission a simulation toolkit to expedite the adoption of models of practice involving simulation and related activities through rapid dissemination (short term).

4. Invest in a co-produced authentic 'simulation library' of expert patient or actor videos/resources (different settings, specialities, presentations) to reflect

contemporary practice and improve understanding regarding diversity. This library should be retained and managed by the CSP (medium term).

5. Consider commissioning research to i) generate evidence to further inform the use of simulation in HEI settings ii) explore consensus regarding outcomes to evaluate student development of knowledge, skills, behaviours and attributes and iii) explore how adjuncts to PBL across HEIs and clinical settings might be resourced and shared within the profession (medium to longer term).

6. Explore how other large health care providers (such as the independent/private sectors) can offer more opportunities for PBL and promote the benefits of placements across health care sectors and settings (medium term).

7. Promote clear guidance regarding the role of all Bands for the profession to promote equity: KNOWBEST findings offer guidance for Band 5/newly qualified physiotherapist roles to be developed, and has started to identify knowledge, skills, behaviours and attributes commensurate for Band 6 roles to assist their development in the near term (medium term).

8. Generate a template role descriptor for a Band 5/newly qualified physiotherapist, which meets the professional standards for practice and legislation regarding equality, diversity and inclusivity (EDI) (short term).

9. As part of the CSP's commitment to improvements in EDI, promote inclusivity in tone of Band 5/newly qualified physiotherapist role descriptors (short term).

10. Require pre-registration physiotherapy programmes to map the curriculum to the four pillars of practice when they apply for accreditation/re-accreditation. EDI and digital skills and learning should be demonstrably woven throughout the curriculum (medium to long term).

11. Advocate inclusive curricula involving relevant experience of person-centred healthcare delivery, ensuring students obtain knowledge and experience in a broader set of core specialities, across key health care settings (community, primary, secondary etc) and with different patient populations (e.g. those with dementia, learning disabilities, mental health, people from a wide range of socio-economic and diverse ethnic backgrounds) (short to long term).

12. Proactively collaborate with managers/employers and the profession as the nature of physiotherapy practice continues to evolve (short to medium term).

Recommendation 1: There was general agreement to retain an hours based approach to PBL and that adjunctive approaches (including SBL) be included in PBL hours. Due to COVID-19, changes within the current 1000 hours of PBL, such as virtual placements, have been established and these changes should be retained and made more overt for the profession. The need for SBL as a substitution for clinical - patient facing PBL was highlighted for patient safety in future professional practice (e.g. students may not encounter a patient with cauda equina syndrome but the requisite knowledge and skills could be developed using SBL). Furthermore, PBL to support learning across all four pillars of practice (i.e. research, education, leadership and management,) and in other areas of health and social care (i.e. virtual care/tele rehabilitation, public health) should be included.

Recommendations 2-6: Specific areas of additional knowledge and skills are required by contemporary physiotherapists (e.g. clinical negligence and litigation). Digital learning knowledge and skills have already been identified as important for Band 5/newly qualified physiotherapists, and HEIs should further integrate these within the core curriculum. Knowledge and awareness of adjuncts to PBL could be enhanced to benefit pre-registration physiotherapists' education; this would require additional resource. It is recommended that HEIs identify Digital/Simulation Lead roles or similar to lead on the integration of SBL in the curriculum. With the increasing demand for NHS placements, extending opportunities for PBL with other health care providers (i.e. independent/private sectors/occupational health) promotes profession-wide shared responsibility for training the next generation of physiotherapists. Practice educators want HEIs to contribute more to PBL (e.g. simulation, virtual placements). Integration or enhanced use of SBL in HEIs may improve students' preparedness for hospital based PBL. HEI respondents voiced concerns about the resources required to support SBL and highlighted the need for upskilling, time and resources. Respondents commented that diversity in existing case scenarios and learning materials requires improvement, co-production to enhance EDI and further engagement of expert patients/actors in PBL. Some HEIs have already successfully developed such inclusive scenarios so enhancing and decolonising the curriculum. Profession specific SBL resources should be centrally developed (for cost efficiency), maintained (for security) and updated (for currency); accessible only to HEIs, students and practice educators.

NB: The CSP is also developing the Physiotherapy Health Informatics Strategy to inform the further development of the knowledge, skills and tools needed to collect, manage, use and share information and thus support healthcare delivery and promote health and wellbeing.

Recommendations 7-9: Work packages 2 and 3 identified concerns regarding equity and the experiences (level and scope) expected for a Band 5/newly qualified physiotherapist post; some RDs required significant post registration experience and expertise, exceeding that normally expected of a Band 5/newly qualified physiotherapist. Clarification of requirements across physiotherapy bands is needed to promote equity; establishing the expectations of Band 6 posts would help to establish the distinctiveness of a Band 5/newly qualified physiotherapist. Some RDs specified pre-requisite placements/settings thus disadvantaging those students who had not had these opportunities. Some RDs were clearly indirectly discriminatory e.g. requiring individuals to undertake sustained moderate/strenuous physical activity and to be able to drive +/- own a car. Whilst certain roles may have pre-requisites, the RDs were largely not inclusive in tone. When mapped to the CSP Code of members' professional values and behaviour, many gaps were evident.

Recommendation 10: Work packages 2 and 3 evidenced differences in the weighting of pillars of practice in RDs and practice. Whilst clinical practice is key to the pre-registration education of physiotherapists, greater consideration of the weighting of the knowledge and skills related to the other pillars of practice is warranted as these are integral for the development of physiotherapists and the profession with its expanding roles and opportunities. Recognition and acknowledgment of opportunities to develop knowledge, skills and attributes pertaining to research and leadership (i.e. non-clinical skills) during clinical - patient facing PBL is needed. EDI and digital skills and learning also need to be woven throughout curricula.

Recommendations 11-12: There are already many excellent PBL opportunities in pre-registration education and the on-going striving for improvement is acknowledged.

Work packages 2 and 3 revealed though that not all PBL opportunities are currently considered equally by stakeholders. Acknowledging the aging UK population, more community based care, an increased demand for physiotherapists and PBL placements and divergent career pathways necessitates further evolving in physiotherapy professional practice. Whilst previously students would complete standard placements, (i.e. MSK outpatients, acute cardiorespiratory and neurology) this has become less feasible over time, and is not reflective of current physiotherapy provision with the shift to primary and community care, person-centred care, the aging population and interventions with discrete populations (e.g. mental health). For example, respondents reported the need for students to gain experience and knowledge treating people with cardiorespiratory conditions. Traditionally this may have been achieved on hospital wards, but now may also be gained via PBL in the community setting or primary care. Indirect PBL (e.g. research, leadership etc.) should usefully complement and be valued equally to clinical - patient facing PBL. Expansion of core placements reflecting all health care settings and the needs of the UK population is underway and these should be regarded equally by stakeholders. Keeping in mind that students have always qualified with varying amounts of experience, that which is considered essential by employers and clinicians should be specifically identified with a focus on key transferable skills. If some students are unable to access this experience through their clinical - patient facing PBL, HEIs should endeavour to provide this via alternative means e.g. SBL.

1 - The KNOWBEST Project

These sections provide comprehensive details regarding the discrete aims, methods used, data, findings and summary for each work package and which support the derived recommendations for the CSP.

2 - Work Package 1. Scoping Review

2.1 - Rationale

PBL is central to the curricula of programmes leading to professional practice registration. Advances in educational and digital technologies, pressures on placement providers to accommodate an ever-increasing number of students and the acute impact of the Covid-19 pandemic indicated that a review of contemporary approaches to PBL was needed; including digital learning and more specifically simulation.

Within physiotherapy, a number of studies have been conducted exploring the use of SBL in pre-registration physiotherapy education [1, 2] with one systematic review concluding that SBL could replace one quarter of clinical placement time without impairing learning [1]. However, this finding was based on studies published up to 2013, did not consider more recent evidence and other SBL approaches which have emerged with advances in technology.

2.2 - Aim and Objectives

To chart the literature of contemporary approaches to PBL

1) to provide an overview of the current evidence base and describe contemporary approaches to PBL within AHPs, specifically digital learning and SBL.

2) to detail the current landscape of SBL within physiotherapy pre-registration education (areas of practice, different approaches, skills, etc.).

2.3 - Findings

Searches yielded 13,420 studies in nursing, with a further 2373 for AHP. Following screening, 2263 were included for AHP, with 113 studies specific to physiotherapy (digital learning n=53, SBL n=60).

2.4 - SBL in physiotherapy education

In the main, studies were focused on examining pre-registration physiotherapy student development of clinical reasoning, knowledge acquisition, competence, safety etc. Tutor, student and practice educator acceptability and appropriateness of the use of SBL was also evaluated. SBL was used across different areas of practice and to support development of both specific and generic professional practice skills (e.g., neurology, older adults, cultural empathy). Research designs mainly included surveys, qualitative methods of enquiry including focus groups and interviews; reflective of the exploratory nature of the emergent evidence base. It is noteworthy that a number of eligible studies were from abstracts, supporting this as an evolving area of research interest. The majority of studies were from Australia (n=16) and USA (n=8) with most focused on exploring new approaches, examining acceptability of these and investigating development in student confidence, clinical reasoning and knowledge acquisition through qualitative, survey or descriptive interrogation. See Appendix I for further information.

SBL is used to support student development. A number of studies were focused to specific specialist areas (MSK, cardiorespiratory) of practice, others examined development of generic professional practice skills such as promoting cultural empathy and communication. The majority of studies reported favourably on the use of SBL in supporting student development, a finding echoed in other systematic reviews [1, 3] where, notwithstanding the need for further high quality evidence, conditional support is reported for SBL as a substitute for clinical practice [3]. Further information with respect to a) models, b) methods, c) structure/content of simulated learning is detailed below.

A key observation was the variability in reported outcome measures used. Whilst many studies were exploratory and used data from focus groups or interviews, some used self-reported outcomes; many of which have been validated, but are not in widespread use e.g. Assessment of Physiotherapy Practice (APP) tool; a reliable

Table 1. Focus of interest for SBL

	Focus of interest						
	Appropriateness	Acceptability Satisfaction	Confidence	Knowledge / Clinical reasoning	Competence / Skill	Safety	Other
Ladyshewsky et al, 2000 [10]	√						
Hassam & Williams, 2003 [11]	√					√	
Hale et al, 2006 [12]	√	√	√	√			
Jones & Sheppard, 2011 [13]	√				√		
Watson et al, 2012 [9]	√		√		√		
Smith et al, 2012 [14]		√	√	√	√		
Ohtake et al, 2013 [5]	√	√	√				
Blackstock et al, 2013 [6]	√	√			√		
Johnston et al, 2013 [15]		√	√	√		√	
Mandrusiak et al, 2014 [16]	√	√	√				
Maas et al, 2014 [17]					√		
Judd et al, 2016a [4]							Stress
Judd et al, 2016b [7]							Validity
Gough et al, 2016 [18]				√		√	
Phillips et al, 2017 [19]		√	√		√		
Johnston, 2018 [20],			√		√	√	
Dalwood et al, 2018 [21]		√	√	√			Communication
Ward et al, 2018 [22]		√					Empathy
Kelly et al, 2018 [23]	√	√					
Riopel et al, 2018 [24]	√	√					
Riopel et al, 2019 [25]	√		√				
Hough et al, 2019 [26]		√	√	√			
Chong 2019 [27]		√		√			
Pritchard et al, 2020 [28]	√	√					
Kurul et al, 2020 [29]	√	√		√			
Ballengee et al, 2020 [30]	√	√					
Walker & Roberts, 2020 [31]	√	√			√		
Sandoval-Cuellar et al 2021 [30]				√			
Johnston & Wakely, 2021 [8]	√	√					
Favolise 2021 [32]	√		√	√			

measure of physiotherapy student competence (20-item instrument covering

professional behaviour, communication, assessment, analysis and planning) [4].

2.4.1 - Models of PBL and use of SBL

A number of placement models using simulation as an adjunctive are reported in the literature; all from Australia. The majority involve University based simulation (1-2-weeks) in preparation for an hospital based placement (3-4-weeks). Collectively most have substituted 25-50% of their PBL with SBL, although in one instance this exceeded 50% (2 weeks SBL with 3 weeks hospital based clinical placement) [4]. Those studies exploring SBL/PBL models, included University based simulation (1-2-weeks) in preparation for a hospital based placement (3-4-weeks); SBL either in tandem or parallel to hospital based placement [5-9]. Other studies explored SBL as part of the core University curriculum rather than as a bridge to better prepare students for clinical - patient facing PBL in a hospital/clinical setting or as an adjunct to hospital based provision.

2.4.2 - SBL methods

Types of SBL ranged from relatively inexpensive and accessible student role play through to expensive laboratory-based settings (e.g. virtual ward) and needing costly expert patients/actors or resources (e.g. age suit). See Table 2.

The majority of studies used standardised patient roles, including actors, senior students with scripts or patients themselves. Student role play was used in a number of studies, with benefits to both the model and therapist being noted (e.g. greater empathy) [22]. High fidelity simulation (e.g. SimMan, paediatric human patient simulators) was most commonly associated with cardiorespiratory care or paediatrics [5, 6, 11, 13, 26, 31]. Virtual reality simulation was used in a small number of studies with examples of use across different specialities [23, 27, 29, 32].

Two studies used what they termed a simulation learning environment (SLE) to aid student preparation for clinical placements [8, 9]. A simulation learning environment comprising small group tutorials, practical sessions and interactions with and without simulated patients; all centred on case scenarios (standardised patient videos) with X-rays, test results and clinical reasoning and reflection tasks to replicate clinical settings.

Table 2. SBL approaches

	Simulation approach					
	Standardised patient	Role play	HF mannequin	SLE	Virtual reality	Model/s
Ladyshewsky et al, 2000 [10]	√					
Hassam & Williams, 2003 [11]			√			
Hale et al, 2006 [12]	√					
Jones & Sheppard, 2011 [13]			√			
Watson et al, 2012 [9]	√ (actors/ patients)			√		√
Smith et al, 2012 [14]	√					
Ohtake et al, 2013 [5]			√			
Blackstock et al, 2013 [6]	√		√ (SimMan)			√
Johnston et al, 2013 [15]		√				
Mandrusiak et al, 2014 [16]	√ (senior student)					
Maas et al, 2014 [17]		√				
Judd et al, 2016a [4]	√					√
Judd et al, 2016b [7]	√ (actors)					
Gough et al, 2016 [18]	√		√			√ (ISTEL)
Phillips et al, 2017 [19]	√	√				
Johnston, 2018 [20],	√					
Dalwood et al, 2018 [21]		√				
Ward et al, 2018 [22]		√				
Kelly et al, 2018 [23]					√	
Riopel et al, 2018 [24]	√					
Riopel et al, 2019 [25]	√					
Hough et al, 2019 [26]			√			
Chong 2019 [27]					√	
Pritchard et al, 2020 [28]		√				
Kurul et al, 2020 [29]					√	
Ballengee et al, 2020 [30]	√					
Walker & Roberts, 2020 [31]			√			
Sandoval-Cuellar et al 2021 [30]	√	√				
Johnston & Wakely, 2021 [8]				√		√
Favolise 2021 [32]					√	

Abbreviations HF: high fidelity, SLE: simulated learning environment, ISTEL: Integrated Simulation and Technology-Enhanced Learning

2.4.3 - Structure and content of SBL

Many of the studies failed to fully detail training requirements (academic staff, training expert patients, students for role play etc.) and methods used to enable replication. One study reported that 30 hours was spent training the simulated patient [10] although a further study suggested that training senior PT students to be standardised patients with just one-hour of coaching was beneficial to both the involved senior and junior students; enhanced self-efficacy and satisfaction [16]. For some studies it was evident that preparation and debriefing were important elements of the SBL experience.

2.5 - Summary

SBL (any scenario where a case study or similar is re-created through use of mannequin, peers, actors, technology etc.) offers considerable potential as an adjunct or substitute for conventional PBL. Findings reveal that pre-clinical placement SBL has been positively received by key stakeholders, with students exhibiting heightened levels of confidence and self-efficacy through engagement with University based SBL activities. Findings further reveal instances where essential knowledge, skills and behaviours have been enhanced through SBL, supporting a recommendation to adopt simulation hours within the required PBL hours.

3 - Work Package 2. Desktop analysis of Role Descriptors (Job Descriptors and Person Specifications)

3.1 - Aim

To undertake a content analysis of current RDs and map to the knowledge, skills, behaviours and attributes required for contemporary physiotherapy practice.

3.2 - Design and Methods

Content analysis of job descriptors and person specifications and mapping these to professional standards; methods and analysis reflected those used previously to explore the use and development of Advanced Clinical Practice in Maternity Services (University of East Anglia) [33]. The team aimed to include RDs for newly qualified/Band 5 physiotherapists across a representative range of roles and settings undertaken/possible at this stage of a physiotherapist's career across the UK. Appropriate eligibility criteria and search methods were used. RD characteristics are reported in Table 3, illustrating inclusivity of the search and process of RD selection.

3.3 - Data analyses

Documentary analysis enabled the systematic reviewing and evaluation of RD, to elicit meaning, gain understanding and develop knowledge [34]. The process included content analysis to interpret meaning from the content of text data [35]. A directed content analysis approach was utilised [35]; drawing on the terms from the CSP brief as key concepts for initial colour coded categories:

Knowledge: the theoretical or practical understanding of a subject

Skills: ability to do an activity or job well, involves practicing

Behaviours: the ways in which one acts or conducts oneself

Attributes: the quality or feature regarded as a characteristic or inherent part of someone/something

During coding the team looked for any additional codes/information related to the aims of KNOWBEST. Relevant text that could not be categorised with the initial codes were given new codes and are included in data analyses [35]. Following piloting, data were extracted and data mapped against HCPC Standards of

[Proficiency for Physiotherapists,](#) [HCPC Standards of Conduct, Performance and](#) [Ethics](#) and the [CSP Code of Members' Professional Values and Behaviours](#).

3.4 - Findings

Thirty-four RDs were available for inclusion, with 5 submitted directly to the team/via KNOWBEST study site, the remainder from online searches. Nineteen role descriptors were included to populate a grid affording representativeness with respect to UK home countries, role types, specialities, health care settings and rural/urban areas (see Table 3).

RD data was summarised and is presented visually (Figure 1) to accompany narrative reporting of findings.

3.4.1 - Knowledge

The required knowledge listed in RDs for Band 5/newly qualified physiotherapists is extensive, ranging from Physiotherapy Professional standards/guidelines to an exhaustive list of Trust/Departmental/ Employer guidance and other policies, registration, standards and values. Profession specific knowledge included:

- anatomy and physiology
- patient journey (assessment through to discharge/referral including complex patients, understanding people, biopsychosocial approach)
- audit, research and service improvement
- knowledge of technologies
- reflection on practice/development as a practitioner

Examples of broader knowledge required:

- assessment of risk and healthcare systems
- use of electronic health records
- legal and ethical issues and impacts on practice
- understanding of legal responsibilities of the profession (including record keeping)
- consent

Table 3. Role descriptor characteristics

Category	Domains within category	RDs including this domain (n=)
Country	England	12
	Scotland	4
	Wales	2
	Northern Ireland	1
Type of Post	Static / rotational	13/6
	Full / part time	13/3
	Locum	2
	Bank/Flexible	1
Speciality	Multiple (rotational)	4
	Musculoskeletal	4
	Community	2
	Neurological	2
	Paediatric	2
	Respiratory	2
	Other (e.g. *Obstetrics & Gynaecology, Oncology*)	4
Setting	Secondary care	4
	Tertiary care	2
	Primary care	0
	Multiple levels of care (rotational)	7
	Private practice	3
	Independent sector	2
	Multiple levels of care (static)	1
	Other (e.g. charity, schools)	2
Area	Predominantly urban	12
	Predominantly rural	5
	Urban city	3

NB: Numbers do not all add up to 19 due to some RDs containing multiple options for some categories

3.4.2 - Skills

Profession specific, generic, organisational, physical and non-physiotherapy specific skills were all included e.g.:

Profession specific:

- patient assessment
- effective, sensitive communication – able to modify as required (e.g. verbal/non-verbal/written/language)
- devising/delivering/modifying treatments
- documentation and record keeping skills.

- ability to manage patients with communication and language difficulties, different cultural backgrounds with a person centred approach

Generic skills:

- advising others

- evaluation of self (including self-development) and others

- excellent interpersonal skills

Organisational skills:

- caseload management

- delegating and supervising others

- prioritising workload

- flexibility and responsiveness to service demands

- team working

- reasoning/critical appraisal supporting research and audit

Physical skills

- meeting physical demands of the post

Non physiotherapy specific skills were also mentioned e.g. being able to drive.

3.4.3 - Behaviours

Mirroring to some extent the skills noted above, four main categories of behaviours were revealed:

1) Practice related - e.g. assessments and treatments, caseload management and supervision of others and behaviours to optimise patient outcomes such as communication.

2) Professional - e.g. adhering to departmental, employer and professional policies, standards and codes of practice, assessing risk, safeguarding and using equipment safely.

3) Promotion of self-care and development – e.g. continuous professional development (CPD) (i.e. in service training and appraisals).

4) Service enhancement or improvement - e.g. audit, research and initiatives such as clinical pathway development.

3.4.4 - Attributes

Frequently mentioned attributes included:

- being an autonomous practitioner, working independently
- being responsible for engaging with, and recording, personal professional development
- being legally accountable and responsible for all areas of practice (including working within scope of practice)
- safety
- documentation
- registration with HCPC/DBS/CRB checked/maintaining CPD
- being experienced; clinically, in audit and research and specific areas of practice
- flexibility and another 50 discrete attributes were mentioned (i.e. ability to manage stress, kindness, respect).

3.4.5 - Additional Information from data analyses

Some RDs (n>7) clearly required experience beyond that commensurate with a newly qualified Band 5 post. For example, specifying the role was for a specialist/experienced Band 5 or requiring recent post-qualifying experience or demonstrable advances in clinical skills from post graduate courses. Some RDs required experience of specific physiotherapy approaches (i.e. pulmonary rehabilitation or obstetrics and gynaecology) and previous Band 5 experience in specific rotations.

Some RDs from the independent/private sector described offering benefits, such as private medical and dental insurance and financial rewards for joining, finding a job, referring a friend (£250-£1000) or £100 towards HCPC fees. Only one NHS Trust made reference to any benefits such as 'city weighting additional money', ticket ballots for sports and arts events, sporting facilities, trust clubs and childcare support. One independent/private sector RD mentioned flexible working. Figure 2 shows the summary of the content of Role Descriptors.

Attributes
- Autonomous practitioner
- Experienced
- DBS and CRB
- HCPC registered/eligibility
- Responsible Practitioner
- Legally Accountable
- Flexible
- diploma/degree physio

Skills
- Advising, instructing and educating
- Team
- Skills with patients
- Driving
- Evaluation
- IT/Digital
- Physical ability
- Reasoning
- Research and audit
- Organisational
- Specific
- Supervision
- Interpersonal

Knowledge
- Physiotherapy Professional standards/guidelines
- Practice
- Trust/Departmental/Employer/Other policies and standards, values

Behaviours
- Supervise
- Safe
- Training
- Safeguarding
- Adhere to policies
- Manage
- Network
- Support
- Communicate
- CPD
- Classes
- Open/Close clinics
- Cover
- Consent
- MDT
- 7 day/Oncall
- Unsupervised
- Moving stock
- Mandatory Training
- Assess
- Caseload
- Seek support
- Diagnose
- Document
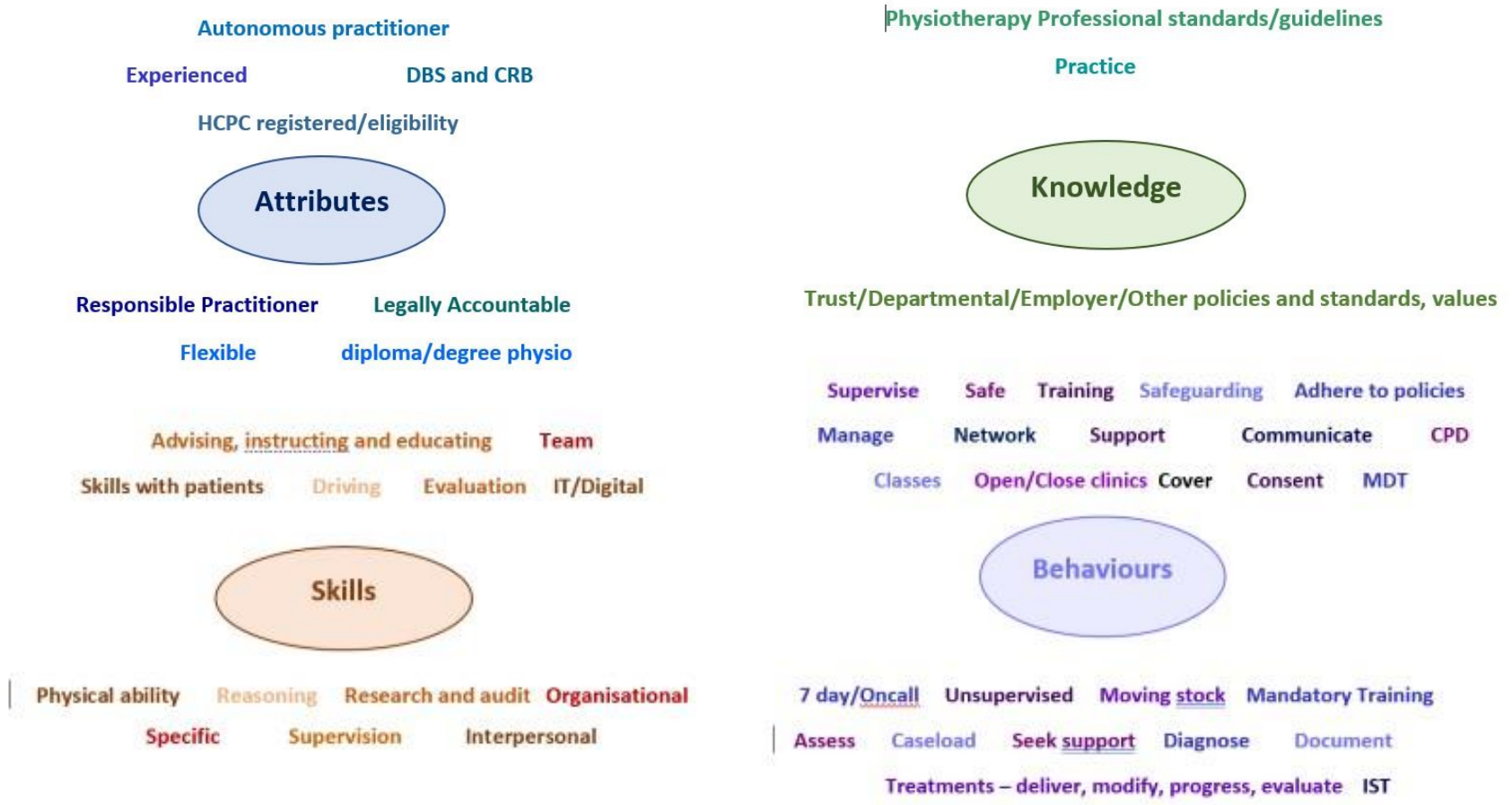- Treatments – deliver, modify, progress, evaluate
- IST

Figure 2. Summary of the content of Role Descriptors

EDI was identified as a code during analyses. There appears to be a mismatch in expectation here. Employers require employees to be physically active, use physical effort and physical dexterity, deal with faints/falls etc., however, minimal commitment (n=1) to employer responsibilities to applicants was evidenced in relation to protected characteristics and equity e.g. family friendly policies and so on. Some RDs showed elements of indirect discrimination such as requirements for driving skills, being a car owner/driver or the ability to travel daily for cross site meetings in large geographical areas.

3.5 - Mapping to standards

Less than half of Band 5 RDs (n=7) included applicants having knowledge of HCPC standards, although the majority (n=12) included knowledge of CSP standards.

Active research was not included in many Band 5 RDs and is not mentioned in any standards. Digital learning and skills were also not strongly evidenced in Band 5 RDs and standards. Specifically;

1) The HCPC Standards of Proficiency: generally met across all RDs as a whole but not within individual RDs. [NB: these standards are currently under review by the HCPC].
2) The HCPC Standards of Conduct, Performance and Ethics: not met across or within all RDs.
3) The CSP Code of Members' Professional Values and Behaviour: a mixed picture was found for the four main principles.
   This included:
   i. CSP members take responsibility for their actions. Generally this is met, although acting within scope of practice was rarely included.
   ii. CSP members behave ethically. Acting with integrity, honesty, respect and openness. Fair access to services and addressing inequalities are less/not well evidenced.
   iii. CSP members deliver an effective service. Areas such as communicating and working effectively with others are well evidenced. Areas such as respecting and promoting individuals' autonomy are less/not well evidenced

iv. CSP members strive to achieve excellence. Areas such as service improvement are well evidenced. Others, such as contributing to the development of physiotherapy practice are less well evidenced.

A summary of the RD data and the HCPC standards are illustrated in Figure 3.

Mapping of RDs to HCPC Standards

Key. Green: Standards generally met
Ochre: Mixed picture, some parts of a standard met
Light red: Standards less evidenced
Dark red: Standards not evidenced

HCPC Standards of proficiency

1. to be able to practise safely and effectively within their scope of practice
2. be able to practise within the legal and ethical boundaries of their profession
3. be able to maintain fitness to practise
4. be able to practise as an autonomous professional, exercising their own professional judgement
7. understand the importance of and be able to maintain confidentiality
8. be able to communicate effectively
9. be able to work appropriately with others
10. be able to maintain records appropriately
12. be able to assure the quality of their practice
14. be able to draw on appropriate knowledge and skills to inform practice

11. be able to reflect on and review practice. Whilst the majority of RDs included continuous professional development and learning activities, reflection on practice was less evident.
13. understand the key concepts of the knowledge base relevant to their profession. This standard includes awareness of the research process and a wealth of scientific knowledge beyond that included in RDs.

5. be aware of the impact of culture, equality and diversity on practice
6. be able to practise in a non-discriminatory manner
15. understand the need to establish and maintain a safe practice environment. This standard includes knowing and being able to apply appropriate moving and handling techniques which was mentioned in only a few RDs, but risk (assessment, management and reporting) was included in the majority of RDs.

HCPC Standards of conduct, performance and ethics

2. Communicate appropriately and effectively
4. Delegate appropriately
5. Respect confidentiality
7. Report concerns about safety

1. Promote and protect the interests of service users and carers. Working in partnership with service users and carers and challenging discrimination were less evidenced than consent (included in 8 RDs)
3. Work within the limits of your knowledge and skills, mentioned only a few times.
5. Manage risk Identify and minimise risk. Whilst management of clinical risk was included in RDs, making changes to how you practise/stop practising, if your physical or mental health may affect your performance, was not included.

8. Be open when things go wrong
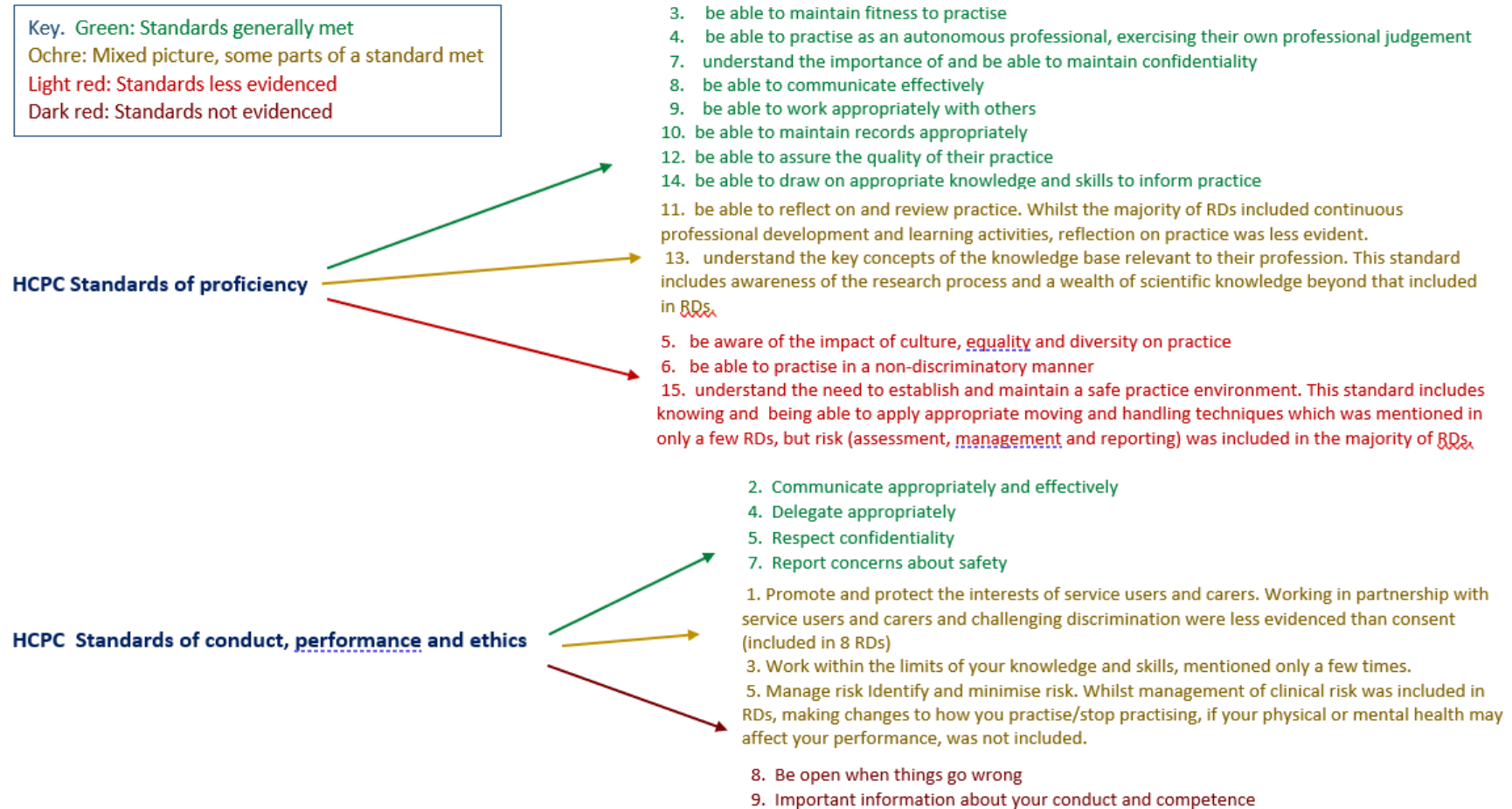9. Important information about your conduct and competence

Figure 3. Mapping to HCPC Standards

3.6 - Discussion

Overall, findings revealed high expectations of behaviours and attributes, and extensive pre-requisite knowledge and skills in qualified physiotherapists. Considerable overlap exists between knowledge, skills, behaviours and attributes, where for example, a behaviour may need knowledge and skills and professional attributes for use in practice.

Pillars of practice: It is evident that some of the pillars (of advanced practice) are weighted more heavily than others, i.e. clinical practice. While the majority of RDs included the role of Band 5 physiotherapists in supporting and contributing to the improvement of physiotherapy services, fewer mentioned research activities and skills. Six RDs mentioned Band 5 physiotherapists being involved in or participating in research activities, one mentioned collecting data but only two described clear active research behaviour. In terms of leadership, this was evidenced by means of caseload management, including lone working. In terms of education, many RDs included clear activities to facilitate learning.

Non-standard format and variability: Considerable variability was seen across RDs, with respect to length (<1-14 pages) and appropriateness, with at least seven being suited to more highly specialist and/or experienced staff. This raises concern that these posts may be offered at Band 5 level to save money, or as a result of difficulties in recruiting Band 6 level staff. In some instances, the geographical location was linked to higher band posts rarely becoming available, necessitating staff having to remain at Band 5 even though sufficiently experienced and skilled to move to a higher band.

Equality, Diversity and Inclusivity: As noted above, an apparent mismatch was evident between the requirements expected of physiotherapists and the lack of an EDI approach from employers. The issues identified indicate a lack of attention to EDI matters on the part of these employers and indirect discrimination. Only one RD stated that the employer was committed to ensuring that no job applicant or employee receives less favourable treatment on any EDI grounds. Overall, as standalone documents, these job advertisements and RDs suggest a lack of engagement with equalities legislation. It is important to be cautious, however, as other parts of the recruitment process followed by these employers may include

inclusive practices, for example asking applicants to complete equality and diversity monitoring forms and/or ensuring reasonable adjustments are put in place for interviews. Having said this, there is a duty under the Equalities Act for employers to avoid indirect discrimination (rules or arrangements that apply to everyone, but which in practice could be less fair to someone because of their sex, race or other protected characteristic) and so these RDs would need to be reviewed and modified.

Benefits: Findings revealed financial benefits or incentives were offered to Band 5s joining an independent or private workplace that NHS employers currently do not offer or match.

3.7 - Summary

Given the observed heterogeneity in knowledge, skills, attributes and behaviours included across the sampled RDs, a review of Band 5 post and RD requirements is recommended and a standard template designed to promote equity. Furthermore, findings indicate that some areas of physiotherapy practice are featured less strongly in professional standards of practice than others, attributable to the expansion of roles of physiotherapy professional practice, with career pathways into research, leadership and management.

4 - Work Package 3. Crowdsourcing

4.1 - Aim

To conduct 'crowdsourcing' data collection of key stakeholders [Public Health England, CSP, HEIs, physiotherapy graduates, managers, patients etc.] to evaluate the perceived needs (knowledge, skills, behaviours and attributes) of contemporary physiotherapy graduates.

4.2 - Methods

This work package comprised a variety of methodologies and data collection approaches with the aim of maximising engagement with the KNOWBEST project to achieve its objectives. Key stakeholders were accessed to evaluate the perceived needs (knowledge, skills, behaviours and attributes) of contemporary physiotherapy graduates. This included:

- Data capture form on the KNOWBEST website (n=168): people were free to leave comments about knowledge, skills, behaviours and attributes, values and the future of PBL from 27th September 2021 to 31st January 2022. Content analyses included line by line coding until new codes were infrequently identified (n=50-65). The remaining responses were read through and further new codes/views added.
- vPUK conference (n≈40): clinicians, educators, students and CSP employees (included Council member) attended 'The Future of Practice Based Learning in the UK' Networking Field Session at virtual Physiotherapy UK, 2021.
- Webinars: Following a Herts webinar (n=14 students and staff) two webinars were hosted
  - Webinar 1 Practice Based Learning (n=61 registered, n=48 attended)
  - Webinar 2 Digital Skills and Learning (n=31 registered, n=19 attended)
- Student Instagram (n=239): 10 questions were posted on the CSP Students Instagram page for a 24 hour period (14th December 2021)
- Discussion fora
  - Group 1 (n=18)
  - Group 2 (n=19)

- Meeting with Support Workers: CSP support worker reference group meeting (n=9)
- One-to-one meetings/emails from 27th September 2021 to 31st January 2022 (approximately n=30-40).

4.3 - Findings

Of the 168 respondents who completed the data capture form, this included physiotherapists from NHS (n=125) and private/independent sector (n=37). The sample included respondents with a master's degree (n=77) and with 11-20 years of HCPC registration (n=65). All UK home nations, NHS bands (4-9) and professional networks were represented (see Figure 4). In the main respondents worked in a clinical setting (n=119), including NHS (n=93), independent/private sector (n=19), Ministry of Defence (n=4), charity sector (n=2) and sport (n=1). A further six respondents made reference to backgrounds such as service providers, rehabilitation engineering, occupational therapy, music therapy, MSK and holistic healthcare, community neurology, clinical placements and AHP practice education. Of those respondents working in the private/independent sector their practice level was described as specialist (n=21), senior (n=8), consultant (n=5) and junior (n=3). Five respondents described themselves as AHPs with a range of professional backgrounds: occupational therapy, clinical sciences, dietetics and nursing. Additional background information was provided by 27 respondents, including being a service user, a GP, a health psychologist and people working for other NHS and AHP organisations[1].

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[1] Findings in this section reflect what respondents thought important and are not comments about existing programmes.

4.3.1 – Demographic data
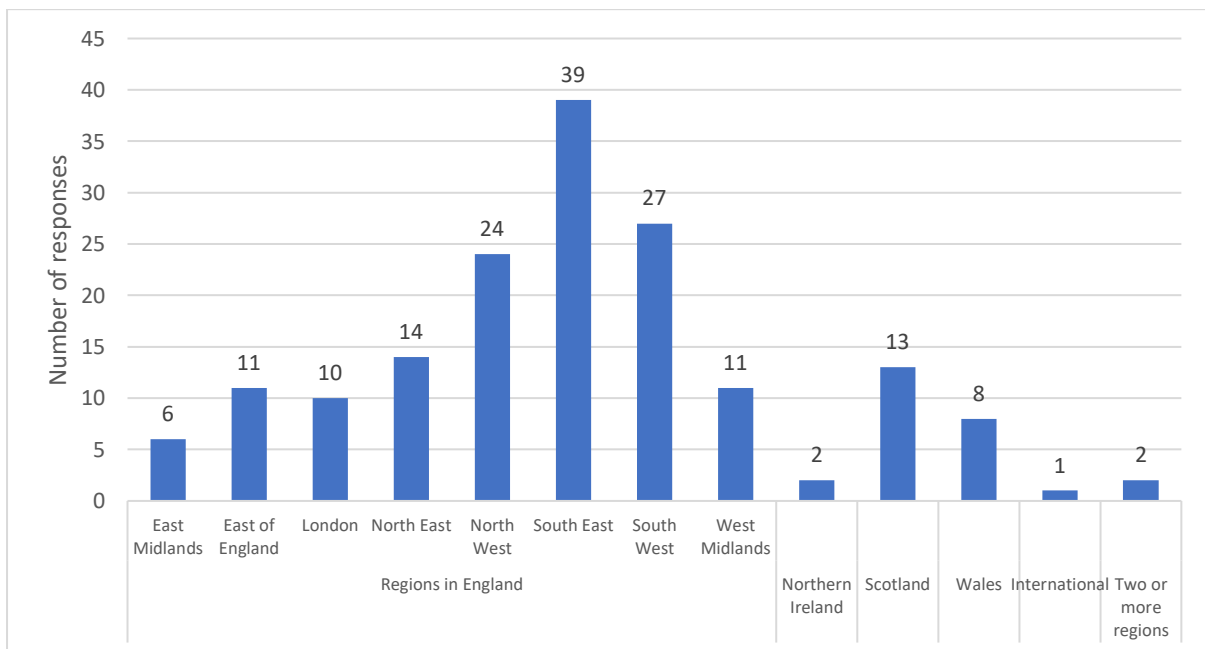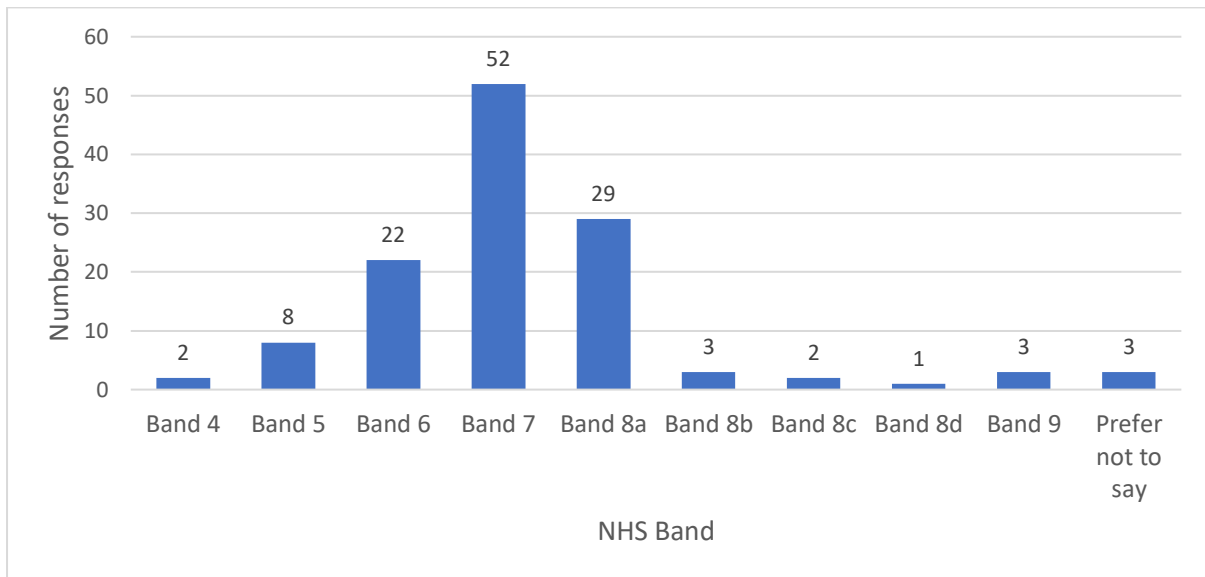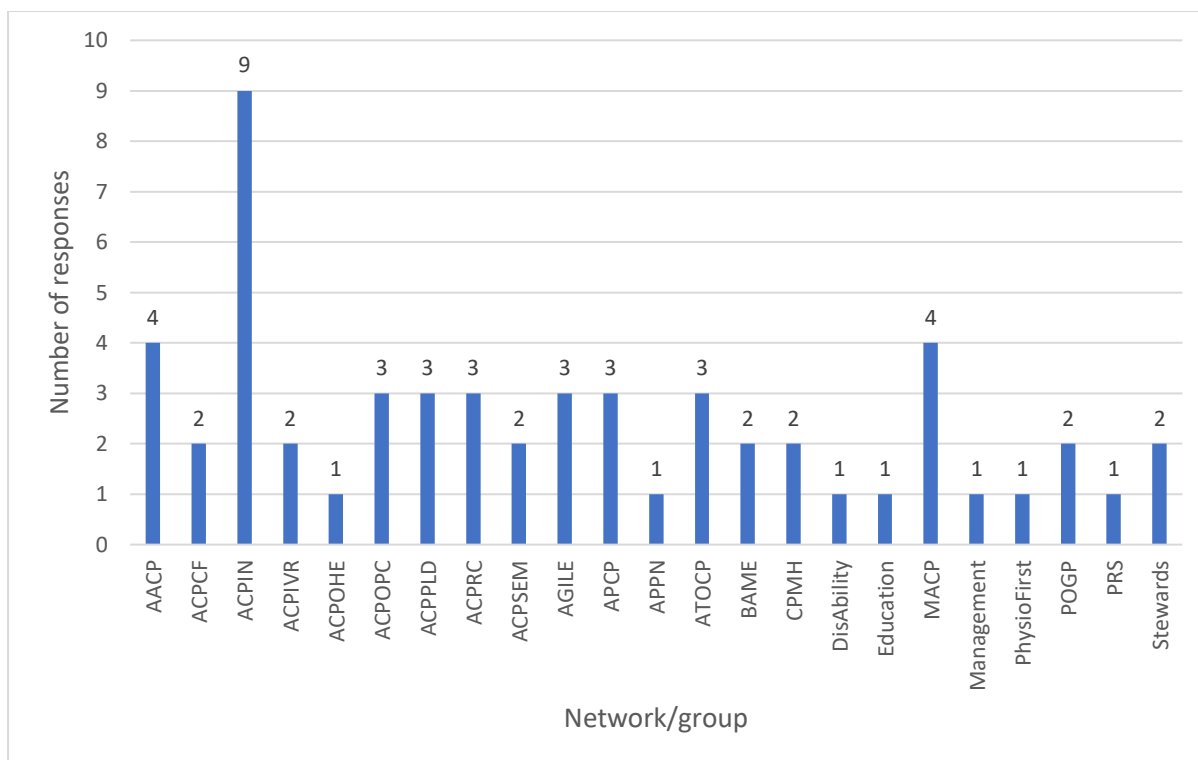
Abbreviations: AACP - Acupuncture Association of Chartered Physiotherapists, ACPCF - Association of Chartered Physiotherapists in Cystic Fibrosis, ACPIN - Association of Chartered Physiotherapists in Neurology, ACPIVR - Association of Chartered Physiotherapists Interested in Vestibular Rehabilitation, ACPOHE - Association of Chartered Physiotherapists in Occupational Health and Ergonomics, ACPOPC - Association of Chartered Physiotherapists in Oncology and Palliative Care, ACPPLD - Association Of Chartered Physiotherapists For People With Learning Disabilities, ACPRC - Association for Chartered Physiotherapists in Respiratory Care, ACPSEM - Association of Chartered Physiotherapists in Sports and Exercise Medicine, AGILE - Chartered Physiotherapists working with older people, APCP - The Association of Paediatric Chartered Physiotherapists, APPN - Advanced Practice Physiotherapy Network, ATOCP - Association of Trauma and Orthopaedic Chartered Physiotherapists, BAME network, CPMH - Chartered Physiotherapists in Mental Health, DisAbility network, MACP - Musculoskeletal Association of Chartered Physiotherapists, POGP - Pelvic, Obstetric and Gynaecological Physiotherapy, PRS - Physiotherapy Research Society

Figure 4. Main demographic data: NHS band, Regions and Networks/groups

4.4 - The future of PBL

Respondents valued the available range and diversity of student placements. Many highlighted the importance of experience in core areas (MSK, cardio, neuro, older adults), settings (primary, secondary, tertiary, sport, social care, etc.) and for a few, further opportunities for shared learning with other professional groups was worth further consideration. Respondents reported a number of PBL areas which would be beneficial for student development, including mental health, long term conditions, pelvic health, balance/vestibular, trauma, frailty, rehabilitation *etc.*

Overall, there was an acknowledgement that whilst 1000 hours is just a number, it is a helpful benchmark; many were supportive that these hours could usefully include PBL such as simulation, telehealth, virtual placements etc. and did not all need to be

done in a clinical setting. Whilst one respondent expressed an opinion on needing *'to have as much time as possible face-to-face with service user'* there was some agreement this could be away from a hospital/clinical setting via University led SBL.

For some, there was a sense that students lacked basic skills and competences going out to placements, ranging from communication to practical skills; thus supporting a call for more PBL/clinical placements hours. Whilst acknowledging the impact of Covid-19, some felt this lack of preparation for patient-facing PBL pre-dated the pandemic. Few suggested either increasing or reducing the hours although there was a strong sense that competence was important and the need for high quality student experience; quality over quantity. Several respondents rated the importance of experience in the other pillars of practice (research, leadership) as preparation for future professional practice roles; some requested that these should stop being considered 'innovative' and become integral to pre-registration education for professional practice development.

Alternative models of PBL were proposed including University based pre-placement non patient-facing PBL (3 days) so students are better prepared for patient-facing PBL in a clinical setting, 2 days/week patient-facing PBL across a semester (although travel and accommodation may need to be taken into account), and a pre-registration year on completion of the programme of study where graduates rotate through areas of practice. In terms of SBL, there was a sense that respondents did not fully appreciate the scope and nature of this teaching approach; this being referred to as distinct from expert patients, role-play etc.

4.5 - The future of PBL from other crowdsourcing activities

The response from the Chief Allied Health Professions Officer (CAHPO) acknowledged that, whilst the HCPC does not mandate PBL hours to join the register, the professional body requires 1000 hours of PBL in order to qualify. The CAHPO response states student progress should be measured against acquired skills and learning outcomes rather than counting hours. However, crowdsourcing data strongly supported retention of a pre-requisite number of hours at the current time. Having moved from a competency based approach in 1992 to a set number of hours there was little appetite to reverse this. Whilst 1000 hours practice was

considered 'arbitrary' it was also considered as 'working well' as illustrated below in respondent quotes.

> ……*maintain an outcomes-based approach that incorporates a minimum number of hours (Respondent Webinar 1)*

> *A competency based model is hugely constraining for other professions.... and would be a backward step for us. It causes huge issues for HEIs (Respondent Webinar 1)*

Having noted the points above, physiotherapy respondents were receptive to exploring changes in PBL to accommodate increased demand and changes in the professional practice landscape. The 'student voice' provided a slightly different nuance. In the survey (n=25-239) 76% of students acknowledged the detrimental impact of COVID-19 on their readiness for employment due to disrupted and cancelled placements. Of those respondents, 40% supported a need for more than 1000 hours of PBL and 12% supporting less than 1000 hours. Please see Appendix VI (Student Infographic) for survey questions and data. Survey and webinar findings also revealed concerns that not all students had sufficient access to digital technologies to support their learning.

More flexibility in physiotherapy programme design was raised, such as more part time degrees and/or placements. Student respondents voiced that increased flexibility might also realise a much needed improvement in student diversity within physiotherapy; they reported challenges with trying to earn and train around childcare/carer duties.

The demand for clinical - patient facing PBL continues to rise, with one respondent reporting an increase from 150 to 550 occupational therapy and physiotherapy student placements per annum. This is challenging and stressful for academic staff and practice educators. More clinical - patient facing PBL/clinical placements are needed. The profession is evolving, with more divergent/expansive career pathways for those entering the profession; historically physiotherapists qualified to become clinicians in the main, now career opportunities exist in research, leadership/management, and innovation across an array of health and non-health related organisations, (e.g. public health, occupational health etc.). Clinical - patient facing PBL opportunities/placements in these settings are now increasing and

needed, as training the next generation of physiotherapists is the responsibility of all physiotherapists. Additionally, the patients/clients physiotherapists now assess and treat have changed, reflective of the UK's aging population with increasing multi-morbidity, long term conditions and complex presentations. The future physiotherapy workforce needs the knowledge, skills and attributes to serve their communities and a need to be able to treat the 'person as a whole' was acknowledged. This includes patient centred care and PBL opportunities/placements in less commonplace areas, such as mental health and learning disabilities. The introduction of integrated care systems (ICS) supports a greater awareness of community based care in the curriculum. Respondents discussed the tension between some employers and students valuing experience of 'core' placements (e.g. acute cardio-respiratory, MSK outpatients, neuro rehabilitation) over non-traditional placements. Others called for flexibility and evolving practice, with non-traditional placements/settings being valued equally and to give greater consideration of a student's overall journey across specialities and settings, thus ensuring a balanced experience.

RDs and interview questions should ensure equity for Band 5/newly qualified physiotherapy post applicants. Tension was observed around expectations of Band 5 physiotherapists and whether newly qualified physiotherapists should be autonomous and able to manage a full caseload or whether they needed support and time to grow into their new role. Views offered from clinicians and managers varied on this issue which would benefit from further exploration and consideration.

Crowdsourcing activities' findings identified or affirmed means by which the 1000 PBL hours could be re-shaped to meet the changing nature and role of physiotherapy:

a) Introduction of the Common Placement Assessment Form for Physiotherapy placement includes goal setting, reflections and learning outcomes so supporting the aims stated by CAHPO whilst retaining set hours

b) A move away from the term '1000 hours clinical placement' with adoption of the term PBL. Whilst the majority of the hours should comprise clinical - patient facing PBL, other forms of PBL (such as SBL, leadership, research and education placements etc.) could usefully support the development of knowledge, skills and attributes and reduce the demand for placements. The

average number of clinical - patient facing PBL hours suggested in Webinar one was 74%, almost matching the 75% proposed by Mori et al [1].

c) General support for some placements which are not clinical - patient facing, with SBL used as an adjunct or substitute, with the latter enabling standardised and controlled learning of activities that are not guaranteed on placement: one respondent said *'Simulation can help the students get the most varied and in-depth learning'*. Virtual ward placements were considered favourably as a means of pre-placement preparation (i.e. student preparation for acute clinical - patient facing PBL with non-patient facing PBL *a priori* in the University) thus reducing the duration of clinical - patient facing PBL and freeing up capacity. Structure and timing of SBL needs careful consideration to ensure it is tailored to the speciality, for example whether remote placements should be after clinical - patient facing PBL in MSK as '*it requires more advanced skills'* as one respondent mentioned. There was discussion regarding who/how/where SBL activities should be developed, provided and resourced with many clinician respondents seeing the HEI taking a lead on this (in light of the increasing demand of placements) and HEI respondents wondering about the local/national frameworks and resources required to support SBL activities. The responsibility for integration of alternative approaches needs clarifying to ensure shared (academic and practice educator) responsibility which is appropriately resourced - simulation was viewed as potentially resource intensive (e.g. virtual ward, resource development costs, staff time).

d) Cooperation and collaboration with university service user involvement/experience groups and co-producing SBL scenarios to ensure representativeness of diverse populations (e.g. people living with a range of clinical complaints/conditions).

e) Expand opportunities for more flipped learning where students spend time on the theory at home (supported by pre-recorded lectures, quizzes, group work, etc.) with time in university orientated more to transfer and application of new knowledge to achieve deeper understanding; clinical / simulated / involving guest speakers. This was seen as particularly appropriate for MSc pre-registration education where students have prior experience in self-directed learning.

f) Sharing of best practice across universities with a dedicated discussion forum; examples of existing initiatives include telehealth placements and a virtual 1-week observational learning placement.

g) Greater involvement of support workers to enable student development on clinical - patient facing PBL placements; one support worker respondent was University trained and supervising two students on a first placement.

h) Promoting student:educator ratios beyond the convention of 1:1, utilising 2:1, 3:1 and other models (e.g. cross-professional) may also ease pressure on placements.

i) Period of preceptorship (i.e. one year) for newly qualified physiotherapists was mentioned by some respondents. Views regarding preceptorship varied, some saw this as supporting newly qualified staff to adapt to their new role 'in-house', others thought an assessed (pass/fail) 12-month professional practice period post qualifying should be introduced and passed for eligibility for HCPC registration. Forms of preceptorship have resource implications.

4.5.1 - Knowledge

The excellent work already undertaken by HEIs with regard to curricula improvements is acknowledged. There was an appreciation from respondents that, adding content to the curriculum would also require removal of existing content; potentially difficult and contentious. There was also a view that physiotherapists need to be self-aware recognising when they need to seek help, refer to others and take appropriate action (e.g. knowing how to locate and access information). Findings support the need for physiotherapists to be independent self-directed learners who are comfortable with uncertainty (e.g. when a clinical diagnosis cannot be made with certainty), and are equipped to manage change.

The importance of learning to treat the 'person as a whole' and knowledge of the body from birth to aging and death, i.e. '*physical/mental/emotional/social/cultural/philosophical/educational*' as one respondent described it, was recognised. Findings included understanding of:

- social factors,
- psychosocial approach,
- behaviour change theory,

- motivation for behaviour modification,

- how people live,

- how to interact with patients to achieve goals,

- providing personalised/person centred care,

- involving patients in shared decision making.

This included supporting and treating groups of people known/perceived to be currently poorly managed in health care settings. EDI should underpin the curriculum; tackling health inequalities is an accepted part of the role of a physiotherapist. To achieve this, physiotherapists need to learn and understand who they are themselves and have knowledge of philosophies, values and beliefs and interactions with others. Knowledge of communication needs, tools, strategies, building rapport and around consent and capacity is required.

There was strong support for continued inclusion of existing subjects in the curriculum. For anatomy some respondents mentioned a form of grading system to help students learn 'common' anatomy used frequently in clinical practice, whilst remaining aware of more *'sophisticated anatomy'* they may use less frequently (and how to access this knowledge when needed). Updated knowledge was mentioned, for example 'biotensegrity' as the model of human movement replacing classic biomechanics.

New/less common areas of knowledge were identified as warranting a place in current curricula e.g. clinical negligence and litigation, knowledge and ability to adapt treatments for people with dementia/cognitive impairments and who are neurodiverse, management of vestibular problems, public health and disease prevention, climate and the ecological crisis and how physiotherapists might contribute (it must be noted that some programmes already include many of these areas).

Findings indicate a need for greater awareness/knowledge of all specialities: including, oncology, pelvic health, women's & men's health, learning difficulties, mental health conditions, treatment of adolescents, falls management, frailty, and musculoskeletal paediatrics.

A broad, holistic and relevant range of assessment and treatment strategies (evidence based where possible) to support patients in an acute or chronic episode

or in any environment (acute, community, mental health, primary care) which may require MSK/orthopaedic, cardiorespiratory, neurological, paediatric knowledge was supported. This included understanding when to intervene, refer on and caseload management. The importance and challenges of ensuring learning and teaching was current and evidence based where possible, including clinical reasoning and problem solving, were emphasised. Whilst some respondents mentioned 'core' areas of practice, others thought this term and any placement hierarchy outdated and that value and learning about the complexity of humans and physiotherapy was necessitated in all areas of practice. A range of treatments were mentioned for key areas of practice, especially exercise, including strength and conditioning, exercise therapy, the evidence base for exercise, web links, principles of exercise, exercise protocols and exercise prescription. Views on electrotherapy varied from knowledge of effective electrotherapy to this being a post registration option. Practical 'hands on' experience, manual handling, manual respiratory and mobilisations techniques were mentioned by some respondents. Knowledge of 'red flags', the basics for 'On call' and basic respiratory support, and simulations for emergency situations were also mentioned.

All four pillars of practice need to be clearly demonstrated in all curricula. It was recognised that the curriculum was weighted towards clinical knowledge but that learning about research (i.e. applying research into practice, audit etc.) and leadership are important. As the physiotherapy career pathway has expanded the curriculum needs to include current options and students need to know how to navigate a career pathway and become Lifelong learners (Figure 5).

Figure 5. Summary of knowledge needed by students

NB: text size does not denote frequency

There is a recognition that current pedagogy is largely not matched yet to the '*best technologies*' to meet the needs of new changes in physiotherapy practice; further research is needed. In terms of SBL co-producing/further co-producing materials such as case scenarios with patients/people living with a condition/s from diverse backgrounds is required to ensure authenticity. Social justice, population health, health inequalities and how to tackle them should be included and expanded on within education.

A discussion is needed about whether we should teach evidence based activities only and remove modalities/techniques that lack evidence regarding effectiveness. Newly qualified physiotherapists should appreciate the part they play in a modern multi-professional team, what their unique professional skills are (competent capable diagnostic skills, treat, discharge) but equally their skills within the wider team.

4.5.2 - Skills

There were a variety of views regarding Band 5/newly qualified physiotherapist competence; some believed new physiotherapists should accept it takes time to settle into their role and that support is needed, others reporting that new graduates should be able to practice autonomously without supervision post qualification. Common sense, leadership, a good work ethic and the ability to respond to pressure/think 'on your feet' were also mentioned.

Communication was repeatedly emphasised as an essential core skill for physiotherapists. This involved being able to communicate at the right level with a variety of different people/groups via verbal, non-verbal and written communication (plus using tools to enable communication and knowledge transformation, digital and IT skills). Closely linked with this was the importance of listening skills (especially with patients), being skilled at giving and receiving feedback, and the need for excellent interpersonal skills. '*Soft skills are as important as physiotherapy specific skills'* according to one respondent. Other broader skills included being able to reflect, being flexible, resilient, having coaching skills and being able to motivate others, presentation skills, being able to manage change and manage a caseload and being organised. Team working, collaborative, networking and inter-disciplinary skills were included, as was the importance of self-awareness and being able to cope with complaints and provide culturally congruent physiotherapy interventions. Being able to teach/train/supervise others, and basic line management, were also mentioned by respondents.

Physiotherapy practice skills included assessment and treatment skills for a wide range of systems and conditions across settings, including people who have cognitive impairments and complex/multiple conditions neurodiversity and mental health conditions as well as physical conditions. This involved treating the patient 'as a whole' being able to recognise deterioration in a patient's condition, when to progress or regress a treatment plan, discharge criteria/onward referral and skills in delivering brief interventions to influence modifiable behaviours. Safe manual and therapeutic handling, manual therapy, taping and manual dexterity skills and exercise prescription were included. Physical aptitude and good observational skills were mentioned. Goal setting skills, cognitive behavioural therapy skills to manage psychosocial risk factors, building therapeutic alliances that support people, shared

decision making and personalised care skills were also recognised. Clinical reasoning, critical thinking and analysis and evaluation were needed, as were skills in self-directed learning, audit, quality improvement and research.

Respondents also mentioned some new skills, although in some instances this was by one or two individuals. These included diagnostic ultrasound, artificial intelligence, marketing skills, and injection therapy to enable entry to Independent Prescriber training on graduation. There was also a call by respondents to replace the view of the 'body as a machine' with a far more dynamic, socially embedded and ecological model of practice which requires genuine reflective and reflexive skills.

4.5.3 - Additional Information about skills from other Crowdsourcing Activities

In addition to the above information, skills (and knowledge) to support digital learning and remote and digitally enabled practice and digital therapeutics were provided by respondents with expertise in these areas and are reported in Appendix VII.

4.5.4 - Attributes and Behaviours

Physiotherapists should possess a range of attributes in accordance with HCPC and CSP standards and as illustrated in Figure 6. Given the overlap between attributes and behaviours, and to avoid repetition, key attributes and behaviours have been combined in this section and detailed below.

At an individual level, physiotherapists should be kind, caring and compassionate focused on patient/person centred care and with good interpersonal skills. Data indicate that they should be clinically competent/skilled and possess a range of communication skills (listening, verbal) and, be able to utilise these skills flexibly to strive for excellence in patient care and working within a team (team player).

Physiotherapists should be self-aware, open minded, organised, inquisitive, diplomatic, honest/trustworthy, respectful, exhibit problem solving skills and with a willingness (proactive/motivated) to learn and progress in their development. Having a good work ethic (hardworking) and being determined were considered important attributes and finally being resilient featured strongly within the data. Attributes which featured less strongly included physiotherapists needing to be physically fit, enthusiastic, professional, confident, mature, commercial aware, culturally sensitive, digitally literate, creative and having humility.

One respondent expressively referenced *'Arnold and Stern's model of professionalism (foundation of competence, ethical practice, ability to operate within relevant legal and regulatory frameworks, and Communicator) with pillars of aspiration toward excellence, personal accountability, altruism and humanism. Unconditional positive regard for their peers, other professional groups and their customers. Evidence based. Assertiveness, the ability to recognise and constructively resolve conflict. Political awareness, flexibility, Resilient. '*

Figure 6. Word cloud for attributes

4.6 - Discussion

The design and methods of crowdsourcing [36] enabled data capture from a diverse population which was largely representative and critically included a broad representation of stakeholders' voices. Given Covid-19 limiting physical engagement, this approach, using a multitude of approaches (discussion fora, virtual conference, email, webinars, focus groups, online data capture) was not limited by costs (travel, time from work) and geography, thus trying to ensure the views of all key stakeholders across the home countries of the UK could be captured and used to shape and inform findings.

Moreover, whilst respondents were invited to comment on what is required of the contemporary physiotherapy graduate, there was less consideration given to what they perhaps did not need; thus posing a challenge when considering what a future programme curriculum might look like. Importantly within the data, a clear distinction

is not made regarding what is existing indicative curriculum content and what would constitute 'new' indicative content; reflective of what is required of the newly qualified physiotherapist in 2022 and beyond and reflective of the forthcoming HCPC standards of proficiency for physiotherapists.

4.7 - Summary

Respondents offered a considerable volume of data regarding the scope and nature of knowledge, skills, attributes and behaviours. This expansive data set and findings raises challenges when discriminating the content of the pre-registration curriculum and ensuring graduates are optimally prepared for professional practice in a Band 5/newly qualified role; equipped with knowledge, skills, attributes and exhibiting behaviours affirming their competence to be safe and effective practitioners.

5 - Work Package 4. Focus groups with stakeholders

5.1 - Aim

To conduct focus groups of key stakeholders to further explore and analyse data from work packages 1-3; informing recommendations and implementation and specifically with

1. academic staff in HEIs, practice educators, students (Objective 1)
2. patient /service users (Objective 2)

5.2 - Methods

The focus groups (n=3) were structured to ensure focus and balanced within the time allocated; centred on findings from work packages 1-3. The main aims were to disseminate findings, discuss and analyse findings with participants, evaluate proposed recommendations and rank based on perceived priority. Focus groups were led by experienced researchers (Objective 1: NH, Objective 2: CML) with each then completing a common approach to data analysis and interpretation.

Focus group transcripts were reviewed and thematic analysis methods used to derive themes and subthemes. Views and perceptions were influenced by participant experiences and their lens e.g. clinicians involved in recruitment held strong views about Band 5/newly qualified physiotherapist recruitment, those in academia strong views around the use of simulation to support development etc. (Objective 1) and patients from their own personal journeys and narratives around care (Objective 2).

5.3 - Objective 1- Findings for academic staff in HEIs, practice educators, students

Focus groups (n=2) ran for a total of 180 minutes and included 10 participants (males n=4, females n=6) and were led by NH (with a second researcher to assist with any issues joining/during the group). The sample comprised of academic (n=3), clinicians (n=4) and students (n=3). The academics included individuals with considerable experience of leading programmes with pre-registration students. Within the group of clinicians were consultant level practitioners involved in the recruitment of Band 5/newly qualified physiotherapists.

Findings according to main themes, subthemes and coding are presented in **Error! R eference source not found.**.

Main themes	Subthemes	Views
Terminology		No one was particularly wedded to 'clinical' v PBL, but convention is historical and it was offered as distinguished learning in and outside University, the latter being clinical - patient facing
Shape and content of PBL	Scope of experiences	Weak support to broaden core experiences beyond MSK, neuro and cardiorespiratory with mental health and frailty mentioned in particular

Scope of experiences perceived as important (setting and specialism) and welcomed opportunities to further widen current provision (i.e. private practice); acknowledging some of the challenges

Quality was considered important, but not simply as a statement of quality over quantity |
| | Clinical - patient facing PBL | Needs to be predominantly clinical - patient facing and in line with literature

Support for different models received positively e.g. different student: staff ratio

Involvement of support workers, other professional groups favourable |
| | Values of, and distinctiveness of placement | Whilst most acknowledged that clinical placements offered leadership development, student participants did not differentiate the types of training/development offered within a single setting |
| | Integration of development across pillars (common language) | Clarity of development opportunities (e.g. use of research in practice, leading a ward, managing a patient list) |
| | University based training to be considered within 1000 hours | Offering and extending clinical - patient facing (including simulation) University based training as part of the 1000 hours

University based SBL were highly rated but not formally included within the pre-requisite 1000 hours |

	Curriculum to enable autonomy	Qualifying programme need to prepare students to practice autonomously and within their scope of practice; to be safe and effective.
Realistic expectations needed for qualifying programmes	HCPC	Needs to further involve HCPC as regulatory body
	Safe and effective practitioners	A distinct focus of pre-registration education It is important students are evaluative and self-aware regarding scope of practice
Simulation/SBL	Substitute	Appropriate for instances where students may benefit from exposure to patient populations e.g. paediatrics, ICU
	Adjunct	Appropriate to support preparation for clinical placements (simulation placements replacing a first placement). Useful to enhance safety – analogy made with flying/pilots and use of simulation
	Resource	Toolkit would be highly valuable Concerns were raised regarding cost of simulation - very high Shift within programme design is costly (time and equipment) and staff resource
	Evolving practice	Resistance experienced from some practice educators Toolkit perceived as valuable
	Profession specific support and endorsement	Support from CSP perceived as important – professional endorsement and resourced
Band 5/newly qualified physiotherapist	Realistic expectations	Injection therapy not being appropriate for pre-registration education Strong support from those involved in recruiting Band 5/newly qualified physiotherapists
	Representative	EDI needs to be evident and consistent with language used within HEI and health care practices
	Equity	Improvements needed for common settings/posts, but acknowledging requirements may need to be tailored for some posts

5.3.1 - Summary

There was overall strong support for the recommendations presented and a clear appetite for evolution in the way in which students develop the knowledge, skills, attributes and behaviours required for professional practice; ensuring that training content/approaches marry appropriate and realistic expectations for employment as

a Band 5/newly qualified physiotherapist. There was interest regarding the literature on simulation and for clinicians, where SBL had not been part of their education, an acceptance that there was a need for upskilling and better understanding of the scope and process of SBL in education.

The two main priorities offered included

1) Short term: publish a generic Band 5/newly qualified physiotherapist role descriptor which fully reflects the requirements of HCPC and CSP professional standards with respect to knowledge, skills, behaviours and attributes

2) Medium term: To commission a physiotherapy specific SBL toolkit to expedite the adoption of new models of practice involving simulation and related activities through rapid dissemination

5.4 - Objective 2: Findings for patient /service users

This group lasted for 60 minutes and included 5 participants (3 males, 2 females), all of whom had previously received physiotherapy (MSK, neurological, previous paediatric, cardiac rehabilitation) and some who had also participated in activities to train pre-registration physiotherapists.

Quotations supporting the analyses and illustrating the support for the recommendations from the group are presented in Table 5.

Table 5. Findings for patient /service users

Recommendations	Views from Group Members
PBL: 1000 hours, up to 75% clinical - patient facing and up to 25% other forms of PBL. Approved by the group	Including non-patient and indirect PBL is acceptable as long as it is done well '*it's the outcomes that matter*' and is in the '*learning outcomes…in the course*' and assessed in an appropriate way.
Simulation: It's use, the toolkit and a resources library were all approved by the group	The authentic voice of the patient is important '*the real contact with people, real service users, so to speak, I think is invaluable*'. It enables role play/practice with service users allows them to feed back to students '*we feedback to them how they've done, how it made us feel during it. So it's not just 'you asked the right question', it's how they ask the questions. So it's the actual interaction*' It helps students '*to recognise… understand the social economic implications of the person they're treating… often in our interviews with students we say how would you treat someone in a one bedroom flat compared to someone who's got a big garden*?' '*25% of simulation I think. I think that's a good idea*' The library is important for students to see a wide range of conditions and for EDI '*it's vitally important that a potential physio sees people from right across the spectrum of the natural population...not always a certain age, race, religion, gender [but] the wider the context of people they get to meet in training*'. A library would also help HEI staff '*It's a way of giving all the lecturers or things confidence in new subjects. If you've done the groundwork and it does say that they can't build on things themselves, but it just seeds new ideas*'.
Need for further research: acceptable to group	'*Right*', '*Fine*'.
The demand on placements and need to expand beyond the NHS: acceptable to group	CML '*if that sounds OK or any other…Yes I'm getting lots (of nods of heads) across the board on that*'
The development of Band 5/newly qualified guidance/role descriptor: acceptable to group	It is '*amazing…there is not a set down format of 'a Band 5 is XYZ' and…to get the Band 6, you've got travel [and obtain knowledge/skills] B&C as well.*'
EDI in RDs and for employers: agreed strongly by group	This issue was described as '*sadly*' and serious both for the employers if/when '*sued if they're not following equality law*' and for physiotherapists effected by unfairness '*saying people have to drive because it's actually not true, they need to be able to travel*'. One member spoke of the sometimes '*intimidating*' nature of being treated by the stereotypical young sporty athletic physio and how, of all the physiotherapists he'd seen, it was an older physiotherapist with listening and important life skills who had helped him the most.
The inclusion of all four pillars of practice throughout education: Accepted by group	This was viewed as important to ensure physiotherapists were equipped to provide up to date care throughout their career '*it's imperative that there is some way that they have to demonstrate [being up to date]*' '*it's vital that the…new techniques and all and new things are passed down in my opinion*'
To ensure students obtain knowledge and experience across key health settings and of	CML '*I'm seeing nods around the screen again there*' [nods from all group]

people from a wide range of backgrounds: acceptable to group	55
'Other' views raised by the group as important for contemporary physiotherapy and that the physiotherapy profession 'should hear'	Physiotherapy is '*mostly on my own because you don't get long term physio input*' for life long conditions. Another member expanded: they get six weeks [of physiotherapy] then they wait until they are referred again '*it's an awful lot of waiting…I don't know if there's any way round that, but I just think with patients who are taking more responsibility for health care, they need sometimes that professional input*'. This person went on to wonder if it is possible to '*save*' their consultation time and use it as they needed '*it might be [a] 10 minute conversation' that would be helpful.* The transition from paediatric to adult care and healthcare inequalities were raised: '*there was a lot of paediatric involvement as a child. However, as an adult, as a teenager and adult, it all sort of fell by the way side… it's like post code lottery thing about where the support is*' The lack of consistency amongst physiotherapy practitioners '*I could never find was… consistency because they all said different things…[I got] most benefit from X because they seem to have softer skills. The others had hard skills '*it's always been doing like this for the last 30 years so don't bend your back*'. This emphasised the need for up to date, person centred care including the psychosocial model and excellent communication

5.4.1 - Summary

Overall, there was strong support for the recommendations presented and the recommendations were highly acceptable to the group, particularly about the need to provide personalised care (which was holistic and followed a biopsychosocial approach) and improved EDI.

6 - Work package 5. Data synthesis of findings from work packages 1-4

6.1 - Aim

To synthesis findings from work packages 1-4, finalisation of recommendations and project report drafted, revised and finalised

Project data strongly support some refashioning of pre-registration physiotherapy education which has been driven by a number of factors, not least placement capacity but also importantly population need and an evolving profession and broader career landscape. Figure 1 illustrates data driven key findings from across the work packages.
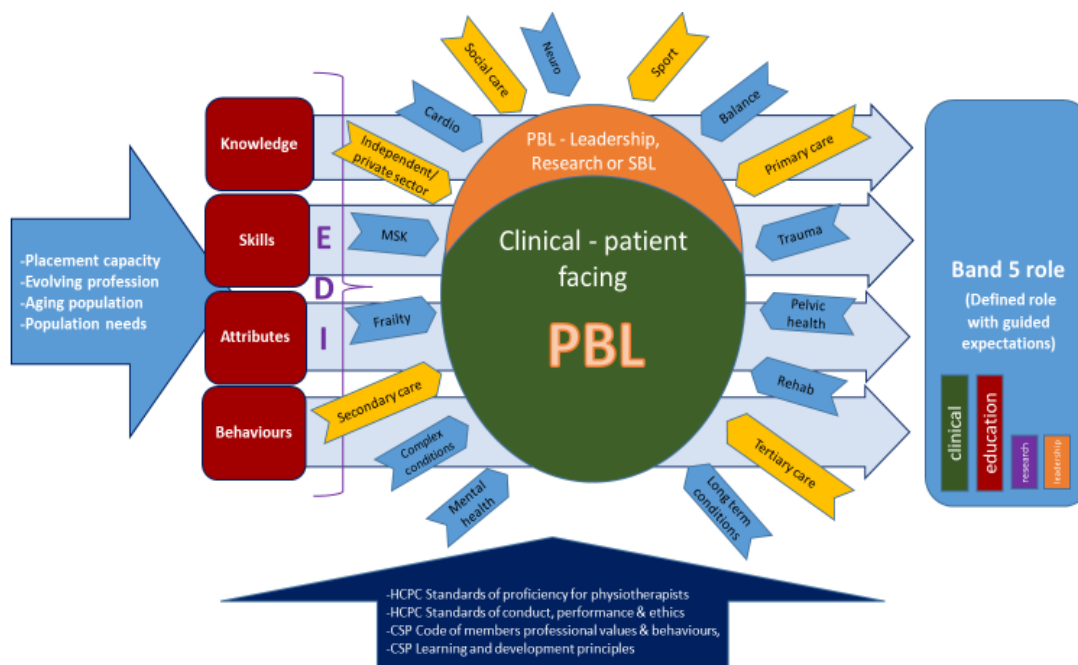

Figure 1. Summary of the findings from work packages 1-4

NB. Please remember that people chose to take part in KNOWBEST, the findings may not be fully representative of the profession and key stakeholders. Also the figure summarizes key findings; it is not to be taken as prescriptive, other settings, conditions etc. are included in the data.

Findings support retention of the 1000 hours of PBL, along with an expansion of what are considered 'core' placements, reflective of population need (e.g. frailty, mental health etc.). Moreover, it was considered important to offer and further value PBL experiences across a broader range of settings (i.e. primary care, independent/private section etc.). Clinical - patient facing PBL was considered extremely important although support was evident for other forms of PBL, these accounting for no more than 25% of the total hours. There was strong support for adjunctive SBL and acknowledgement of its value as a substitute to better equip students with skills and knowledge for safe and effective practice.

Findings strongly support EDI underpinning all activities and learning, and that HCPC Standards of Proficiency for Physiotherapists, Standards of Conduct, Performance & Ethics and CSP Code of members Professional Values and Behaviours should be mapped to programme curriculum for transparency. Preparing new graduates for professional practice and a more expansive career framework was considered important with opportunities to develop knowledge, skills, attributes and behaviours in research and leadership as part of indirect PBL experiences viewed favourably. For equity, guidance regarding Band 5/newly qualified roles and responsibilities should be published thus detailing clearly expectations of and for such roles.

7 - Student research placement experience

Incorporated within the lifespan of the KNOWBEST project, five student research placements (indirect PBL) were supported. Students were year 2 and 3 Herts students, who completed a 5 week research placement, supported by CML and NH and the Herts placement lead. Students were all full time and supported to complete a range of research related activities (i.e. data collection, analysis and interpretation etc.) and achievement of individually set objectives. Whilst predominately a virtual placement, students had the opportunity to meet researchers to get experiences of laboratory based data collection methods. The activities and specific objectives are detailed in Table 6.

Table 6. Student research placement activities

Activities	Students				
	1	2	3	4	5
Scoping review – database searches, screening, data extraction, data analysis and interpretation (work package 1)	x	x			
Sourcing RD, data extraction, content analysis & data interpretation (work package 2)			x	x	
Evaluation of student experience of research placement					x
Written reflections upon student placements	x	x	x		x
Understanding and applying ethics in research (workshop)	x	x	x	x	x
Presentations, (workshop and/or practice)	x	x	x	x	x
Research visits (laboratory based, virtually: clinical trials/virtual reality/research)	x	x	x	x	x
Stakeholder meetings	x	x	x	x	x
Participation at vPUK/webinars/focus groups	x	x	x	x	x
KNOWBEST project meetings (weekly)	x	x	x	x	x
Dissemination of research/project findings (to CSP & project team)	x	x	x	x	x

From analysis of the data, some of the key findings included, valuing the immersion in research for a deeper learning experience, recognition that whilst research placements (indirect PBL) were *new (-and different)*, there were similarities to clinical - patient facing PBL and opportunities to develop a considerable number of transferable skills. Student appreciated the variety of experiences afforded to them whilst also having autonomy and an opportunity to lead on a specific line of enquiry within the KNOWBEST project. See quotes below for student insights.

Immersive learning

'I think it's different when you're being kind of immersed into it rather than just kind of learning about it and not having guidance. So, I think being immersed into it and having guidance throughout the different activities you need to perform on such a placement, um, kind of helps, uh, let's you, you gain a greater appreciation of the importance I think of research.' (S1)

'So I think by doing Knowbest, I was able to learn the theory or, or, you know, the team members of the team taught me the theory and then put it into practice by doing it immediately afterwards, a bit like we would with, I don't know, massage or mobilisations. You know, you ..You know, you have that theory and then you have that immediate hit of, of practical or that immediate hit of putting it into practice.' (S3)

Clinical and research placements: different but the same

'I think they're, it's really strange because they're two very different things, but also very similar at the same time, you're still on placement. You're still working towards the profession that, you know, hopefully that you love.' (S3)

Transferable skills

'Um, but in terms of transferable skills, you know, there's loads that since then, I've kind of taken forwards.'(S3)

'And we also like were asked to do some presentations…we watched…a presentation or a webinar kind of thing. We were asked to either do a presentation…or just kind of discuss it with one of the educators…So, the presentation side of things, I think gave us an idea, like how to kind of structure a presentation…but I think it will translate if I'm asked to like, do an in-service training.' (S1)

Variety of research experiences valued

'And yeah, I really enjoyed the extra activities we did as well with other researchers from the sports sciences or that kind of thing. So overall I think it was a good experience.' (S1)

Evidence based practice

'And I mean, of course I feel more evidence based now and I understand more about research so I can kind of gear treatments and things up to why we do them.' (S3)

'So, we weren't just really learning about research we were learning about the importance of research for the NHS, for example. Um, so yeah, I think that's just really stuck in my brain.' (S2)

Opportunities to lead

'And having the confidence, I think to ask questions when needed all fed into that kind of having the leadership kind of skills to lead like an aspect of it and complete it well.' (S1)

7.1 - Summary

Findings provide evidence supporting research or in-direct PBL to support pre-registration student development. Students valued the variety of experiences, immersion and opportunities for growth and development within the research pillar. They offered rich insights as to the similarities and differences between types of PBL with maturity.

8 - Final Discussion

The KNOWBEST project has successfully achieved its aims and has provided recommendations for consideration by the CSP. The recommendations are detailed in the executive summary. The following section summarises how the KNOWBEST findings fit with a selective number of other available frameworks and reports relevant to physiotherapy pre-registration education.

KNOWBEST findings complement the recent Review and Development of Practice Educator Resources for Pre-Registration Physiotherapy Education [37]. Both projects endorse that PBL is an integral part of the role of every registrant and all members of the physiotherapy profession are responsible for developing the future

workforce, thus further drawing on clinicians/practitioners outside the NHS. Collectively both projects support a need for a library/central repository to hold resources to support PBL and a review of how support workers can further support PBL; recognising and valuing their skills and abilities.

KNOWBEST findings also fit well with the recent HEE and NHS Roadmaps to Practice for AHPs designed to provide a clear educational pathway from pre-registration to advanced practice for clinicians wishing to pursue a career in primary care. KNOWBEST findings, like the Roadmaps, support the training of physiotherapists to:

- manage and treat medically complex patients
- enable and support individuals to recover or adjust to achieve their full potential, to live as full and active lives as possible
- positively affect the physical, mental and social wellbeing of individuals, communities and populations.

The urgent need to increase the number of AHPs in the UK is recognised by the Royal Society of Public Health (RSPH) (2021) with clinical placement availability being a limiting factor to increasing HEI places, a finding strongly evident in the KNOWBEST project. The RSPH advocates expanding the range of placements offered to AHP students into public health settings, to increase placement capacity and enable students to better understand determinants of health. This would involve greater integration of public health into the curricula of AHP pre-registration courses. Again, such placements/PBL opportunities could provide leadership training to further support skill and attribute development across the pillars of practice in pre-registration education.

KNOWBEST findings also relate to Integrated care systems (ICS) and the NHS Long Term Plan [41]. ICS aim to integrate care across different settings and organisations, joining up community and hospital-based services, physical and mental health, health and social care and planning services to meet the needs of local population. KNOWBEST project findings strongly endorse and support ICS and identify how pre-registration education can be enhanced to meet this approach to improve patient care and population health.

KNOWBEST findings highlight the importance of integrating all four pillars of practice into pre-registration education. This concurs with the HEE Research and Innovation Strategy [38] which aims to create an education and training system that is evidence based and underpinned by research and innovation building capacity and capability enabling physiotherapists to qualify and continue to be able to embrace and actively engage with research and innovation. This strategy includes the introduction of an annual process for identifying, prioritising and sharing innovative and evidence based good practice across HEE. Whilst research objectives were rarely included in Band 5 RDs this presents an opportunity whereby physiotherapists could identify band appropriate research objectives for annual appraisals. This could be developed and included appropriately across physiotherapy career pathways. Development of an inclusive, over-arching framework for Clinical Academic Careers in the future by HEE is welcomed.

With regard to digital skills and learning, information is provided about the knowledge and skills needed in pre-registration education which aligns to the digital competency framework for UK Allied Health Professionals [39], and the Topol Report (2019)[40], thus preparing the healthcare workforce to deliver the digital future. KNOWBEST findings concur with many of the elements of the Personalised Care Interprofessional Education Framework (PERCIE): with a values-based person-centred model of care and focussing upon what is important to patients/people living with health conditions using collaborative, inclusive principles that support mutual learning; aligned with the NHS Long Term Plan [41]. This also supports students' exposure to diverse communities so that they develop empathy and gain a wider understanding of their health and social needs and associated inequalities. This includes the need to recruit people to the profession who reflect the communities that they serve. The PERCIE framework provides a curriculum model to aid HEIs to incorporate personalised care in pre-registration programmes and include this in learning outcomes and map this to professional competencies. KNOWBEST findings also resonate with the Personalised Care Institute's Curriculum [42] and the Comprehensive Model of Universal Personalised care (2010). The Personalised Care Institute's Curriculum includes methods of learning, including SBL, and consultation models; highly relevant to pre-registration education.

The importance of person centred care and EDI was also emphasised in a recent scoping review of AHP education [43], which highlighted EDI, professional responsibility, leadership development, and person centred care. All these areas are evident in KNOWBEST findings; as were other areas of the AHP education scoping review, namely, increasing digital skills, quality improvement and broadening clinical skills for people with mental health conditions, learning disabilities and neurodiversity.

Furthermore, the NHS is recognising the need to support staff not just during the pandemic but throughout their careers and have acknowledged that enhancing retention is a critical issue for individual employers and local systems. Improving Staff Retention – a guide for employers [44] sets out the priorities and ambitions to support, value and invest in its staff. Along with Our People promise [45] that includes being compassionate and inclusive, safe and healthy and offering flexible working, it is anticipated that this may begin to address some of the EDI challenges outlined in the RDs and will provide a further driver for change. In addition, as the AHP Faculties become established, they are setting up regional Ethnic Minority Networks open to all AHPs including students to provide a forum for sharing best practice and identifying solutions to EDI challenges.

In summary KNOWBEST findings fit well into the surrounding literature and commitment to adapt pre-registration physiotherapy and AHP education to ensure they meet the changing needs of the people and communities served by physiotherapy.

8.1 - Strengths and limitations

The experience and expertise of the team ensure rigour in data acquisition, analysis and interpretation. Using a sequential mixed methods methodology, stakeholder engagement was maximised and findings largely representative of key stakeholders. The student and patient voice were central to the project with 5 pre-registration Herts students completing a 'research placement' with the KNOWBEST team and active engagement of a dedicated patient service user. A stakeholder group was convened at the start of KNOWBEST and iteratively informed the shape of sequential work packages with regular feedback sessions.

The majority of respondents were self-selected and therefore findings may not be fully representative of the profession and key stakeholders. Furthermore, those individuals who are less comfortable with or without access to means of engagement (Zoom, email etc.) may have been 'put off' contributing to the advertised engagement events. Whilst every effort was made to ensure participation of individuals across the four home nations of the UK, respondents were in the main from England and findings not truly reflective of stakeholders in other countries.

For specific work packages the following limitations were noted.

-Work package 2: whilst all the RDs evaluated in work package 2 were for currently advertised posts and made reference to Covid-19, the date when most were written was unclear.

-Work package 3: where interrogation of some responses (e.g. responses submitted via the website) was not feasible; thus data was taken on face value and some inferences may have been missed.

-Student research placement: students were pre-selected based on profile and from expressions of interest. An informal interview ensured expectations were clear and aligned between the student and the needs of the project.

9 - Conclusions

Findings include twelve recommendations regarding the future of PBL and the knowledge, skills, behaviours and attributes needed by contemporary physiotherapists for consideration by the CSP. Recommendations are data driven and may usefully inform the CSP's current review of pre-registration physiotherapy education. Essentially recommendations support retention of 1000 hours PBL but allowing more flexibility; including hours for adjuncts and substitution to in-person PBL to be incorporated into pre-registration education. Findings identify areas of prerequisite change, suggest approaches/strategies to improve the pre-registration education for physiotherapists and the ultimate aim being to improve the health care provided to patients, people living with long term health conditions, and the public in the UK. The challenges of an aging population, increasingly complex patients, and a health service under immense pressure emphasise the importance of physiotherapists qualifying from their education provider who are able to meet these

challenges in their future practice. At a time when career pathways for physiotherapists are also continuing to develop and expand, clarity about roles will also benefit physiotherapists and the physiotherapy profession.

References

1. Mori B and et al., *Use of Simulation Learning Experiences in Physical Therapy Entry-to-Practice Curricula: A Systematic Review.* Physiother Can, 2015. **67**(2): p. 194-202.
2. Pritchard SA and et al., *Simulated Patients in Physical Therapy Education: Systematic Review and Meta-Analysis.* Phys Ther, 2016. **96**(9): p. 1342-53.
3. Bogossian FE and et al., *Locating "gold standard" evidence for simulation as a substitute for clinical practice in prelicensure health professional education: A systematic review.* J Clin Nurs, 2019. **28**(21-22): p. 3759-377.
4. Judd BK and et al., *Comparison of Psychophysiological Stress in Physiotherapy Students Undertaking Simulation and Hospital-Based Clinical Education, Simulation in Healthcare.* The Journal of the Society for Simulation in Healthcare:, 2016. **11**(4): p. 271-277.
5. Ohtake PJ and et al., *Simulation Experience Enhances Physical Therapist Student Confidence in Managing a Patient in the Critical Care Environment.* Physical Therapy, 2013. **93**(2): p. 216-228.
6. Blackstock FC and et al., *Simulation can contribute a part of cardiorespiratory physiotherapy clinical education: two randomized trial.* Simul Healthc, 2013. **8**(1): p. 32-42.
7. Judd BK, et al., *The validity of a professional competence tool for physiotherapy students in simulation-based clinical education: a Rasch analysis.* BMC Med Educ, 2016. **5**(16): p. 196.
8. Johnston C and Wakely L, *Delivering introductory physiotherapy clinical placements incorporating simulated learning experiences in rural settings.* The Australian Journal Of Rural Health, 2021. **29**(2): p. 172-180.
9. Watson K and et al., *Can simulation replace part of clinical time? Two parallel randomised controlled trials.* Med Educ, 2012. **46**(7): p. 657-67.
10. Ladyshewsky R and et al., *Reliability and validity of an extended simulated patient case: a tool for evaluation and research in physiotherapy.* Physiother Theory Pract, 2000. **16**: p. 15-25.
11. Hassam M and Williams M, *Education Via Simulation: Teaching Safe Chest Percussion for Pre-term Infants.* Hong Kong Physiotherapy Journal, 2003. **21**(1).
12. Hale L and et al., *Standardized Patients and Multidisciplinary Classroom Instruction for Physical Therapist Students to Improve Interviewing Skills and Attitudes About Diabetes.* Journal of Physical Therapy Education, 2006. **20**(1): p. 22-27.
13. Jones A and Sheppard L, *Use of a Human Patient Simulator to Improve Physiotherapy Cardiorespiratory Clinical Skills in Undergraduate Physiotherapy Students: A Randomised Controlled Trial.* The Internet Journal of Allied Health Sciences and Practice, 2011. **9**(1): p. 12.
14. Smith N and et al., *Using simulation and patient role play to teach electrocardiographic rhythms to physical therapy students.* Cardiopulm Phys Ther J, 2012. **23**(1): p. 36-42.
15. Johnston V and et al., *Using technology to enhance physical therapy students' problem-solving skills around safe patient handling.* Physical Therapy Reviews, 2013. **18**(6): p. 407-415.
16. Mandrusiak AM and et al., *Senior physiotherapy students as standardised patients for junior students enhances self-efficacy and satisfaction in both junior and senior students.* BMC Med Educ, 2014. **23**(14): p. 105.
17. Maas MJ and et al., *Why peer assessment helps to improve clinical performance in undergraduate physical therapy education: a mixed methods design.* BMC Med Educ, 2014. **14**: p. 117.
18. Gough S and et al., *Using video-reflexive ethnography and simulation-based education to explore patient management and error recognition by pre-registration physiotherapists.* Adv Simul, 2016. **1**(9).

19. Phillips AC and et al., *Developing physiotherapy student safety skills in readiness for clinical placement using standardised patients compared with peer-role play: a pilot non-randomised controlled trial.* BMC Med Educ, 2017. **17**(1): p. 133.

20. Johnston TE, *Assessment of Medical Screening and Clinical Reasoning Skills by Physical Therapy Students in a Simulated Patient Encounter.* The Internet Journal of Allied Health Sciences and Practice, 2018. **16**(2): p. 10.

21. Dalwood, N. and et al., *Preparing Physiotherapy Students for Clinical Placement, Simulation in Healthcare.* The Journal of the Society for Simulation in Healthcare:, 2018. **13**(3): p. 181-187.

22. Ward A and et al., *Cultural empathy in physiotherapy students: a pre-test post-test study utilising virtual simulation.* Physiotherapy, 2018. **104**(4): p. 453-461.

23. Kelly D and et al., *Augmented reality learning environment for physiotherapy education.* Physical Therapy Reviews, 2018. **23**(1): p. 21-28.

24. Riopel M and et al., *Utilizing Standardized Patient Feedback to Facilitate Professional Behavior in Physical Therapist Students: A Pilot Study.* The Internet Journal of Allied Health Sciences and Practice., 2018. **16**(3): p. 4.

25. Riopel MA and et al., *Promoting Professional Behaviours in Physical Therapy Students Using Standardized Patient Feedback.* Physiother Can, 2019. **71**(2): p. 160-167.

26. Hough, J. and et al., *Simulation-based education improves student self-efficacy in physiotherapy assessment and management of paediatric patients.* BMC Med Educ 2019. **19**: p. 463.

27. Chong DYK, *Benefits and challenges with gamified multi-media physiotherapy case studies: a mixed method study.* Arch Physiother, 2019. **9**: p. 7.

28. Pritchard SA and et al., *Physiotherapy students can be educated to portray realistic patient roles in simulation: a pragmatic observational study.* BMC Med Educ, 2020. **20**(1): p. 471.

29. Kurul R and et al., *An Alternative Method for Anatomy Training: Immersive Virtual Reality.* Anat Sci Educ, 2020. **13**(5): p. 648-656.

30. Ballengee LA and et al., *Introduction of a psychologically informed educational intervention for pre-licensure physical therapists in a classroom setting.* BMC Med Educ, 2020. **20**: p. 382.

31. Walker CA and Roberts FE, *Impact of Simulated Patients on Physiotherapy Students' Skill Performance in Cardiorespiratory Practice Classes: A Pilot Study.* Physiother Can, 2020. **72**(3): p. 314-322.

32. Favolise M, *The Effectiveness of Augmented and Virtual Reality in the Education of Physical Therapy Students.* Archives of Physical Medicine and Rehabilitation, 2021. **102**(10): p. e84.

33. Crozier K and et al. *Advanced Clinical Practice (ACP) in Midwifery A deep dive analysis into the use and development of ACP in Maternity Services*. [cited 2022; Available from: https://www.hee.nhs.uk/our-work/maternity/advanced-clinical-practice-acp-midwifery.

34. Bowen GA, *Document analysis as a qualitative research method.* Qualitative Health Research, 2009. **9**: p. 27-40.

35. Hsieh H-F and Shannon SE, *Three approaches to qualitative content analysis.* Qualitative Health Research, 2005. **15**: p. 1277-1288.

36. Tucker JD and et al., *Crowdsourcing in medical research: concepts and applications.* PeerJ, 2019. **7**: p. e6762.

37. O'Connor D and et al., *Review and Development of Practice Educator Resources for Pre-Registration Physiotherapy Education.* 2022, CSP.

38. England, H.E., *Developing a flexible workforce that embraces research and innovation* 2022.

39. Tack C, *Development of a digital competency framework for UK Allied Health Professionals*, in *Topol Digital Health Fellowship*. 2020, Health Education England and NHS England

40.   England, H.E., *The Topol Report Preparing the healthcare workforce to deliver the digital future.* 2019.

41.   Alderwick H and Dixon J, *The NHS long term plan.* BMJ 2019. **364** p. l84.

42.   Foreman P and et al., *Personalised Care Institute, Curriculum 2020.* 2020, RCGP.

43.   Davis J, *Future AHP Education Needs A scoping report May 2021*, A.H. Solutions, Editor. 2021.

44.   NHS. *Looking After Our People – Retention.* 2022; Available from: https://www.england.nhs.uk/looking-after-our-people/.

45.   NHS.uk. *Our NHS People Promise.* 2022; Available from: https://www.england.nhs.uk/ournhspeople/online-version/lfaop/our-nhs-people-promise/.