Forming and shaping of professional identity within pre-registration physiotherapy curricular: A scoping review

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Published in:
Nurse Education Today

DOI:
10.1016/j.nedt.2021.105250

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Link to output in Bond University research repository.

Recommended citation (APA):
1. INTRODUCTION

Professional identity in physiotherapy is defined as the values both personally and professionally developed through learning and patient care as well as through collaborating with other health professionals to form an understanding of their own professional role (Lindquist et al., 2006). A physiotherapist has a fundamental role in health care and therefore needs to understand their professional identity, this is vital for providing patient centred care within a multidisciplinary team. The development of understanding of one’s professional role as a physiotherapy student is influenced by the experiences through different learning opportunities and the curriculum studied (Roskell, 2012). Professional identity formation is an ongoing and dynamic process (Davis et al., 2011), that has enabled collaborative practice to occur among physiotherapists and all other health professions to achieve highest quality outcomes for their patients.

Physiotherapists are required to engage in continuous professional development as they transition from a student to newly qualified graduate to experienced practitioner (World Physiotherapy, 2019). Learning can be facilitated in a diverse range of teaching methods from formal teaching, problem-based learning, collaborative learning, self-directing learning and learning through experience (Korpi et al., 2014; Stephens and Ormandy 2018; World Physiotherapy, 2019). In order to become a physiotherapist, one must undertake a university degree varying from a bachelor’s degree to a doctoral depending on the university; this can be defined as pre-registration physiotherapy curricular. All physiotherapy programs globally are required to follow a minimum standard outlined by the Guidelines for Physical Therapist Professional Entry Level Education (World Physiotherapy, 2019) inclusive of analysis of health and social needs of the country, attaining required learning outcomes, evidence-based practice, requisite knowledge and attitudes and attributes to support development towards becoming a physiotherapist (Korpi et al., 2014; Lapkin et al., 2014; Borstad et al., 2018;) These can be modified dependent on the context of education of the individual organization (World Physiotherapy, 2019). Physiotherapy educational programs have the responsibility to develop a pre-registration physiotherapy student’s ability to demonstrate professionalism within practice (Lapkin et al., 2011; Wormley et al., 2018). Although, there is no unified definition as to how professional identity is formed and shaped in pre-registration physiotherapy curricular (World Physiotherapy, 2019). According to World Physiotherapy (2019) education guidelines do exist however, professional identity forms apart of hidden
According to the current Physiotherapy Board of Australia registration standards (2015) new graduate physiotherapists are expected to meet high standards and a high quality of practice upon graduating. This requires sound knowledge, treatment skills, teamwork skills and being able to work on one’s own initiative with the ability to constantly engage in self-reflection, to continually develop as a physiotherapist (Furze et al., 2011; Fernandes et al., 2015; Kyte et al., 2018; Wormley et al., 2018). Education is the key factor in the development of the necessary professional skills and principles to increase confidence within a student physiotherapist’s skill set (Furze et al., 2011; Grace and Trede, 2013; Stephens and Ormandy, 2018). This provides a sense of belonging to the students and consolidates their input as being valued within in a team as a physiotherapist (Davis et al., 2011; Stephens and Ormandy, 2018;). Interprofessional education is effective when students from two or more professions educate and cooperate with each other, it enables effective collaboration to improve health outcomes for patients (CAIPE, 2017; Barradell et al., 2018; Borstad et al., 2018). This enables students to become practice ready prior to the entering the workforce to be an effective member of the multidisciplinary team (WHO, 2010; WHO, 2011). Having a professional identity increases collaborative practice enabling a mutual understanding of roles reducing negativity amongst rivalry professions and therefore prevents stereotyping (Davies et al., 2011).

The purpose of this scoping review is to explore how professional identity is formed and shaped within pre-registration physiotherapy curricular. It is anticipated this review will provide an insight into valuable curriculum content and delivery methods implemented into pre-registration physiotherapy. Enabling an understanding of development of professional identity across the world aims to equip physiotherapists for the future and ever evolving demand of health care.

The research question that guided this inquiry was:

Which components of the pre-registration physiotherapy curricular enable students to form and shape their identity as a physiotherapist?

2. METHODS

2.1 Protocol and registration
A methodological framework with reference to Arksey and O’Malley (2005), Cooper et al. (2019) and Joanna Briggs Institute (Peters et al., 2020) was used to assist in sourcing literature relevant to the scoping reviews’ aim. This scoping review has been conducted in accordance with the protocol published via the Open Science Framework (Rappazzo et al., 2020), as registered on 14 July 2020, with reference number 10.17605/OSF.IO/HSWZM.

2.2 Eligibility criteria

A scoping review was conducted as it is a transparent and rigorous method which allows for a wider breadth of literature in the field of interest compared to systematic reviews (Arksey and O’Malley, 2005). This scoping review included articles reporting on research, which was related to physiotherapy students, prior to registration as a physiotherapist regardless of which degree was studied, including Bachelor of Physiotherapy, Masters of Physiotherapy or Extended Masters of Physiotherapy, which are also known as a Doctor of Physiotherapy program.

Articles included in this scoping review were only full text studies published in English. Any studies that explored how professional is enacted (formed and shaped) within pre-registration physiotherapy curricular were included. Studies reporting on the impact of interprofessional learning and its impact on professional identity were also included. The following types of publication were eligible for inclusion: qualitative studies, quantitative studies, mixed methods and systematic reviews. Physiotherapy students, pre-registration curricular and professional identity were all eligible for inclusion. Studies with or without a comparator were eligible for inclusion. There were no restrictions on publication date because this is a relatively new area of research with limited published studies.

Articles were excluded if they were not pertaining to physiotherapy students and did not feature the development of professional identity. The following types of articles were excluded: clinical commentary, unpublished, dissertations, theses, book chapters, non-primary research and non-peer reviewed.

2.3 Information sources and search strategy

A comprehensive literature search of electronic databases PubMed, Embase, Cinahl, ProQuest Health and Medical Collection and Google Scholar was conducted up to 19 June 2020. The search strategy was developed through application of the methodological frameworks proposed by Arksey and O’Malley (2005), the Joanna Briggs Institute (Peters et al. 2020) and latest scoping review checklist according to Cooper et al. (2019). This followed
a 3-step approach (1) a pilot search of PubMed using the subject headings (“physiotherapy students” AND “professional identity” AND pre-registration AND curricular); (2) identified keywords and terms relating to developing professional identity in physiotherapy students and/or curricular; (3) execution of final search strategy, a hand search and further searching of reference lists of the selected articles, systematic reviews, narrative reviews were also searched. No contact to corresponding authors was required. Please see Table 1 for the full search strategy used in PubMed.

2.4 Selection of sources of evidence

The databases were searched, and results exported into bibliography software [EndNote X9] and removing duplicates by two independent reviewers. Eight hundred and ten articles were screened for eligibility by reviewing the titles and abstracts in accordance with the inclusion and exclusion criteria to identify articles reporting on professional identity in pre-registration physiotherapy curricular. The articles were selected by the two reviewers (LR and SS) in which were selected by following the PRISMA scoping review statement (Tricco et al., 2018). This process included the following stages: (1) methodical search of chosen databases; (2) elimination of duplicates; (3) screening of titles and abstract for eligibility; (4) screening of full text articles for eligibility; and (5) inclusion and exclusion criteria were developed prior to article selection.

2.5 Data charting process and data items

A draft extraction table was developed by the two reviewers (LR and SS) and piloted at the protocol stage to record the key information of the source, such as author, reference, and results or findings relevant to the review question (Peters et al., 2020). This was further refined prior to data extraction. Data meeting inclusion criteria was independently extracted by the two reviewers (LR and SS), into purposely designed tables. Data was extracted in accordance with the Joanna Briggs Institute Reviewers’ Manual (2020). Key findings relevant to the scoping review question were extracted in the following categories: (1) author(s); (2) year of publication; (3) origin/country of origin; (4) aim(s)/purpose/research question(s); (5) population, sample size and profession/year of study; (6) methodology and methods; (7) intervention type, comparator and details of these where appropriate; (8) outcome measures and details of these (how they were measured and the applicability)/analysis; and (9) key findings relating to the scoping review question. Tables were developed to extract data from the systematic review in the following categories: (1)
author; (2) year; (3) country/setting; (4) aim/population; (5) types of research papers; (6) methods and; (7) outcomes. A subsequent table was developed to extract text and opinion pieces in the following categories: (1) authors/background; (2) type of text; (3) population represented; (4) setting/context; (5) stated allegiance/position and; (6) reviewers conclusion relating to the scoping review question. Checks were undertaken to ensure any included studies had not been retracted in accordance with Cooper et al. (2019). No further data was obtained from authors of the included studies.

2.6 Critical appraisal of individual sources of evidence

In accordance with the latest guidance to improve the quality of scoping reviews, a critical appraisal of the quality of included studies was undertaken (Tricco et al. 2018; Cooper et al., 2019). Two reviewers (LR and SS) screened and rated each included paper independently. Each article was scored accordingly using an appropriate critical appraisal instrument developed by the Joanna Briggs Institute (Joanna Briggs Institute, 2017) or mixed methods appraisal tool (Hong et al., 2018). A critical appraisal table (Table 2) was used to analyse and place more weight of findings on relevant studies which scored higher once critically appraised (Peters et al., 2020). A Cohen’s Kappa analysis was conducted using statistical software [IBM SPSS Statistics 26 Mac] to analyse percentage of agreement between the two independent reviewers (LR and SS).

2.7 Synthesis of results

In alignment with the research question, a thematic synthesis of 18 of the 21 articles was undertaken to explore the components of pre-registration physiotherapy curricular that form and shape professional identity (Peters et al., 2020). Three articles were not included in the thematic synthesis due to being text and opinion pieces or a systematic review. The narrative specifically addressed the research question, by exploring which components of the pre-registration physiotherapy curricular enable students to form and shape their identity as a physiotherapist. This was achieved by summarising the literature according to the types of information provided about the participants, education or factors pertaining to the development of professional identity and outcomes identified. A meta-synthesis was conducted in this scoping review to identify common themes from qualitative research to provide a deeper understanding of literature (Erwin et al., 2011). This was conducted in accordance with a framework analysis approach, based on Ritchie and Spencer’s (1994) five-step process which outlines the following steps: (1) familiarisation with data; (2) developing
a coding framework; (3) coding; (4) charting and; (5) mapping and interpretation. Meta-
syntheses utilise rigorous qualitative methods to construct superior meaning of existing
qualitative studies through interpretation (Erwin et al., 2011). No randomised controlled trials
were identified by the search strategy therefore it was not possible to undertake a meta-
analysis, and heterogeneity could not be analysed (Haidich, 2010).

3. RESULTS

3.1 Selection of sources of evidence

Figure 1 presents the PRISMA flow diagram of the scoping review process, showing
the sources of evidence screened, assessed for eligibility, and included in the review, with
reasons for exclusions at the full text stage (Tricco et al., 2018).

3.2 Characteristics of sources of evidence

This scoping review yielded 21 articles from eight countries with publication dates from 1992
to 2020. A range of methodologies (Table 3) were used in the articles extracted for this
scoping review which included phenomenological, ethnographic, mixed methods, narrative
methods, pragmatic grounded theory, and quantitative approaches. Eighteen of the 21 articles
included in the review utilised a prospective design, to explore the concepts of forming and
shaping of professional identity in physiotherapy students. The systematic review by Lapkin
et al (2018), focused on interprofessional education and professional identity, whereas two
peer reviewed text and opinion articles provided opinions on classroom and learning
curricular to enhance professional identity development in physiotherapy students (Gandy
and Jensen, 1992; Trede, 2012).

Thematic analysis was the most frequently adopted data analysis method to analyse
common occurring themes of the participants of the studies (Lindquist et al. 2006b; Davies et
al., 2011; Furze et al., 2011; Kyte et al., 2018; Grace and Trede, 2013; Roskell, 2013;
Fernandes et al., 2015; Stephens and Ormandy, 2018; Wormley et al., 2018; Harman et al.,
2019; Norris et al. 2020). Exploratory factor analysis and ordinary least squares regression
model for variables as outcome measures were used in the quantitative article (Adams et al.,
2006). Other forms of analysis included cross-country analysis (Lindquist et al., 2006b),
heuristic inquiry data analysis (Barradell et al., 2018), content analysis (Borstad et al., 2018),
devil’s advocate analysis (Borstad et al., 2018), grounded theory analysis and symbolic
interactionism (Nortvig et al., 2017).
Twelve studies only included physiotherapy students with participants ranging from first year of study to final year of study in Bachelor, Masters and Doctor of physiotherapy programs. The remaining studies reported findings from physiotherapy students as well as other health professional students (n = 4), clinicians or teachers (n = 2) and physiotherapy programmes (Roskell, 2013).

3.3. Critical appraisal within sources of evidence

Critical appraisal was undertaken and is presented in Table 2 (Cooper et al., 2019; Peters et al., 2020). A variance in scores was discussed between reviewers (LR and SS) to come to an agreed score. The percentage of agreement between the two reviewers was 84.0%. A Cohen’s Kappa analysis was used to measure levels of agreement between the two reviewers for critical appraisal scores, this resulted in a Kappa measure of agreement of 0.509, considered a ‘moderate’ level of agreement (Landis and Koch, 1977; Cooper et al., 2019). Seventeen of the eighteen articles were low risk of bias in accordance with the Joanna Briggs Institute critical appraisal tools (Joanna Briggs Institute, 2017). The quality of studies using the mixed method appraisal tools could not be analysed as this is not recommended according to Hong et al. (2018). Majority of the studies lacked clarity according to locating the researcher culturally or theoretically and the influence of the researcher on the research, within section six and seven of the JBI qualitative critical appraisal tool checklist. In section six, studies had to locate research culturally or theoretically which only four out of the 15 had included. In section seven, studies had to state the influence of the researcher on the research in which only seven of the 15 included.

3.4 Forming and shaping of Professional Identity

The included articles discussed themes of professional identity and development, individual perceptions of professional identity, different curriculums, roles of interprofessional learning on professional identity and development of professional role perception and skills. Tables 3, 4 and 5 identify which articles illustrate forming, shaping and themes attributing to professional identity through qualitative, quantitative, mixed method, systematic and text and opinion approaches. There was no pattern identified with relevance to country and forming and shaping professional identity, although it was noted that the United Kingdom had a higher amount of research articles published focusing on forming professional identity alone (Adams et al., 2006; Grace and Trede, 2013; Stephens and Ormandy, 2018; Lapkin et al., 2018).
3.5 Thematic analysis

A meta-synthesis was conducted to extract common themes from 18 of the 21 articles (Table 3) of this review. Five main themes emerged from the included studies as well as subthemes following these. Figure 2 illustrates the emerging main themes and subthemes regarding the components of pre-registration physiotherapy curricular that enable students to form and shape their identity as a physiotherapist.

4. DISCUSSION

This scoping review aimed to identify different components that enabled students to form and shape their professional identity as a physiotherapist. This scoping review identified that there is currently no standardised way of teaching professional identity in pre-registration physiotherapy curricular.

The findings suggest that there are different factors which contribute to the forming and shaping of professional identity expressed in different ways dependent on an individual’s ‘self’, skills, curricular, program and location (Adams et al. 2006; Lindquist et al., 2006b; Kyte et al., 2018; Norris et al., 2020). Self-encompassing values attributing to the person which is developed through skills that are encountered through pre-registration curricular. Physiotherapy curricular, programs and locations further shape professional identity as they provide students with the ability to develop and define their role as a physiotherapist due to increasing their knowledge of their role and other health professions (Davies et al., 2011; Gough et al., 2013; Kyte et al., 2018).

Adams et al., (2006) discussed physiotherapy students already had a strong formation of professional identity prior to embarking on their degree as a result of previous experiences in health settings, understanding of working as part of a team and pre-conceived knowledge of the physiotherapy profession. Therefore, highlighting that exposure to the profession itself can support pre-registration curricular in the forming and shaping of professional identity.

4.1 Emerging Themes

Thematic analysis was used in 11 of the included studies to identify common emerging themes (Nowell et al., 2017). These themes were identified by analysing and transcribing qualitative responses from focus groups, narrative interviews, reflective questionnaires and written reflective assignments (Nowell et al., 2017). The commonality of the themes gives evidence for establishing individual roles as a physiotherapist and increasing self-awareness.
Lindquist et al. (2006b) discovered three professional identity themes labelled as The Empowerer, The Educator and The Treater. The three identities differed in terms of their professional focus, the context of work preferred and the understanding of individual role and in a setting of other health care staff.

A common theme regarding ‘self’ was pronounced in many of the included studies using different terminologies including, learning about self and others (Fernandes et al. 2015), establishing a physiotherapy role independently (Kyte et al., 2018), increased self-awareness and self-recognition (Furze et al., 2011), developing an autonomous, respected and lively sense of self and the profession (Barradell et al., 2018) and self-reflection (Wormley et al., 2018). A text and opinion piece highlighted concepts of professional identity and beginning with ‘self’, with the second relating to professional relationships and third being dialogue with ‘self’ and others (Trede, 2012). The themes emerged from this scoping review similarly reflect the themes of professional identity formation in nursing students discussed in the scoping review by Simmonds et al., (2020), highlighting the similarities between the two health professions.

The theme of compassion and caring was elicited in the study conducted by Wormley et al., (2018) as a core value developed in the problem-based learning (PBL) curriculum. This enabled physiotherapy students to interact with and care for patients proving that PBL is a catalyst of the curriculum in developing a holistic approach to treating patients and participation in a multidisciplinary team (Fernandes et al., 2015; Wormley et al., 2018).

4.2 Forming of Professional Identity

The formation of professional identity are the underlying foundations and core principles that enable a student physiotherapist to become aware of what matters most in practice, with values and interest that shape their decision making (Trede, 2012). The ability to independently think and act as a future professional is the underpinning of professionalism and the formation of professional identity (Trede, 2012).

The concepts of forming professional identity were described in different terms, such as professionalism (Trede, 2012; Grace and Trede, 2013) professional values (Borstad et al., 2018), projected identity (Roskell et al., 2013), professional formation (Furze et al., 2011), understanding professional roles (Davies et al., 2011), professional identity development (Nortvig, 2017; Harman et al., 2019), development pathways (Lindquist et al., 2006a) and identity construction (Rees et al., 2019). Trede et al., (2012) used these terms forming and
shaping simultaneously to discuss professional identity as well as providing the opinion that professional identity can be formed and shaped with work-integrated learning (WIL).

Interpersonal education enabled students to develop attitudes, values and beliefs developing a sense of professional identity and providing a sense of belonging in a professional team (Gough et al., 2013; Stephens and Ormandy, 2018). Stephens and Ormandy’s (2018) study discovered that students developed their confidence to work inter-professionally and produced self-efficacy in class although competence was increased when students have repeated interprofessional experiences on clinical placement. It enables self-reflection a key aspect in the transformation process from a student to a professional along with the components of shaping professional identity (Fernandes et al., 2015; Wormley et al., 2018).

Wormley et al., (2018) highlighted the importance of PBL within curriculum, attributing to the development of a student’s holistic approach to care and their communication skills within multidisciplinary team (Fernandes et al., 2015; Wormley et al., 2018). Thus, providing students with the overall skills of emotional intelligence, maturity and ability to critically think in clinical practice. These skills developed, align with core values that a student physiotherapist develops through education and clinical exposure. The incorporation of teamwork in physiotherapy curricular can highlight the importance of understanding a physiotherapists professional role within a multidisciplinary team adding to the forming and shaping of a student’s professional identity. These findings suggest that clinical experiences and real-life work situations (Korpi et al., 2014), as well as university curricular both strongly shape the development of professional identity in pre-registration physiotherapy.

4.3 Shaping of Professional Identity

Shaping of professional identity refers to the experiences that mould and shape the values and roles of a pre-registration physiotherapy student as they progress through their programs such as a Bachelors, Masters or Doctor of physiotherapy degree (Davies et al., 2011; Trede, 2012). The findings of this review indicate that different features of embedded physiotherapy curricular play a role in shaping of professional identity in pre-registration physiotherapy students. In this scoping review four of the included studies utilised interprofessional learning, education, or interaction in their qualitative study design to measure the effects of these settings in shaping professional identity (Davies et al., 2011; Fernandes et al., 2015; Stephens and Ormandy, 2018; Rees et al., 2019;).
Shaping of professional identity was influenced by the location that a pre-registration physiotherapy student was situated in. These included the physiotherapy workforce (Norris et al., 2020), community engagement experiences (Furze et al., 2011), role emerging placements (Kyte et al., 2018), observing clinical supervisors and lectures at university (Grace and Trede., 2013) and E-learning experiences (Nortvig, 2017). These findings were similarly replicated in the literature of shaping and forming of medical, nursing, occupational therapy, and psychology professional identities during pre-registration education (Goodolf, 2018; Volpe et al., 2019; Goodolf and Godfrey, 2021, Gray et al., 2020; Heeyoung and Boyung, 2021; McLean and Pecoraro, 2021). Harman et al., (2019) discussed the positive experiences of clinical placements reflected in narratives of first year physiotherapy students in developing and shaping professional identity, these findings align with Lindquist et al. (2006a) who highlighted that it is important for students to meet patients to provide them with certainty of their chosen physiotherapy profession. Shaping and forming of professional identity in medicine and health professions is also considered an essential concept of professional education (Volpe et al., 2019; Goodolf and Godfrey, 2021, Heeyoung and Boyung, 2021; McLean and Pecoraro, 2021). McLean and Pecoraro (2021) used narrative analysis to explore medical students’ ‘journey to ‘becoming’ a doctor after first qualifying as pharmacists, physiotherapists, radiographers, occupational therapists, nurses, dentists and orthopticians. Their findings illustrate the interplay between various existing and emerging roles (e.g., qualified health professional, medical student, and future doctor) and self-tailored hybrid interprofessional identities and identity dissonance throughout the journey to ‘becoming’ a doctor (McLean and Pecoraro, 2021).

Goodolf and Godfrey (2021) recently utilised a think tank methodology to explore professional identity to build the structure, purpose, definition, and direction needed to inform the future impact of the nursing profession. Participation from 50 international leaders in education, regulation, and practice, has enabled the planning of research, and dissemination of findings to enable unification terminology and clarity of understanding of professional identity in nursing. Adoption of unified approaches to defining and researching professional identity formation within medical and allied health professions may also help to inform future curricular design and optimise positive professional identity formation.

5. METHODOLOGICAL STRENGTHS

A strength of this scoping review includes undertaking a transparent and rigorous method; allowing for key concepts of a particular research area to be explored in great depth.
and enable comprehensive coverage of literature (Arksey and O’Malley., 2005). Undertaking a critical appraisal was another strength within this review as it improves the overall quality in accordance with the latest guidance from Cooper et al., (2019) and Tricco et al., (2018).

6. LIMITATIONS

While a scoping review process allows for a wide range of studies to be eligible for inclusion it needs to be acknowledged that there are some limitations to this process. A meta-analysis was not conducted within this review as no randomised control trials could be identified therefore leading to insufficient data for meta-analysis (Haidich., 2010).

There was a potential risk of bias as the reviewers have personal experiences in shaping and forming of professional identity as pre-registration physiotherapy students. The cultural influence and background were not explored in any of the included literature of this review. This may impact and distinguish different experiences between race, gender, and expectations (Pines et al, 2002; Slay and Smith et al., 2010). Similarly, Volpe et al., (2019) reported most of the research studies included in their scoping review on professional identity in nursing, medicine, psychology/counselling, also did not analyse or consider whether race, gender, or socio-economic status influenced the formation of professional identity. The process of professional identity construction may be different for members of culturally stigmatised groups who may experience racism and discrimination which limits possible and provisional understanding of forming and shaping professional identity (Pines, 2002; Slay and Smith et al., 2010; Volpe, et al., 2019; Leedham-Green et al. 2020).

Whilst the findings of this scoping review are situated in the context of physiotherapy pre-registration education, they have strong implications for future research to explain how health professional students shape and form positive professional identities.

7. RECOMMENDATIONS

Recommendations for future research includes exploring how is the best way to form and shape professional identity and the optimal timeline of embedment of professional identity, within pre-registration physiotherapy curricular. It would be empirical for future research to find a uniform definition of professional identity. This may provide clarity in world-wide curricular to optimally embed teaching methods, in which enhance the forming and shaping of professional identity. Therefore, enabling it to transition out of the hidden curriculum and to be embedded within a learning outcome or subject in the near future to
enhance student physiotherapist skills upon pre-registration. Further research can delve deeper into other methods to capture an entire perspective of the phenomena of forming and shaping professional identity.

8. CONCLUSION

The purpose of this scoping review was to identify the components of pre-registration physiotherapy curricular that enable students to form and shape their identity as a physiotherapist. This review provides evidence for the multidimensional components of physiotherapy curricular involved to assist in shaping and forming professional identity in pre-registration physiotherapy students. Forming and shaping is influenced by self, skills, curriculum, program, and location. Positioning of professional identity development remains unclear within the curricular along with timing of embedding of each component. The results of this review can provide a foundation level into the understanding of what professional identity is, although further research is required to understand how it could be implemented within pre-registration physiotherapy curricular.


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Fig 1. PRISMA Flow Diagram for article selection.
### Table 2. Quality Analysis using Joanna Briggs Critical Appraisal Tools and Mixed Methods Appraisal Tools

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<td>Y  Y  Y  Y  Y  N  N  Y  Y  Y</td>
<td>8/10  80  Low</td>
<td></td>
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<td></td>
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<td>Gandy &amp; Jensen (1992)</td>
<td>Y  Y  Y  Y  Y  Y</td>
<td>6/6  100  Low</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Trede (2012)</td>
<td>Y  N  Y  Y  Y  Y</td>
<td>5/6  83.33  Low</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Lapkin et al. (2018)</td>
<td>N  Y  Y  Y  Y  Y  N  Y  N  Y  Y</td>
<td>8/11  72.73  Low</td>
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Key: Y: Yes; N: No; U: Unclear; NS: Not scored Risk of bias: >70% = low, 50-69% = moderate, <49% = high
NS*: MMAT not recommended to be scored according to Hong et al. (2018).
Table 3. Characteristics of findings of selected articles related to forming and shaping of professional identity in pre-registration physiotherapy curricular.

<table>
<thead>
<tr>
<th>Author</th>
<th>(Year)</th>
<th>Country</th>
<th>Aim(s)/Research Questions of Study</th>
<th>Participants: sample size, profession/year of study</th>
<th>Methodology</th>
<th>Methods</th>
<th>Outcome Measures/Analysis</th>
<th>Key Findings</th>
</tr>
</thead>
</table>
| Lindquist et al.      | 2006b  | United Kingdom & Sweden | 1. To explore characteristics of graduating students’ professional identity prior to professional practice. | n = 18 physiotherapy students (8 = United Kingdom, 10 = Sweden) | Phenomenology                  | Individual semi-structured interviews for a duration of 45-75 minutes were completed in person. | Thematic Analysis | 1. Three main themes of professional identity were identified and expressed as the  
• The Empower  
• The Educator  
• The Treater  
The interface of endpoint of education and working life were found to be a critical point in professional development. Socialisation processes in professional education contributed to the three distinct professional identities.  
This was enhanced further through clinical placements. There is a linear trajectory of learning touch in the early stage of pre-registration physiotherapy education.  
Three sets of themes were developed on experiences of professional touch:  
• ‘Uncertainty, self-awareness and anxiety’  
• ‘Emerging familiarity and awareness of inter-action’  
• ‘Realities of touch in the clinical environment’.
| Norris et al.         | 2020   | United Kingdom    | 1. To expand on limited literature and determine how pre-registration physiotherapy students within a context experience in the United Kingdom experience the learning process of professional touch. | n = 11 pre-registration physiotherapy students (8 = first year students, 3 = second year students) | Phenomenology and Ethnographic Methods | Focus Groups: 5 of 2-hour duration conducted along 2 points of the academic year and facilitated by the researcher.  
Individual Diaries of Personal Experiences: Completed anonymously and submitted to the researcher. | Inductive Thematic Analysis | 1. An initial preoccupation with personal control of the body, breaching lines of intimacy and management of social space.  
There is a linear trajectory of learning touch in the early stage of pre-registration physiotherapy education.  
Three sets of themes were developed on experiences of professional touch:  
• ‘Uncertainty, self-awareness and anxiety’  
• ‘Emerging familiarity and awareness of inter-action’  
• ‘Realities of touch in the clinical environment’.
| Adams et al.          | 2006   | England           | 1. To determine the strength of professional identity in first-year health and social care students  
2. To determine if the baseline level of professional identity varies by each profession  
3. To determine which factors best predict the variation in baseline professional identity | n = 1254 First year students (28 = audiology, 177 = medicine, 13 = midwifery, 599 = nursing, 73 = occupational therapy, 75 = physiotherapy, 38 = podiatry, 63 = radiography, 58 = | Quantitative                      | Questionnaire administered to cohort, completed once and consisting of 1. Group identification scale; 2. Team understanding scale; 3. Cognitive flexibility scale; 4. Self-reported knowledge as a single Likert scale item and; 5. Prior team working experience, prior work experience and family. | Exploratory Factor Analysis/Descriptive Analysis | 1. Strength of professional identity:  
• A relatively strong professional identity upon entry to each programme of study was found in the first-year students.  
2. Professional identity baseline variation:  
• Physiotherapy students had the strongest professional identities  
• Social work students had the weakest professional identities.
Davies et al. (2011) United Kingdom

- 1. To explore final-year physiotherapy students’ perceptions and experiences of their IPL in the university and placement setting.
- n = 97 (third year physiotherapy students)

**Mixed Methods**

Survey questionnaire was completed individually by all participants using close- and open-ended questions in the following areas: 1. The importance of IPL in helping learning on other academic models; 2. The relevance of IPL modules to clinical practice; 3. The significance of IPL on clinical placement compared with university learning and; 4. The impact of IPL on the student.

**Impact of Engagement**

Rating of Importance/Thematic Analysis

1. Engagement in IPL positively impacts the awareness and understanding of professional roles of others, interprofessional issues and how they value other roles and support they offer.

**Thematic Analysis**

IPL is an important aspect of the student’s transition as a novice learner to practitioner, helping to develop identity as a physiotherapist.

Kyte et al. (2018) United Kingdom

- 1. To explore the experiences of physiotherapy students to an alternative model of practice education of REPs.
- n = 6 (second- and third-year physiotherapy students (5 female and 1 male))

**Pragmatic Grounded Theory Approach**

1 x 1-hour focus group of 8 third-year physiotherapy students conducted by a facilitator with no involvement in the IPL module.

**Thematic Analysis**

1. Five main themes emerged from students’ experiences of REP:
   - Establishing a physiotherapy role independently
   - Finding a voice and influencing change
   - Developing professional identity
   - Professional development
   - Support

Barradell et al. (2018) Australia

- 1. To explore physiotherapy's WTP as identified from the accounts of physiotherapy entry-level students.
- n = 13 (11 entry-level physiotherapy students and 2 entry-level physiotherapy graduates)

**Heuristic Phenomenologically Oriented Inquiry**

1. Six WTP were identified:
   - Committed to the discovery of new knowledge that supports and informs practice decisions
   - Ability to analyse client and personal information and make logical connections in order to problem solve client related contexts
   - Adopts a systems approach to the body; what physiotherapists uniquely know about, work with and work through

- 2. To determine how the WTP are experienced by those students.

**Short demographic questionnaire (SDQ)**

SDQ Purpose: To determine 1. Gender; 2. Year of study at time of interview; 3. International student or not; 4. Previous tertiary study and; 5. Previous allied health or physiotherapy assistant work.
<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Objective</th>
<th>Sample Size</th>
<th>Methodology</th>
<th>Research Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borstad et al. (2018)</td>
<td>United States of America</td>
<td>1. To evaluate whether physiotherapy professional values were manifested in students’ reflections. 2. To characterise the level of student reflections according to Bradley’s criteria.</td>
<td>n = 21 (3rd year DPT Students)</td>
<td>Qualitative Evaluation of Reflective Assignments</td>
<td>Content Analysis of 63 anonymised written assignments. Devil’s Advocate Analysis Independent coding of Bradley’s Criteria for Assessing Levels of Reflection by three evaluators.</td>
</tr>
<tr>
<td>Fernandes et al. (2015)</td>
<td>Canada</td>
<td>1. To determine how learning in a PBL and case-relevant gross anatomy dissection setting influenced students’ perceptions of other health professional students, as well as their perceptions of IPE.</td>
<td>n = 97 students from different programs. (n = 27 medicine students; n = 11 midwifery students; n = 14 occupational therapy students; n = 15 physician’s assistant students; n = 13 physiotherapy students; n = 17 nursing students)</td>
<td>Mixed Methods</td>
<td>Quantitative data: Interdisciplinary Education Perception Scale (IEPS) using a six-point Likert scale and; Readiness for Interprofessional Learning Scale (RIPLS) using a five-point Likert scale. Qualitative data: Thematic Content Analysis</td>
</tr>
<tr>
<td>Furze et al. (2011)</td>
<td></td>
<td>1. To explore student perceptions and values of community engagement</td>
<td>n = 47 (first- and second-year students in the DPT Program)</td>
<td>Phenomenology</td>
<td>Reflective Questionnaire: six open-ended questions, online survey developed by the researchers of the</td>
</tr>
</tbody>
</table>

- Contributes to a positive therapeutic alliance that has the intention to make a unique difference to the way clients move and live
- Develop an autonomous, respected and lively sense of self and the profession
- Appreciates the organisation of the physiotherapy workforce and how it is influenced by the real world and own values

2. Students developed a broader and more expansive perspective of physiotherapy as the course progressed.
   1. The ISL course provoked reflection which help to shape development of professional values in DPT students.
   2. All three of the Bradley levels of reflections were identified in all three reflective assignments.
   - Group discussions may produce higher-level reflections.

Whilst no specific instruction pertaining to professional values was provided, physiotherapy values were implicit within written reflective assignments.
United States of America

experience based on frequency of student participation.

[Forming / Shaping]

study, completed within 48 hours of their community engagement experience.

Focus Group Interviews: Four in total of 1-hour duration. Two initial focus groups following the summer semester with 59% of participants taking part and two held at the end of the fall semester with participant involvement of 32% after completing the community engagement experience.

Thematic Analysis

• Contemplating change
• Self-recognition and service capacity

Three themes emerged for more than one-time participants:

• Professional transformation
• Sense of community impact
• Increased awareness of impact on others

Grace & Trede

(2013)

Australia

1. To explore ways in which professionalism is talked about and experienced by lectures and students in their first and final year of study

n = 28
(n = 6 first year physiotherapy students; n = 6 final year physiotherapy students; n = 6 first year dietetics; n = 9 final year dietetics; n = 2 full time lecturers)

Hermeneutic Phenomenology

Focus Group Interviews: 8 in total. Between two and six participants in each group. 60-90 minutes in duration.

Meta Thematic Analysis

1. Recognise behaviours that were professional and some that were not so professional (physiotherapy lecturer). Providing opportunities to talk talking to one another and articulating ideas is one strategy to enhance the development in professionalism.

2. Supervisors and lecturers appear as role models. Students could learn more from their experiences.

3. Students learn a great deal from their clinical supervisors. Academic educators should collaborate more closely with them so that all stake holders recognise professionalism as important aspect of university courses.

Harman et al.

(2019)

Canada

1. To explore their process of professional identity development and how their expectations and views of interprofessional practice evolved as they moved through the first year of their professional program.

n = 12 (first year students of physiotherapy master’s degree)

Narrative Methodology

3 x individual face-to-face interviews and skype (if not on campus) conducted with the research coordinator.

1. Pre-entry interview (n = 12) conducted prior to participants’ formal program orientation

2. First term interview (n = 9) conducted after completion of first term of study

Beater Procedure for Analysis

Polkinghorne’s Theory of Narrative Emplotment

Thematic Analysis

1. The findings elicited three major plotlines from the inquiry:

• Physiotherapy: An ‘active choice”
• “I didn’t see it coming” Reframing professional identity
• Authenticity matters

These plotlines describe the evolving nature of participants’ professional identity over the course of their first year in the master’s physiotherapy program.
<table>
<thead>
<tr>
<th>Study</th>
<th>Objective(s)</th>
<th>Participants</th>
<th>Methodology</th>
<th>Data Collection</th>
<th>Analysis</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Korpi et al. (2014) | 1. To investigate students’ narratives about their professional development for planning their personal curricula and EQF competences concentrate on the learning outcomes in physiotherapy but do not cover the ways to achieve those outcomes. | n = 8 physiotherapy students, (8 female) | Qualitative Narrative Approach | Three-Stage Analysis of Narration (Chronological plot of stories in three steps) | 1. Three story models were formed from the student’s narratives:  
• The story of an autonomous learner  
• The story of becoming a physiotherapy  
• Story of a critical developer |
| Finland | 2. End of first year interview (n = 7) conducted after completion of first clinical placements. | | | | |
| Lindquist et al. (2006a) | 1. To study the experiences of situated learning and change in a student cohort through a physiotherapy education programme. Ethical approval | n = 18 physiotherapy students | Longitudinal Qualitative Design with Phenomenographic Approach | Semi-structured Interviews:  
75 in total with 21 students, each for a duration of 45-75 minutes. All conducted by the same researcher. | Data analysis identified through units of meaning in student interviews | 1. Four development pathways of learning are described:  
• Reflecting on practice  
• Communicating with others  
• Development of Performing skills  
• Searching evidence |
| UK & Sweden | 2. End of first year interview (n = 7) conducted after completion of first clinical placements. | | | | |
| Nortvig (2017) | 1. To determine how students in a professional bachelor’s degree programme in physiotherapy can develop a professional identity via e-learning.  
2. To determine teachers and students’ perceptions of the effects of e-learning on student’s participation, presence and professional identity development in the professional bachelor’s physiotherapy programme. | n = 40 physiotherapy students in the professional bachelor’s degree program in physiotherapy; n = 5 teachers. | Symbolic Interactionism and Grounded Theory Approach | E-learning students participated in traditional teaching on-campus 3 days per in every second week, and then all the other days students attending on-campus teaching via videoconference or studied at home independently or in groups. | Qualitative Data Analysis Software (Dedoose)  
Grounded Theory Analysis and Symbolic Interactionism | 1. Video technology created more awareness of the complexity of students’ future profession as a physiotherapist.  
2. E-learning contributes to development of professional identity when the student accepts an educational setting where they can be present in more times and places.  
By teachers observing their own habits, it was educational to both teachers and students regarding experiencing the role as educators and physiotherapists. |
<p>| Denmark | 2. End of first year interview (n = 7) conducted after completion of first clinical placements. | | | | |
| Rees et al. (2019) | 1. To explore how soon-to-become graduates and workplace-based clinicians | n = 61 (38 students and 23 clinicians). | Secondary Analysis of Qualitative Data | Framework Analysis by three authors | 1. The constructed identities of students and clinicians change according to the negative and positive elements evaluated from their narratives. |
| Australia | construct their own and others’ identities in IPSC interaction narratives. (Forming) | (medicine n = 9; midwifery n = 7; nursing n = 11; occupational therapy n = 15; paramedicine n = 10; physiotherapy n = 9) (Narrative Methods) | All group interviews were homogeneous with student and clinician participants and all but one of the group interviews were uniprofessional. 10 individual interviews (five with clinicians and five with students). | In-Depth Positioning Analysis of two selected narratives (from one student and one clinician) 11 student identity constructions:  • Learner  • Novice  • Competent  • Motivated learner  • Observer  • Outsider  • Team worker  • Incompetent  • Bothersome  • Wrongdoer  • Insider  Eight clinician identity constructions:  • Wrongdoer  • Educator  • Specialist  • Kind  • Health care expert  • Hero  • Team worker  • Superordinate | Stephens &amp; Ormandy (2018) England 1. To evaluate the impact of IPL programme on the students’ attitudes and values 2. To evaluate the impact of the IPL programme on self-reported behaviour changes in clinical practice towards IPW (Forming) | n = 62 students (from pre-registration program within adult nursing n = 26; children’s nursing n = 7; mental health nursing n = 5; physiotherapy n = 3; podiatry n = 3; radiography n = 2; social work n = 10 and; joint programme learning disability/social work n = 6)  | Phenomenology Focus Groups: 6 were conducted (3 during each programme/action cycle at week 6) which was held on NHS sites, semi-structured, 40-45 minutes in length, digitally recorded with consent and confidentiality pre/post session reinforced. Interviews: Conducted by academics and clinicians involved in programme development and delivery. A group guide was used for discussion to enable students to discuss their experiences.  | Thematic and Analytical Framework (Einstein’s three stage process) 1. Affective domain development using IPL: what works for whom and when and outcomes on patient/client care – evidencing the impact of IPL:  • Identifying what good collaborative practice is  • Professional identity  • Learning alliance  • Circles of care  2. Conceptual framework for IPL and affective domain development:  • Confidence and compliance  • Self-reported application to practice |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wormley et al. (2018)</strong></td>
<td>n = 27 DPT students (twenty-one females and six males)</td>
<td>Phenomenology Pilot Interview: (n = 3 females); two months prior to graduation. Focus Groups (n = 24) with random allocation into three groups of eight. Each were held immediately after graduation 2-3 days post to prevent work experience to skew data. Interviews were digitally recorded and completed in 46-60 minutes in a classroom. Both conducted by primary investigator.</td>
<td>Thematic Analysis of words and phrases, using core values and their indicators, providing a framework to interpret the findings. 1. The investigator developed nine main themes from the students' experiences in developing core values in PBL curriculum: • A new way of learning • The big picture • Accountability • Self-reflection • The active learner • Confidence • Where’s the evidence • Teamwork • Faculty/program expectations</td>
</tr>
<tr>
<td><strong>Roskell (2013)</strong></td>
<td>n = 14 UK higher education undergraduate physiotherapy qualifying programmes</td>
<td>Exploratory Qualitative Case Study Email and invitation to participate sent to programme directors of each institution with the request of CPT curriculum documentation.</td>
<td>Sequential Analysis of Coding completed by an external verifier. Content Analysis Thematic Analysis There is consistency in the core content and projected identity of UK physiotherapy undergraduate CPT curricula. The projected identity had a strong biomedical focus. 1. There is consistency in the core content and projected identity of UK physiotherapy undergraduate CPT curricula. The projected identity had a strong biomedical focus. 2. 17 thematic areas of content found within CPT documentation included: • Knowledge, assessment, treatment skills, physiotherapy management, critical care, complex problems, needs of age groups, settings of care, evaluation skills, team working, health promotion, ethics, evidence-based practice, nutrition, reflective practice, approach to care and record keeping.</td>
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</table>

**Abbreviations:** DPT: Doctor of Physiotherapy; IPL: interprofessional learning; REP: role emerging placements; PBL: problem-based learning; ISL: international service learning; WTP: ways of thinking and practicing; IPSC: interprofessional student-clinician; IPE: interprofessional education; EQF: European qualification framework; CPT: cardiorespiratory; IPW: interprofessional working.
Table 4. Forming and shaping professional identity according to a systematic review.

<table>
<thead>
<tr>
<th>Author/Year/Country/Setting</th>
<th>Aim</th>
<th>Population</th>
<th>Types of research papers</th>
<th>Methods</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lapkin et al. (2018) UK, Belgium, Germany, USA</td>
<td>To appraise and synthesise the best available evidence on the effectiveness of IPE in university-based health professional programs. [Forming]</td>
<td>n = 9 (research papers) Students of two or more undergraduate or post-graduate health professions including; nursing, medical students, dental hygiene, occupational therapy, pharmacy, physical therapy and respiratory care all engaged in interprofessional education, regardless of gender, age or discipline.</td>
<td>3 RCT; 5 control before and after studies; 1 control longitudinal study</td>
<td>Systematic Review with narrative analysis</td>
<td>Statistical changes in attitudes towards IPE in nursing students only (undergraduate program), statically significant improvements only in the attitudes of the male participants in the experiential group. Although students’ attitudes towards IPE improved post intervention for the interprofessional groups they returned to pre-levels by 3-4 months</td>
</tr>
<tr>
<td>Authors/Background</td>
<td>Type of text</td>
<td>Population represented</td>
<td>Setting/context</td>
<td>Stated allegiance / position</td>
<td>Reviewers Conclusion</td>
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<tr>
<td>Gandy &amp; Jensen (1992)</td>
<td>Text and opinion</td>
<td>Physical therapy students</td>
<td>Experience in classroom setting and reflective practicum experiences</td>
<td>Author suggest alternative teaching methods that focus on active learning strategies applied in small group process and reflective activities</td>
<td>Professional behaviours necessary for physical therapy clinical practice have been described as problem setting and problem-solving abilities and the ability to handle ambiguity, communicate effectively and work in collegial relationships while still being accountable for one’s actions</td>
</tr>
<tr>
<td>Trede (2012)</td>
<td>Text and opinion</td>
<td>Physiotherapy students, dietetics students and educators</td>
<td>Experience of students and educators in learning curriculum</td>
<td>Author explores the role of work integrated learning and its place in the curriculum to enhance professional identity development and professionalism</td>
<td>Debating professional identity and its development in students should be grounded on theoretical and pedagogical platform. Such debates require the involvement of all stakeholders of WIL because all influence and shape professional identity. WIL links to develop professional identity formation between university and work has enormous pedagogical potential. This paper suggests that WIL and professional identity formation should be embedded throughout course curriculum.</td>
</tr>
</tbody>
</table>

Abbreviations: RCT: Randomised Control study; UK: United Kingdom; USA: United States of America; IPE: Interpersonal education; WIL: work-integrated learning.
Fig. 2. Themes and subthemes in forming and shaping professional identity.