# The development of pre-registration occupational therapy student perceptions of research and evidence-based practice: A Q-methodology study

Tanya Rihtman, Mike Morgan & Julie Booth

View supplementary material 

Published online: 18 Aug 2024.

Submit your article to this journal 

Article views: 112

View related articles 

View Crossmark data

Taylor & Francis
Taylor & Francis Group

RESEARCH ARTICLE

🔓 OPEN ACCESS | Check for updates

# The development of pre-registration occupational therapy student perceptions of research and evidence-based practice: A Q-methodology study

Tanya Rihtman[a], Mike Morgan[b] and Julie Booth[b]

[a]Department of Sport, Health Sciences and Social Work, Faculty of Health and Life Sciences, Oxford Brookes University, Marston, Oxford, UK; [b]School of Nursing, Midwifery & Health, Coventry University, Coventry, UK

## ABSTRACT

**Background:** Pedagogically sound curricula are needed for occupational therapy (OT) students to adopt evidence-based practice (EBP) principles and internalise EBP within their professional identities. Exploring students' perceptions of this knowledge area can contribute to effective curriculum design.

**Aims/Objectives:** To explore the evolution of pre-registration OT student perceptions of research and EBP over the course of their engagement with undergraduate teaching and learning.

**Materials and methods:** The Q-sort approach synthesises different viewpoints regarding a sample of statements, using by-person factor analysis (respondents = variables; statements = sample). Final year pre-registration OT students completed the same Q-sort at three timepoints (pre-dissertation [$n=18$]; post-dissertation submission [$n=12$]; post-student research conference [$n=6$]). Q-sort responses were intercorrelated and factor-analysed; extraction of factors with an eigenvalue of ¬>0.9 and varimax rotation identified majority viewpoints.

**Results:** Significant factors were revealed at each timepoint: 1a: 'Evidence–inseparable from OT practice', 1b: 'Research for research's sake-inseparable from the occupational therapy identity', 2: 'Who am I to question the gurus?', 3: 'I can do it with confidence…but so what?'

**Conclusions:** Opportunities for completing 'authentic' student research projects, with 'ownership' of results, may enhance research and EBP confidence and professional identity.

**Significance:** Findings expand current knowledge regarding effective use of pre-registration educational opportunities to support future research and EBP.

## Introduction

The World Federation of Occupational Therapists (WFOT) has identified eight international occupational therapy (OT) research priorities [1]. While seven of these priorities are founded on the assumption of researcher and practitioner competency in the use of research and evidence-based practice (EBP), one of the priorities relates to developing understanding of EBP and knowledge translation itself. Since the collection of evidence to support OT practice is insufficient unless the evidence informs practitioner behaviour and clinical practice, within the scope of this priority, the WFOT has highlighted the need for further understanding of what educational interventions are effective in assisting OTs to change their attitudes to EBP and knowledge translation [1,p.8].

According to Slade et al. [2], a strategic approach is necessary to structure the development of research capability within allied health contexts. Research capacity building has been defined as 'the process of individual and institutional development which leads to higher levels of skills and greater ability to perform useful research' [3,p.1321]. This developmental process begins within pre-registration allied health educational programmes [4], and pedagogical experiences may set the tone for the longer-term research and EBP attitudes and skills of learners.

Ease of access to clinical information has progressed enormously over recent decades [5], such that practitioner skill in evaluating the quality and usefulness of large amounts of information has become even more vital. Simultaneously, since being explored by Sackett et al. in 1996, the conceptual development of the construct of EBP has expanded significantly [6]. If current views assume that clinical expertise of the individual practitioner is central to integrating the other components of EBP [7], then it would be advantageous to further develop understanding of the influence of personal attributes and specific pre-registration EBP learning experiences in this regard. Indeed, the United Kingdom Department of Health [8] has called for greater links between education and research to support the transfer of research evidence into practice, while Asokan highlights the importance of well-structured curricula to empower allied health professionals (AHPs) to adopt EBP principles, in order to effectively apply evidence as a means to bridge the 'research-evidence gap' [9,p.227]. In England, AHPs collectively constitute the third largest clinical workforce, with roles across health and social care, education, research, voluntary and private sectors [10,p.5]. With a similar workforce picture in many other places in the world [2], this contextual understanding is significant for pre-registration healthcare programmes in terms of the pedagogical strategies [11] and approaches [12] adopted to prepare future AHPs to internalise requirements for EBP as fundamental to their futures roles.

Within the OT profession, there is increasing recognition that OTs need to develop skills to not only find, appraise and utilise research evidence, but also to become active researchers to strengthen the professional evidence base [13]. In the UK, the development of this professional responsibility is highlighted within the most recent edition of the Royal College of Occupational Therapists' (RCOT) Learning and Development Standards for Pre-Registration OT Education, which show significant shifts in requirements related to evidence and research based content, with greater reinforcement of the need to develop research skills deemed vital for future-proofing the profession [14].

In 2007 [15], White and Creek suggested that university programmes can enhance research confidence and capacity by enabling engagement in professionally relevant research activity, which can ultimately lead to research-enhanced careers. The research emphasis embedded in the RCOT's Learning and Development Standards for Pre-Registration OT Education [14] facilitates greater focus on research and EBP within the OT profession, and aligns with clear directives of local and national policies and guidelines, including those with general [8,16]) and profession-specific implications (e.g. RCOT [17] and World Federation of Occupational Therapists [WFOT] [18]). However, despite requirements for OT programmes to 'incorporate effective teaching strategies about EBP into the curriculum so as to prepare students with the appropriate knowledge, skills and attitudes' [19,p.8], there remains great variety in the pedagogical approaches for doing so. Moreover, anecdotally, the design of OT research and EBP education varies across pre-registration OT programmes, with the honours component awarded by some programmes evidenced through hands-on research experience but by others through research proposals.

A recent review by Hitch and Nicola-Richmond [4] highlighted that pedagogical practices related to research and EBP education need to consider the learner's existing knowledge, beliefs, and attitudes. While knowledge-based components central to research and EBP education appear to be easier to identify, understanding the role of student beliefs and attitudes is more complex, with these more fluid personal learner attributes including constructs such as self-efficacy, task value, predisposition, and motivation [20–22]. A general perception amongst AHP students has also been noted in that EBP is 'difficult, time consuming and irrelevant to their clinical practice' [4,p.1038], with these attitudes creating a barrier to engagement in EBP learning. This perception may explain recent findings of Jeffery et al. [23] who identified that novice practitioners may struggle to translate research evidence into practice, and aligns with Aglen's [24] findings that students' failure to see the contribution of research to practice constitutes the greatest challenge to EBP teaching.

It would seem that pedagogical decisions for supporting research and EBP learner development may themselves be made based on assumptions related to learning that are not necessarily evidence based. Thomas et al. note that 'in the absence of systematic or empirically supported models for teaching and evaluating EBP in academic programmes, the development of EBP skills is left to chance with outcomes that are, at best, haphazard' [25,p.254]. Within OT pre-registration education, the contextual structures mentioned above (such as calls from the DoH for greater education-research links, the notable percentage of AHPs in the healthcare workforce and professional body requirements) provide a scaffold for facilitating research and EBP teaching, yet the application of these imperatives within teaching and

learning structure and content is largely left to the discretion of individual programme leadership. There is a need to develop the evidence-base underpinning the pedagogical approaches selected to attain profession-specific requirements for preparing future OTs for EBP together with the evidence-based obligations that exist within the wider healthcare context.

Q-methodology is a research technique which gathers subjective viewpoints of individual participants through the sorting of a bank of statements related to a particular topic [26]. The collection of statements is known as a concourse and is developed with the intention of capturing the range of perspectives related to the topic in question. The structured research process forces respondents to prioritise and rank their relative level of agreement and disagreement with each statement during a process known as a Q-sort. The inter-correlation and by-person factor analysis of each participant's item ranking can then be analysed in relation to the ranking matrix of other participants. Q-methodology is based on the idea that the use of ranking facilitates understanding of how people think about ideas in relation to other ideas, rather than in isolation; this methodology acknowledges the subjectivity brought by each participant while employing objective measurement of these subjective views [27].

Engaging in research related activities, including completion of small scale empirical research projects can enhance research competence in pre-registration OT students [28]. Within one specific pre-registration OT programme in the UK, a scaffolded research and EBP learning approach [4] broadly follows the five phases of EBP learning identified by Dawes et al. [6] and aligns with recommendations that the concept of EBP should be introduced in the initial stages of the educational programme as a foundation for subsequent stages of study [11]. The pedagogical design of this structure is informed by a range of considerations, including the imperative of facilitating relevant and authentic learning experiences [25], exposure to situations requiring presentation and feedback [28] and evidence suggesting that engagement with dissemination activities incorporates 'many features of EBP beyond the understanding of research evidence' [4,p.1040]. However, while the design of this pre-registration programme is based on pedagogical evidence that appears to underpin knowledge and skill development, there remains a need to explore how specific research and EBP learning experiences inform the complex constructs related to subjective student belief and attitudes.

Within the context of this OT programme, an exploratory, longitudinal descriptive Q-sort study was nested within a wider mixed-methods study. The overarching aim of the larger study was to understand the evolution of student perceptions over the course of their engagement with OT research and EBP practice teaching and learning, in preparation for research active OT careers. The specific objectives of the embedded Q-sort study were:

- to identify the types of viewpoints of pre-registration OT students with regard to their relative agreement with statements related to research and EBP skills, knowledge and attitudes and
- to explore changes in viewpoints over the course of engagement with pre-registration research and EBP teaching and learning experiences

A study by Pighills et al. [29] identified that OTs appear to be more anxious about research than all other health practitioner disciplines combined. Although this study focuses on OTs, it could be claimed that there is underlying commonality related to the development of research and EBP standards of practice across AHPs, as reflected in the literature reviewed here. A robust evidence base can influence policy and practice, improving outcomes of service delivery [30]. Understanding the impacts of the pedagogical structures of particular educational programmes on the developing perceptions of future practitioners with relation to research and EBP has the potential to support strategic education development of OT-specific research and EBP as well as for AHP education in general.

## Materials and methods

As opposed to mixed-methods, Q-methodology is a form of merged methods research design, combining both quantitative and qualitative approaches to data collection and analysis in a single instrument [31], which 'provides the basis for a systematic examination of the subjective viewpoints of study participants' [32,p.324]. Whereas a Likert scale in a cross-sectional survey design seeks to ascertain the views of a sample of participants regarding a series of individual statements, Q-Methodology seeks to synthesise overall viewpoints of different participants regarding a sample of statements, using by-person factor analysis as opposed to conventional factor analysis. Thus, in a sense, the participants comprise the variables in the

investigation, while the concourse of statements comprise the sample [27,p.12].

Q-methodology comprises the following stages [27]:

1. Generation of a Q-set: the Q-set is a bank of statements that are comprehensive, and broadly representative of the varieties of opinions regarding the phenomenon under investigation;
2. Q-sort: Participants (the P-set) sort these statements from 'most disagree' to 'most agree' - typically according to a predefined grid analogous to a normal distribution;
3. By-person factor analysis of the data: to identify the main overall viewpoints evident across the P-set;
4. Interpretative analysis of the overall viewpoints.

### Stage 1: Generation of the Q-set

The initial item bank was developed through structured processes intended to enhance the objectivity and construct validity of the concourse [26]. There is no consensus regarding the most appropriate number of statements to incorporate in a Q-Methodology study [27,p.61]. However, an effective Q-Set should be broadly representative and comprehensive in its coverage of the phenomenon of interest [27,p.58], whilst not being so large as to make the sorting process unwieldy. To achieve this, as suggested by Watts & Stenner [27,p.59], initial constructs were agreed by the research team as the means of capturing the phenomenon of research and EBP skills, knowledge and attitudes, namely: Perceived preparedness, Motivation, Enthusiasm, Confidence, Expectations, Fears/anxieties, Values, Roles, Habits. These were used to develop an initial concourse of statements through a review of relevant literature (including OT-specific, international journals and literature related to AHP education) and collaborative discourse with faculty members with relevant teaching expertise.

Thereafter, a process of consultation was undertaken with recent graduates (individuals who had graduated within the past two years), (n = 3). In one-to-one meetings they were asked to identify a) if additional items needed to be developed, b) if all items linked with subjectively driven opinions and behaviours related to undergraduate research activity and c) if all items were phrased in accordance with either 'opinion' or 'behaviour'. The recent graduates were also invited to provide further insights into their undergraduate research experience (which helped the

development of additional items) and then commented on the existing items in relation to wording. This process was undertaken three times, resulting in 239 initial statements; when the same items were being generated, data saturation was assumed to have been reached [33]. Finally, the bank of 239 statements was sent to the same three recent graduates, as well as to all academic colleagues who had teaching and learning responsibilities within any of the research or EBP modules of the OT programme in question, asking input regarding whether i. consideration was given to subjectively-driven opinions and behaviours that might affect undergraduate research engagement, ii. items related to EBP were adequately included and iii. items related to research were adequately included. Furthermore, respondents were asked to complete a table of specification [34] mapping the potential 239 items to the 9 defined constructs. With careful editing to minimise the use of double negatives in any statements, and to ensure optimal relevance of all items, a final concourse of 90 statements, which were a priori linked with the nine initial constructs, was achieved (Appendix 1, supplementary material).

### Stage 2: Administration of the Q-sort

#### Participants (P-set)
Data were collected at three different time points (see procedure below):

1. Second year: immediately after the final research module teaching session (n = 18)
2. Third year: Immediately after submission of the research dissertation written assignment, but prior to presenting at the student research conference (n = 12)
3. Third year: Following the student research conference (during which data generated from the first two time-points were collated and fed-back to the cohort) (n = 6)

Students enrolled in the second-year undergraduate OT research and EBP module (point 1) and/or the equivalent third-year module (points 2 and 3) were eligible to participate – approximately n = 190 students, taking into account assignment deferrals and students stepping on/off study programmes.

#### Sample

Within Q-methodology, participants are not viewed as the sample. In this methodological approach, participants

are viewed as variables, while the sample size is defined by the number of statements that reflects the phenomenon of interest [27]. As the purpose of this study was to gain an insight into how the overall viewpoints across the P-sets shifted over time, after engagement with EBP-related teaching and learning experiences, rather than tracking individual participants' changes in viewpoint over their personal research journeys, it was important to allow any potential participant to submit their viewpoint at any stage in the study, using the same statements at each stage.

## Instruments

Two instruments were utilised in the nested study and are detailed below.

**Online Q-Sort:** The online Q-sort was built using Q-Sortware, a software programme designed by Pruneddu [35]. In contrast to a cross-sectional survey design, where individual statements are ranked in terms of level of agreement, participants (the 'P-set') were invited to rank the same 90 statements, according to a pre-set template mimicking a normal distribution, from 'most disagree' to 'most agree'. The software generates a correlation matrix comparing the responses of individual participants, as the basis for identifying 'distinct regularities or patterns of similarity in the Q-sort configurations produced, and hence in the viewpoints' expressed by participants [27,p.98].

**Bristol Online Survey (BOS):** developed for the purposes of this study to:

- Gather demographic and background information, related to experience/engagement with prior research modules, non-research modules

and research/evidence experiences during clinical placements.
- Serve as a means of triangulation of the findings of the Q-Sort.

## Procedure

After gaining ethical approval from Coventry University research review board (#P22789), this longitudinal study was initiated with a single cohort of undergraduate students enrolled in the second year of a three-year undergraduate, pre-registration OT degree, accessed via gatekeeper consent. In this particular three-year programme, students undertake a first year research and EBP module, focusing on foundational knowledge and skill (ask/acquire/appraise); the apply and analyse phases are then embedded across the second and third years of study. Students submit either an empirical or literature-based research proposal as the assessed component of their second year research and EBP module. The topic and focus of the research proposal is self-directed, ensuring that personal interest underpins the development of EBP skills [11]. In the third and final year, students submit a written dissertation (usually an implementation of their empirical or literature-based second year research proposal) as one of two assessed components. Approximately three weeks after submission of their written dissertations, students present their research at a student conference as the second assessed component of this module. Figure 1 provides an overview of the study timeline, mapped against the research and EBP modules embedded within the students' academic programme.

At each of the study time points, participants were invited to complete the two anonymous online activities (Bristol Online Survey [BOS] and online Q-sort),
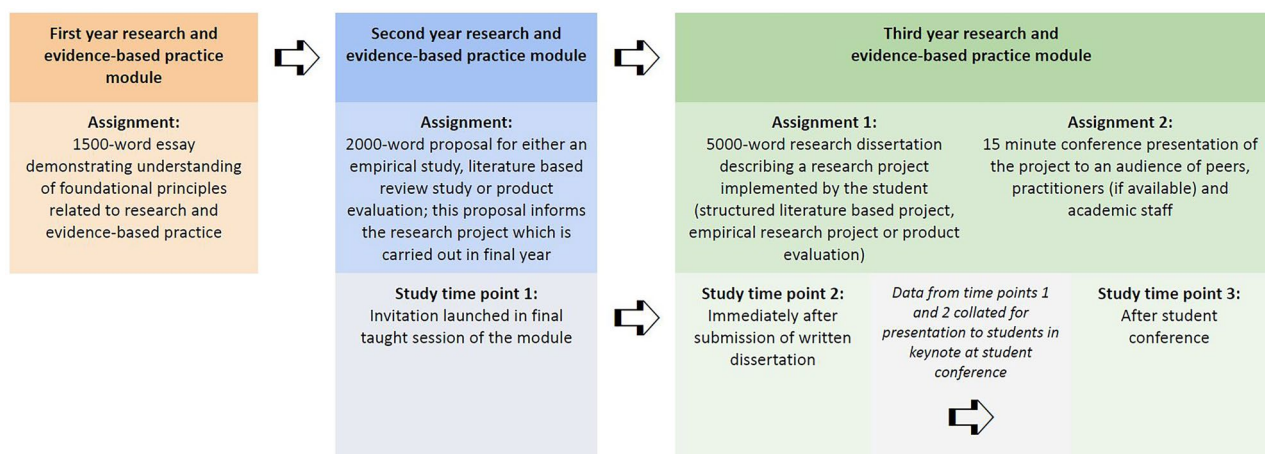
| First year research and evidence-based practice module | Second year research and evidence-based practice module | Third year research and evidence-based practice module | |
|---|---|---|---|
| **Assignment:** 1500-word essay demonstrating understanding of foundational principles related to research and evidence-based practice | **Assignment:** 2000-word proposal for either an empirical study, literature based review study or product evaluation; this proposal informs the research project which is carried out in final year | **Assignment 1:** 5000-word research dissertation describing a research project implemented by the student (structured literature based project, empirical research project or product evaluation) | **Assignment 2:** 15 minute conference presentation of the project to an audience of peers, practitioners (if available) and academic staff |
| | **Study time point 1:** Invitation launched in final taught session of the module | **Study time point 2:** Immediately after submission of written dissertation | *Data from time points 1 and 2 collated for presentation to students in keynote at student conference*    **Study time point 3:** After student conference |

**Figure 1.** ...

with links available for two-weeks. Informed consent was embedded within each of the online activities. At the beginning of each online activity at each time point, participants were presented with a number of questions which facilitated the generation of an individualised code; this process allowed for pairing of data from individual respondents between activities and time points without risking anonymity.

### Stage 3: Factor analysis of the data

#### Data analysis
Individual Q-sorts were collated and analysed using the dedicated software, PQMethod [36], in two main phases:

1. Extraction of centroid factors with an eigenvalue of 0.9 or more
2. Varimax rotation of these factors to identify the majority viewpoints of the group

### Stage 4: Interpretative analysis of overall viewpoints

Composite Q-Sorts of each factor identified (and, when appropriate, distinguishing statements) were produced, allowing detailed visual interpretation of each, in turn.

### Results

By linking codes between respondents who completed the Q sort and extracting their responses data from the BOS survey, it was possible to match demographic information for $n=15/18$ (83%) respondents from the first survey, $n=11/12$ (92%) of the second survey and $n=5/6$ (83%) of the third survey. Key demographic information of the study sample at the three time points offering a descriptive overview of the profile of the participants at different time points of the study is provided in Table 1.

Table 2 shows the factors which emerged at the different time points of the study. Composite Q-sorts for each of the factors identified are available on request; each factor is explored below.

### Point 1

Two clear factors emerged at point 1, which together explained 40% of the variance. This was the only time point where multiple factors were identified; Appendix 2, supplementary material presents a summary overview of the distinguishing statements for the two factors identified at this study point.

### Point 1, factor 1 (P1F1): Evidence – inseparable from occupational therapy practice

P1F1 had an eigenvalue of 6.26, and explained 24% of the study variance. Thirteen of the 18 participants at point 1 were significantly associated with this factor. Of these, further information regarding the nature of the proposed studies was available for $n=9$ ($n=6$: empirical study; $n=3$: systematised review).

While these students believe strongly that research can help assist the development of the best practice in service delivery and outcomes (23: +6 [i.e. statement

Table 1. Descriptive overview of participant profile.*

| | | Q-sort 1 ($n=18$) Demographic information ($n=15$) | Q-sort 2 ($n=12$) Demographic information ($n=11$) | Q-sort 3 ($n=6$) Demographic information ($n=5$) |
|---|---|---|---|---|
| Age Range | 18-22 | 4 (27%) | 5 (45%) | 0 |
| | 23-27 | 5 (33%) | 2 (18%) | 1 (20%) |
| | 28-32 | 0 | 2 (18%) | 1 (20%) |
| | 33-37 | 3 (20%) | 1 (9.5%) | 2 (40%) |
| | 38-42 | 2 (13%) | 0 | 0 |
| | 43-48 | 0 | 1 (9.5%) | 0 |
| | 48+ | 0 | 0 | 1 (20%) |
| | Prefer not to say | 1 (7%) | 0 | 0 |
| Final grade for 1st year research and evidence-based module | 40-49 | 1 (6.5%) | | |
| | 50-59 | 4 (27%) | | |
| | 60-69 | 1 (6.5%) | | |
| | 70+ | 9 (70%) | | |
| Final grade for 2nd year research and evidence-based module | 40-49 | | 3 (27%) | |
| | 50-59 | | 4 (37%) | |
| | 60-69 | | 2 (18%) | |
| | 70+ | | 2 (18%) | |
| Study type (intended/undertaken) | Empirical qualitative | 7 (47%) | 4 (37%) | 5 (100%) |
| | Empirical quantitative | 3 (20%) | 1 (9%) | 0 |
| | Literature-based qualitative | 5 (33%) | 5 (45%) | 0 |
| | Literature-based quantitative | 0 | 1 (9%) | 0 |

*Additional demographic and descriptive information is available on request (implementation of topic initially proposed; implementation of methodology as initially proposed; research/evidence-based practice observed during first, second and third practice placements; prior experience of attending a research).

**Table 2.** Factors which emerged at the different time points of the study.

| | | |
|---|---|---|
| Time Point 1 | Factor 1 (P1F1) | Evidence – inseparable from occupational therapy practice |
| | Factor 2 (P1F2) | Research for research's sake - inseparable from the occupational therapy identity |
| Time Point 2 | Factor 1 (P2F1) | Who am I to question the gurus? |
| Time Point 3 | Factor 1 (P3F1) | I can do it with confidence…but so what? |

#23 placed in location +6]), the concept of EBP seems to be key. Being evidence-based is a key principle of the OT role (47: +5) – considerably more so than being research-active (21, +2) – and that you need to be evidence-based to be a good clinician (25: −5). Empirical research is believed to have only marginally (if any) more value than systematised reviews of research literature (36: −5; 66: −4) and being evidence-based does not seem much more threatening than doing research (52, −3).

These students view engaging with research as something to be proud of (20: +4), and feel a responsibility to promote their profession and research through the use of research evidence (60: +4). Despite policies and procedures being in place already in clinical practice, they feel they can make a difference with research (68: −4); and research is not perceived simply as something they will do as 'a means to an end' or from necessity (85: −4). The thought of disseminating their findings at a professional conference, though perhaps unpleasant, is not really sufficient to overcome these views, and put them off research (88: −2).

However, experience with OT has led to a belief that we still need to develop a lot of profession-specific evidence (46: +3). In order to develop a strong professional identity as occupational therapists, we need to be able to prove that the OT-specific things really do make a difference (48: +3) and engaging in research-related activities is a means of achieving this (12: +3).

### Point 1, factor 2 (P1F2): Research for research's sake - inseparable from the occupational therapy identity

Factor 2 had an eigenvalue of 0.94 and explained 16% of the study variance. Five of the 18 participants at point 1 were significantly associated with this factor. The nature of the proposed studies were $n = 3$: empirical study and $n = 2$: systematised review.

These students most strongly believe that engaging in research-related activities can help develop the professional identity of occupational therapists (12, +6) rather than being a way to develop best practice in service delivery (23, +3), as in Factor 1. Interestingly, however, they do not feel a need to prove that the OT-specific things they do in practice really make a difference, in order to have a strong identity as an OT (48, +1) and only moderately agree that there is a need for a lot more profession-specific research evidence (46, +2). Their beliefs in the power/value of research appear to be held despite any potential barriers such as policies and procedures (68, −5) or strict rules and/or other complications regarding what makes research 'good enough' (73, −4). These views may derive from the fact that the workplace cultures they have witnessed seemed to clearly promote research-related activities (11, −5).

These students do not view research as something to be done only as an obligation and/or a means to an end (85, −6) and are passionate about the topic they have chosen (6, +5). Like those students associated with Factor 1, there is a differentiation between EBP and research, but in the opposite direction: being research-active is seen as a key principle of the OT role (21, +4) – appreciably more so than being evidence-based (47, +2) – and engaging in research is something to be proud of (20, +4). In fact, the thought of discovering something new or of making a difference to clinical practice excites them (3, +5; 40, +3) and, unsurprisingly, they do not mind reading articles about topics in which they are interested (4, +5).

Engaging with research and evidence is viewed as a way to learn more (17, +4) and they can see how research can add prestige to their degree (27, +4) – although they feel that regular supervision is critical, at least at this stage, in developing their research and evidence-based abilities (5, +4). This overcomes any feelings of nervousness they may have in starting a research project when they are not guaranteed that they will be able to get the participants they need (86, −3). They only have the slightest of concerns that failing at research would say much about their professional capability (77, −1).

Despite their enthusiasm for research, beliefs that academics and clinicians should work closely to produce clinically-relevant research (19, +3), and opposition to the idea that 'being a good clinician does not require being evidence based' (25, −3), the personal links made between research and practice do not appear to be very strong. They are uncertain whether one needs to be a good researcher in order to be a good clinician (45, 0) and are highly ambivalent about the extent to which principles of EBP have been

instilled in them throughout their undergraduate course (65, 0).

### Point 2, factor 1 (P2F1): Who am I to question the gurus?

Only one clear factor emerged at point 2 (eigenvalue = 4.17; explaining 35% of the study variance). All but one of the $n = 12$ participants at point 2 were significantly associated with this factor – $n = 7$ of whom had previously participated at point 1 of the study ($n = 6$ previously having a significant association with P1F1, and $n = 1$ with P1F2).

Similarly to P1F1, these respondents continue to view evidence as inseparable from OT practice, and feel strongly that research can help assist the development of the best practice in service delivery and outcomes (23, +6). There was no shift in relation to the feeling that engaging with research and evidence offers an opportunity to learn more (17, +5), nor in the feeling that they can make a real difference to practice with research, regardless of any policies and procedures that may already be in place (68, −4). Topic-driven interest also did not appear to shift, with respondents noting that they are passionate about the topic that they want to research (6, +4). On the other hand, the perceived necessity of being evidence-based in order to be a good clinician had become even stronger (25, −6).

Another interesting shift in profile between P1F1 and P2F1 relates to shifts in student confidence around understanding research (which seems to have increased) and engaging in research (which seems to have decreased). On the one hand, before research engagement, respondents somewhat disagreed that they lacked confidence in their abilities to contribute to a journal club discussion (22, −2), with their confidence to contribute to this type of activity shifting drastically after research engagement (22, −5). They are still quite happy to read articles from academic journals about topics in which they have an interest (4, +5 before; 4, +4 after), rather than resorting to sources such as the internet (28, −3 before; 28, −4 after).

Engagement with research is seen, even more, as something of which to be proud (20, +4 before; 20, +5 after) – enabling them to remain excited about the alternatives available to them (18, −5) and to do research for its intrinsic value, rather than simply as 'a means to an end' (85, −5). After undertaking research, their expectation regarding future learning shifted (2, +5). While this shift may be suggestive of a reduced level of confidence, it may alternatively suggest reflection on understanding of personal limitations: the DOING turned out to be harder than expected, but they trust their own experiences and believe that they will learn through future doing.

### Point 3

One factor emerged at point 3, with an eigenvalue of 2.98 and explaining 50% of the variance. All of the participants ($n = 6$) were significantly associated with this factor and all had undertaken an empirical study. Four of them had previously participated in at least one previous point in this project:

The factor that emerged at point 3 had many overlaps with P1F1 (evidence - inseparable from OT practice) and even more similarity with P1F2 (who am I to question the gurus?) When considering the Q-sort findings along the lines of 'OT practice' and 'OT identity', it is noteworthy that the factor emerging at point 3 appeared to align with both previous 'OT practice' factors. Therefore, the analyses below focus on noting the shifts between P1F1, point 2 and point 3 of the study.

At point 3, there appeared to be consolidation regarding the links between evidence, research and clinical OT practice, as well as continuing increases in research and evidence confidence, but changes in feelings towards the genuine difference that they themselves could make. This factor was therefore entitled, 'I can do it with confidence…but so what?'

### Point 3, factor 1 (P3F1): I can do it with confidence… but so what?

As seen in P2F1, these students most strongly believe that you need to be evidence-based to be a good clinician (25, −6) and that research can help assist the development of the best practice in service delivery and outcomes (23, +6). The most noticeable shift at this point is that these students feel much less threatened by the idea of doing research (7, −5) – seeing this as nearly the same as being evidence-based (52, −4).

A marked change of focus is apparent, with students appearing to think far more about the links between research/EBP and their future practice. They have become much more convinced that they need to demonstrate the value of OT-specific practice in order to have a strong professional identity (48, +5) – which they believe can be facilitated by engaging in research-related activities (12, +5) – that doing undergraduate research provides therapists with important skills for future practice (79, +4), and that they can

make better contributions in the workplace if they are competent in engaging with research and evidence (80, +3). Whilst they still feel strongly that being evidence-based is a key principle of the OT role (47, +5), they are much less convinced that they will become more truly evidence-based once in clinical practice (3, +2) or that being research active is so important a principle (21, +1).

However, there is a sense of disillusion regarding the value of their undergraduate assignment to their future practice. Compared with the point when they submitted their assignment, they seem more apprehensive about finding ways of investigating the things in which they are truly interested and/or less excited about researching available alternatives (18, −3) although they have become more convinced in their ability to do research that is 'good enough' (43, −3).

## Discussion

In recent years, policy and practice advances within the OT profession suggest a welcome move towards the embedding of evidence and research as inextricable professional attributes, of comparable importance with professional practice, leadership and facilitation of learning [37]. However, anecdotally, the design of OT (and other AHP) research and evidence-based practice education varies across pre-registration programmes. This paper describes an exploratory, longitudinal descriptive Q-sort study of student viewpoints regarding research and EBP skills, knowledge and attitudes, exploring changes in viewpoint profiles over the course of engagement with pre-registration research and EBP teaching and learning experiences.

Before research implementation, when students had gained initial research and EBP knowledge, but were yet to have had personal experience of research design and implementation, two types of viewpoints were revealed: 'Research for research's sake - inseparable from the occupational therapy identity' and 'Evidence – inseparable from occupational therapy practice'. Although some overlap is apparent, what is clear at this time point is that there are two distinct types of student profile. One type characterises the student who appears to respect and accept the importance of research for OT practice, yet research/EBP is there to serve their clinical practice (the driving factor of their OT professional identity). This profile is not unfamiliar - although research-related activities may be perceived by some OT students to be integral to their role as health professionals, for most pre-registration students, the focus tends to be on the activities of

reading and integrating research as opposed to carrying out research [28].

The other type of student profile appears to be the one who values research and EBP as a central tenet of OT identity in and of itself. This arguably aligns more closely with the view currently espoused within the Career Development Framework [37]. The nuanced distinction suggested by these two discrete profiles is important to acknowledge if the agenda encouraged by professional bodies [37] is to be achieved. Study findings suggest that research and EBP education as central to a holistic professional identity needs to be threaded through all pre-registration learning for all forms of OT roles, and that the assumption of research belonging in the realm of academia should be challenged. This aligns with Albarqouni et al. [38] who proposed a clinical competency related to understanding the distinction between using research to inform clinical decision making as opposed to conducting research.

Although at point 1, two discrete profiles were revealed following arguably similar learning experiences, findings at point 2 (after implementing independent research, which suggests an element of divergence of experience), the Q-sort revealed only one factor, namely, 'Who am I to question the gurus?' Prior to engagement in independent research activity, the two discrete student attitudes may suggest a sense of confidently-formulated opinions, yet a dip in confidence seems to emerge after undertaking research activity. Although possibly counter-intuitive, this finding is unsurprising. According to Weidman and Salisbury 'proficiency intensifies as individuals move past abstract rules and experiences to higher levels of cognitive abilities' [39,p.244]. Within this learning process, this perceived dip in confidence may be explained by the role of metacognition, which enables monitoring of thinking and problem-solving processes [40]; through experiential learning, it is possible that learners gain greater awareness of scope of learning to be had, with resultant impacts on confidence.

Viewing research and EBP learning as a singular learning process that spans an entire degree programme, may support learners to overcome this drop in confidence. Lehane et al. [41,p.105] propose a 'developmental milestone' approach, with incremental support for teaching and learning of EBP skills and knowledge over a complete course of study. Moreover, ensuring clinical relevance of this central aspect of OT curricula is essential, particularly considering previous student reports of not observing clinical educators practising EBP [19]. Hands-on experiences may help to ensure that learners 'develop expertise because

of the quality of the design and execution of the learning experience, not just the experience itself' [40,p.74-75].

This incremental approach to curriculum design may support an earlier holistic consolidation of learner confidence in research and EBP abilities within professional identity development. At the final study point (post conference), a single factor emerged ('*I can do it with confidence…but so what?*') seemingly reflecting a lack of learner self-belief that they hold power to influence clinical practice through research and evidence based practice. If a holistic, incremental approach to learner development is adopted, it is vital that future practitioners must recognise the potential that they hold to make a meaningful difference to clinical practice through research and EBP before leaving educational settings. As noted by Lehane et al. [41,p.104], 'If students perceive a dichotomy between EBP and actual clinical care, then 'never the twain shall meet'. As practitioners of the future, this component of identity development can only be achieved if research and EBP is situated 'as a core element within the professional curriculum and link[ed] to professional accreditation processes' [41,p.104].

Insights informing the consolidation of professional identity are complicated by virtue of the elusiveness of this concept. To address this elusiveness, an exploration of the movement of individual identity-related items sorted into the extreme positions within the forced Q-sort prioritisation was undertaken. Of the 90 Q-sort statements, only two used the word 'identity', and their rankings and movements are presented in Table 3. At all points and for all factors, both identity-related statements were ranked within the 'agreement' side of the Q-sort spectrum, but their location changed over time. Before undertaking independent research, the two distinct factors revealed contrasting views regarding the role of engaging in

research-related activities in developing professional identity. Immediately after completing their studies, but before presenting their findings at a student conference, identity-related statements appeared to remain in the realm of ambivalent agreement. However, after the conference, students appeared to see much more of a relationship between research engagement and professional identity, with both identify-related statements were ranked within the highest areas of agreement. This suggests a dramatic change in participants' views of the links between professional identity and research activity/EBP [37] which could potentially be offered through the shared conference experience.

Du Toit and Wilkinson [28] suggest that research and EBP learning needs to transcend activities and become 'culture'. If viewed from a cultural lens, it is possible that the conference experience itself - representing a culmination of a highly independent learning activity within a shared learning community - facilitates consolidation of research and knowledge-generation as central to professional identity. If culture can be defined as, 'the customs and beliefs, art, way of life, and social organisation of a particular… group' [42], with shared experience contributing to group culture [43], then the conference opportunity may have provided a shared cultural experience for learners. This experience, which is accompanied by a sense of student accomplishment and pride, as well as presentation of not only 'research' but rather 'their own research', may tackle the suggestion in professional literature of an observed divide between OT academia and practice [28] through underpinning an identity shift.

In addition to insights related to professional identity, the movement of role-related statements sheds light on how engaging in, and disseminating, pre-registration research may help consolidate research and EBP as key to the OT role. Although the recent positioning of 'evidence, research and development' as holding equitable importance with 'professional practice' in the OT CDF is encouraging [37], Lehane et al. remind us that 'the effective development and implementation of professional education to facilitate EBP remains a major and immediate challenge' [41,p.103]. Item #23 (*research can help assist the development of the best practice in service delivery and outcomes for patients*) was ranked by many of the participants with mid-level agreement before the start of their research projects, but ranked highest after research completion and dissemination. Likewise, item #25 (*you don't need to be evidence-based to be a good clinician*) moved from relative disagreement to the most extreme disagreement after research completion and dissemination. This movement may provide some insight into what the doing

**Table 3.** Ranking and movement of 'identity' statements.

| | +1 | +2 | +3 | +4 | +5 | +6 |
|---|---|---|---|---|---|---|
| ITEM 12. Engaging in research-related activities can help develop the professional identity of occupational therapists. | | | P1F1 P2F1 | | P3F1 | P1F2 |
| ITEM 48. In order to have a strong identity as an OT, I need to be able to prove that the OT-specific things that I do really make a difference. | P1F2 | P2F1 | P1F1 | | P3F1 | |

of research contributes to this fundamental pillar [37] of the OT role.

There is a professional requirement that OT students complete a minimum of 1000 practice placement hours [18] presumably due to the unquestioned assumption that practical experience is key to developing the professional practice pillar of the OT role. These study findings may contribute similar evidence to the centrality of practical DOING for developing the research and evidence pillar within the professional role. This in no small way aligns with the central professional OT philosophy of the link between the things we do forming who we become [44]. Taken together, these findings provide compelling underpinnings for ensuring that authentic research and EBP activity is woven throughout pre-registration learning experiences.

To ensure this authenticity through effective teaching and learning experiences, the concepts of research and EBP may benefit from practical differentiation. Although the CDF to some extent combines these as part of the same central aspect of professional OT identity [37], which is certainly useful in relation to what the CDF is intended to achieve, the translation of this to the pedagogical realm may benefit from separating the concepts out for differentiated focus as learners 'mature' professionally [28]. The movement of two specific items sheds interesting light on this (Table 4). Before undertaking research activity, item #21 (*being research-active is a key principle of the OT role. I think this is how it should be*) and item #47 (*being evidence-based is a key principle of the OT role. I think this is how it should be*) strongly distinguished between student profiles. However, after disseminating their studies at the conference, views related to EBP shift and appear to take precedence in importance, which suggests an encouraging development in terms of evidence-based readiness. When preparing AHP students for EBP, Schaefer and

Welton [45] highlight that evidence-based readiness includes the ability to recognise a need for EBP in the first place. According to Jeffery et al. [23], novices struggle to translate research evidence into everyday practice. The finding that - after conference and research engagement - participants recognised research evidence as being only one element of EBP may be suggestive of a positive shift from viewing themselves as research consumers to research contributors.

### Methodological considerations/limitations

Principles of Q-methodology assure that the number of individual participants does not per se impact on the rigour of the factors identified. However, the fact that the number of participants decreased with each time-point of the study may explain why only one factor was generated at each of points 2 and 3. A further limitation stemming from the nature of a Q-sort design lies in the subjectiveness of interpretation of identified factors. While thorough, collaborative processes were employed to ensure accuracy of potential interpretations, the authors are aware that other ways to explain the results may exist. An additional limitation lies in the ever-present potential for selection bias, whereby those who have an interest in the study subject self-select to participate. Furthermore, a longitudinal Q-sort process has rarely been reported in the literature; while the multiple time-point administration of the Q-sort undertaken here is innovative and presents a unique opportunity to consider the development of perceptions over time, the lack of published resources to support the objective manner of undertaking these analyses is a further limitation of the study.

### Implications for education, research and clinical practice

There is evidence that pedagogical opportunities which support pre-registration research engagement, might influence later perceptions related to taking a research active role in practice [9]. However, emotional factors such as student motivation, confidence and anxiety, as well as additional factors including research competence and research knowledge, may be linked to how undergraduate research is experienced and may inadvertently have deleterious effects on professional adoption of research and EBP as central to professional roles. By exploring the evolution of student perceptions of research and EBP as they progressed through their programme, the findings from

**Table 4.** Ranking and movement of 'key principle' statements.

| Statement | Point 1 (Factor 1) | Point 1 (Factor 2) | Point 2 (Factor 1) | Point 3 (Factor 1) |
|---|---|---|---|---|
| 21. Being research-active is a key principle of the OT role. I think this is how it should be. | +2 | +4 | +4 | +1 |
| 47. Being evidence-based is a key principle of the OT role. I think this is how it should be. | +5 | +2 | +4 | +5 |

this study expand on current knowledge related to how to use pre-registration educational opportunities as effectively as possible to support future research and evidence-based clinical practice. For example, the study findings lend support for providing opportunities for completing 'authentic' research projects during pre-registration studies, which may address issues of confidence and enable learners to develop their research skills in a safer space, before transitioning into the real world of clinical practice. Additionally, the study findings suggest that educational experiences in which learners take 'ownership' by presenting the results to others (in a forum such as a conference) can enhance both the confidence and professional identity of the novice researcher.

The opportunity to carry out empirical research at the pre-registration level raises the profile of the graduate, with potential added value in terms of post-qualification employability and entrepreneurship. One of the suggestions made by Illott [46] to support movement from being a research emergent profession [47], to a research established profession [46], is the dissemination of high quality research empirical research outputs. However, ubiquitous engagement in quality empirical research implementation requires skills, confidence and opportunity [29,30,48]. Research capacity building has been on the professional OT agenda for some time [47], and the inclusion of an 'evidence, research and development' pillar within the CDF [37] reinforces the centrality of research and EBP to the OT role. The respondents to the Q-sorts used in this study had recent learning experiences that aligned with the recommendation of Lehane et al. [41] that investigations which provide explicit direction and structure to developments in the field may improve EBP education (p. 103).

## Acknowledgements

## Disclosure statement

## References

[1] WFOT. International occupational therapy research priorities. OTJR - Occup Part Heal. 2017;37(2):72–81. doi: 10.1177/1539449216687528.

[2] Slade SC, Philip K, Morris ME. Frameworks for embedding a research culture in allied health practice: a rapid review. Health Res Policy Syst. 2018;16(1):29. doi: 10.1186/s12961-018-0304-2.

[3] Trostle J. Research capacity building in international health: definitions, evaluations and strategies for success. Soc Sci Med. 1992;35(11):1321–1324. doi: 10.1016/0277-9536(92)90035-o.

[4] Hitch D, Nicola-Richmond K. Instructional practices for evidence-based practice with pre-registration allied health students: a review of recent research and developments. Adv Health Sci Educ Theory Pract. 2017;22(4):1031–1045. doi: 10.1007/s10459-016-9702-9.

[5] Daei A, Soleymani MR, Ashrafi-Rizi H, et al. Clinical information seeking behavior of physicians: a systematic review. Int J Med Inform. 2020;139:104144. doi: 10.1016/j.ijmedinf.2020.104144.

[6] Dawes M, Summerskill W, Glasziou P, et al. Sicily statement on evidence-based practice. BMC Med Educ. 2005;5(1):1–7. doi: 10.1186/1472-6920-5-1.

[7] Haynes RB, Devereaux J, Guyatt GH. Clinical expertise in the era of evidence based medicine and patient choice. EBM Notebook. 2002;7(2):36–38. doi: 10.1111/j.1423-0410.2002.tb05339.x.

[8] Department of Health (DoH). Creating change: innovation, health and wealth – one year on. London: DoH; 2012.

[9] Asokan G. Evidence based practice curriculum in allied health professions for teaching- research-practice nexus. J Evid Based Med. 2012;5(4):226–231. doi: 10.1111/jebm.12000.

[10] The Allied Health Professions strategy for England: AHPs Deliver [Internet]. England: office of the Chief Allied Health Professions Officer; 2022 Jun [cited 2024 Jun 28]. Available from: https://www.england.nhs.uk/ahp/allied-health-professions-strategy-for-england/.

[11] Rolloff M. A constructivist model for teaching evidence-based practice. Nurs Educ Perspect. 2010;31(5):290–293.

[12] Malik G, McKenna L, Griffiths D. Using pedagogical approaches to influence evidence-based practice integration–processes and recommendations: findings from a grounded theory study. J Adv Nurs. 2017;73(4):883–893. doi: 10.1111/jan.13175.

[13] White E. The United Kingdom Occupational Therapy Research Foundation: a 6 year reflection. Br J Occup

Ther. 2013;76(10):433–433. doi: 10.4276/030802213X13 807217284107.

[14] Learning and development standards for pre-registration education [Internet]. London: Royal College of Occupational Therapists; 2019 [cited 2022 Oct 28]. Available from: https://www.rcot.co.uk/practice-resources/rcot-publications/learning-and-development-standards-pre-registration-education.

[15] White E, Creek J. College of Occupational Therapists' research and development strategic vision and action plan: 5-year Review. Br J Occup Ther. 2007;70(3):122–128. doi: 10.1177/030802260707000305.

[16] Standards of proficiency: occupational therapists [Internet]. London: Health and Care Professions Council; 2013 [cited 2022 Oct 28]. Available from: https://www.hcpc-uk.org/standards/standards-of-proficiency/occupational-therapists/.

[17] Watson J. Research priorities for occupational therapy in the UK. Br J Occup Ther. 2021;84(1):3–5. doi: 10.1177/0308022620976834.

[18] WFOT Minimum Standards for the Education of Occupational Therapists. World Federation of Occupational Therapists [Internet]; 2016 [cited 2022 Jun 20]. Available from: https://www.wfot.org/resources/new-minimum-standards-for-the-education-of-occupational-therapists-2016-e-copy.

[19] Stronge M, Cahill M. Self-reported knowledge, attitudes and behaviour towards evidence-based practice of occupational therapy students in Ireland. Occup Ther Int. 2012;19(1):7–16. doi: 10.1002/oti.328.

[20] Allen JL, Long KM, O'Mara J, et al. The effects of students predispositions toward communication, learning styles, and sex on academic achievement. TLC. 2007;4(9):71–84. doi: 10.19030/v4i9.1549.

[21] Komarraju M, Nadler D. Self-efficacy and academic achievement: why do implicit beliefs, goals, and effort regulation matter? Learn Individ Differ. 2013;25:67–72. doi: 10.1016/j.lindif.2013.01.005.

[22] Steinmayr R, Weidinger AF, Schwinger M, et al. The importance of students' motivation for their academic achievement–replicating and extending previous findings. Front Psychol. 2019;10:1730. doi: 10.3389/fpsyg.2019.01730.

[23] Jeffery H, Robertson L, Reay KL. Sources of evidence for professional decision-making in novice occupational therapy practitioners: clinicians' perspectives. Br J Occup Ther. 2020;84(6):346–354. doi: 10.1177/0308022620941390.

[24] Aglen B. Pedagogical strategies to teach bachelor students evidence-based practice: a systematic review. Nurse Educ Today. 2016;36:255–263. doi: 10.1016/j.nedt.2015.08.025.

[25] Thomas A, Saroyan A, Dauphinee W. Evidence-based practice: a review of theoretical assumptions and effectiveness of teaching and assessment interventions in health professions. Adv Health Sci Educ Theory Pract. 2011;16(2):253–276. doi: 10.1007/s10459-010-9251-6.

[26] Stenner P, Watts S, Worrell M. Q Methodology. In: Willig C, Stainton-Rogers W, editors. The SAGE hand-book of qualitative research in psychology. London: SAGE; 2017. p. 212–237.

[27] Watts S, Stenner P. Doing Q methodological research: theory, method and interpretation. London: Sage; 2012.

[28] Du Toit S, Wilkinson A. Promoting an appreciation for research-related activities: the role of occupational identity. Br J Occup Ther. 2011;74(10):489–493. doi: 10.4276/030802211X13182481842029.

[29] Pighills AC, Plummer D, Harvey D, et al. Positioning occupational therapy as a discipline on the research continuum: results of a cross-sectional survey of research experience. Aust Occup Ther J. 2013;60(4):241–251. doi: 10.1111/1440-1630.12057.

[30] Pager S, Holden L, Golenko X. Motivators, enablers and barriers to building allied health research capacity. J Multidiscip Healthc. 2012;5:53–59. doi: 10.2147/JMDH.S27638.

[31] Bazeley P. Mixed or merged? Integration as the real challenge for mixed methods. QROM. 2016;11(3):189–194. doi: 10.1108/QROM-04-2016-1373.

[32] Garbellini S, Randall M, Steele M, et al. Unpacking the application of Q methodology for use in occupational therapy research. Scand J Occup Ther. 2021;28(4):323–328. doi: 10.1080/11038128.2019.1709542.

[33] Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. Qual Quant. 2018;52(4):1893–1907. doi: 10.1007/s11135-017-0574-8.

[34] Frey B. The SAGE encyclopaedia of educational research, measurement, and evaluation. Thousand Oaks (CA): SAGE Publications; 2018.

[35] Pruneddu A, Q-SORTWARE [Internet]; n.d. [cited 2022 Oct 25]. Available from: http://www.qsortware.net/home.html.

[36] Schmolck P, PQMethod Software [Internet]; 2014 [cited 2022 Oct 25]. Available from: http://schmolck.org/qmethod/.

[37] Royal College of Occupational Therapists Career Development Framework. 2nd ed. [Internet]. London: Royal College of Occupational Therapists; 2021 [cited 2022 Oct 28]. Available from: https://www.rcot.co.uk/publications/career-development-framework.

[38] Albarqouni L, Hoffmann T, Straus S, et al. Core competencies in evidence-based practice for health professionals: consensus statement based on a systematic review and Delphi survey. JAMA Netw Open. 2018;1(2):e180281. doi: 10.1001/jamanetworkopen.2018.0281.

[39] Weidman B, Salisbury H. Critical thinking in health sciences and how it pertains to sonography education: a review of the literature. J Diagn Med Sonogr. 2020;36(3):244–250. doi: 10.1177/8756479320908216.

[40] Persky AM, Robinson JD. Moving from novice to expertise and its implications for instruction. Am J Pharm Educ. 2017;81(9):6065. doi: 10.5688/ajpe6065.

[41] Lehane E, Leahy-Warren P, O'Riordan C, et al. Evidence-based practice education for healthcare

professions: an expert view. BMJ Evid Based Med. 2019;24(3):103–108. doi: 10.1136/bmjebm-2018-111019.

[42] Culture. Oxford learner dictionary [Internet]; n.d [cited 2022 Jun 20]. Available from: https://www.oxfordlearnersdictionaries.com/definition/american_english/culture_1#:~:text=noun-,noun,/African/American%2C%20etc.

[43] Bergey BW, Kaplan A. What do social groups have to do with culture? The crucial role of shared experience. Front Psychol. 2010;1:199. doi: 10.3389/fpsyg.2010.00199.

[44] Wilcock AA. Reflections on doing, being and becoming. Aus Occup Therapy J. 1999;46(1):1–11. doi: 10.1046/j.1440-1630.1999.00174.x.

[45] Schaefer JD, Welton JM. Evidence based practice readiness: a concept analysis. J Nurs Manag. 2018;26(6):621–629. doi: 10.1111/jonm.12599.

[46] Ilott I. Evidence-based practice forum: challenges and strategic solutions for a research emergent profession. Am J Occup Ther. 2004;58(3):347–352. doi: 10.5014/ajot.58.3.347.

[47] White E. Occupational therapy research: building capacity. Br J Occup Ther. 2003;66(5):224–226. doi: 10.1177/030802260306600507.

[48] Whitehead P, Drummond A, Fellows K. Research governance and bureaucracy for multisite studies: implications for occupational therapy research. Br J Occup Ther. 2011;74 (7):355–358. doi: 10.4276/030802211X13099513661234.