Pre-registration research training of speech and language therapists in the UK: a nationwide audit of quantity, content and delivery

Article

Accepted Version

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

Pre-registration research teaching for speech and language therapy students in the UK: a nationwide audit of quantity, content and delivery.

Article full title: Pre-registration research training of speech and language therapists in the UK: a nationwide audit of quantity, content and delivery

Short title: Research teaching for speech and language therapy students

Abstract

Aim: To carry out an audit of the quantity and content of research teaching on UK pre-registration speech and language therapy degree programmes. Method: Lecturers delivering research teaching from each higher education institution providing pre-registration training were invited to complete an online survey. Questions included: amount of research teaching, content of research teaching (including final year projects), perceived confidence by staff of graduates in research awareness, research activity and leading research. Responses were received for 14 programmes (10 undergraduate and 4 postgraduate), representing 73% of all undergraduate courses and 44% of all postgraduate courses in the UK.

Results: Fifty percent of courses included over 30 hours of research teaching, with wide variability across both undergraduate and postgraduate courses in number of hours, modules and credits devoted to research. There was no association between quantity of research teaching and perception of adequacy of quantity of teaching. Critical appraisal, statistical software and finding literature were the most common topics taught. Conversely, service evaluation and audit was the least common topic covered. All institutions provided a final year project, with 11/14 requiring empirical research. Perceived confidence of graduates was higher for research awareness than active research and leading research but this varied across institutions. There was a strong correlation between lecturers' perceived confidence of graduates in research awareness and number of hours of research teaching.

Conclusions: Despite the requirements for health care professionals to engage in evidence-based practice, the amount and nature of research training in pre-registration courses for speech and language therapists in the UK is highly variable. Levels of perceived confidence of graduates was also variable, not only for active participation in research, and for leading research, but also for research awareness. This has implications for the ability of speech and language therapists to use and embed research in their routine clinical practice.

Keywords: Clinical Education, Evidence Based Practice, Higher Education Institutions,

Research, Speech and Language Therapists,

What is known about the topic?

- Using best available evidence and research skills are essential to providing quality patient care

- Health professionals lack skills, confidence and experience in research skills

- Pre-registration learning opportunities are associated with later attitudes and use of evidence-based practice and research

What does this paper add?

- There is a high degree of variability in the quantity and content of pre-registration research teaching provided to speech and language therapists in the UK

- Number of hours of research teaching is strongly correlated with perceived confidence of graduates in research awareness

- Training in audit and service evaluation, key activities in clinical practice, is limited in pre-registration speech and language therapy courses

Background

There is increasing expectation internationally that healthcare services will use the best available evidence to inform decision-making and carry out research to improve outcomes and patient experience[1,2,3] . Understanding of the research process is required in order to assess, diagnose and treat clients and deliver evidence-based practice (EBP)[4] . The benefits of research to practice are well documented, including improved healthcare administration processes[5] , staff retention, job satisfaction and patient outcomes[6,7]. Therefore ensuring the understanding and engagement of the current and future healthcare workforce in research and EBP is a key priority for governments, professional bodies and bodies responsible for the education and training of healthcare professionals[8,9]. It has been argued that this is particularly important for allied health professionals in light of the pressing need for a greater evidence base for interventions[10,11].

In line with this, the importance of critically evaluating research, applying research to practice and using research skills to evaluate practice is reflected in professional standards for all health professions internationally. For example, in the UK, standards for pre-registration nursing education include the ability to use 'up-to-date knowledge and evidence to assess, plan, deliver and evaluate care'[12(pp17)]. Similarly, standards of proficiency for speech and language therapists (SLTs) in, for example, Australia, the Republic of Ireland and the UK include; awareness of research methodologies; evaluation of research evidence; recognition of the value of research; engaging in evidence-based practice; audit; gathering qualitative and quantitative data for evaluation, and; using research skills[13,14,15]. Pre-registration speech and language therapy programmes in the UK must meet the Health and Care Professions Council's (HCPC) Standards for Education and Training[16] in order for graduates to meet the

HCPC Standards of Proficiency[13] and register as a practising SLT. These standards include specific reference to research and EBP.

All healthcare professionals must be able to 'consume research' i.e. be able to find, evaluate and apply research findings to practice. However, not all healthcare professionals will be actively involved in research during their careers, and those that are will be involved at different levels, for example, collaboration with others or leading research projects. A recent framework of research involvement describes four different levels: evidence-based practice or research awareness (Level 1), collaboration in research (Level 2), leading research (Level 3) and leadership in research (Level 4)[17]. An alternative model, developed in collaboration with clinical managers, academics and research and development administrators, describes a trajectory from using research in practice ('research consciousness') to involvement in a research team or project ('research participative') and finally to leading research through a postgraduate research degree or project ('research active')[18]. Interestingly, the proportion of healthcare professionals in each category decreased with increasing research engagement.

It has been found that health professionals lack skills, confidence and experience in research skills, including pharmacists[19], other allied health professionals[20] and nurses[21]. Skills, confidence and experience are key to building research capacity and have been shown to be a barrier in its development [22]. In a study carried out in Australia, 137 practising speech and language pathologists (SLPs) rated their interest, experience and confidence on a range of research-related tasks via a web-based questionnaire[23]. SLPs reported lower levels of confidence and experience than interest on all tasks related to planning and carrying out research, with the exception of finding literature. Similarly, when asked how often each activity had been undertaken in the past five years, the most common activity reported was finding and critically appraising literature. Highest post-registration qualification obtained

was a significant predictor of research engagement[23]. A qualitative analysis showed that 'overcoming the fear' of research differentiated between research-active SLPs and those who had not conducted research[24]. Factors such as hands-on research training and mentorship, available support and past experiences were cited as important in becoming research active. Positive past experiences, including pre-registration training and involvement in research projects, emerged as important in enabling SLPs to overcome the fear of doing research.

The links between initial training and later attitudes to and knowledge of EBP has been investigated for a range of allied health professions. Brown et al[25] found that knowledge and confidence in EBP increased over the course of degree programmes in nursing and that more knowledge of and positive attitudes to research predicted use and perceived later use of EBP. Another study carried out in the US, reported that SLP's attitudes to EBP and research, and use of evidence-based resources, were associated with exposure to EBP and research in pre-registration training and/or the first year of practice[26]. A similar finding has been reported for physiotherapists[27] and occupational therapists[28, 29]. A study in Sweden, found that 50% of graduating nursing students intended to use research on at least half their shifts and that intention to use research predicted subsequent research use behaviour one year into clinical practice[30]. In the Netherlands, a study carried out with first, second and third year pre-registration SLT students found that EBP knowledge and skills were significantly higher in third year students in comparison with earlier years[31].

Whilst these studies suggest that a relationship exists between initial training in EBP and research and later attitudes and knowledge of practicing health professionals, this has not been explored in a UK context with the speech and language therapy profession. Furthermore, the nature of pre-registration training for SLTs in EBP and research has yet to be explored. More information about pre-registration training in research and EBP is

important in guiding curriculum development routinely undertaken by the Royal College of Speech and Language Therapists (RCSLT)[32].

Method

Aim

This study aimed to audit the quantity and content of research teaching provided to pre-registration speech and language therapy students by accredited courses in the UK.

Participants

All programme directors from each of the 18 Higher Education Institutions (HEIs) that provide an accredited pre-registration speech and language therapy degree in the UK were contacted directly through email using a contact list provided by the RCSLT and were asked to invite the staff member responsible for research and EBP teaching for their programme to complete the audit. Each respondent had a period of 6 weeks to respond and one reminder was sent during this period.

Eleven lecturers from accredited pre-registration speech and language therapy degrees responded, representing 14 programmes (10 undergraduate and 4 postgraduate). This represents 73% of all undergraduate courses and 44% of all postgraduate courses in the UK. Typically, at the time of data collection, postgraduate courses were 2 years in duration and undergraduate courses four years.

Questionnaire

An anonymised online questionnaire, hosted by SurveyMonkey was developed, and included 17 questions (see appendix I for questionnaire). Questions were a combination of multiple choice and open ended questions and focused on:

- Quantity of research training in terms of hours, modules and credits

- Discipline of teaching staff delivering the research training

- Content of research training, ranging from finding literature to all elements of conducting research

- Strategies/practices used to support students in their understanding of research and EBP

- Information about final year research projects

- Perceived confidence of graduates in research awareness, active research and leading research from the perspectives of the lecturers responsible for research and EBP teaching

HEIs which provided an undergraduate and postgraduate programme completed all questions for each programme separately. There were four additional questions for post-graduate programmes which offer an option for conversion from a post-graduate diploma to a Masters degree.

Data analysis

Results from the questionnaire were analysed descriptively through means, standard deviations, and ranges, using SPSS. Data was analysed separately for undergraduate and postgraduate courses. Correlations were carried out using Spearman rank-order correlation coefficient. For correlational analysis, undergraduate and postgraduate courses were amalgamated due to the small overall number of postgraduate courses[33].

Results

Quantity of teaching

Hours of research teaching were reported in ranges (0-5, 6-10, 11-15, 16-20, 21-30, over 30 hours). The most common total number of hours of research teaching was over 30 hours (50%) but there was wide variability across both undergraduate and postgraduate courses (see Table I).

_____

INSERT TABLE I ABOUT HERE

_____

The mean number of modules dedicated to research teaching was 2.1 for undergraduate courses (SD=0.87, range: 0-3) and 3.0 for postgraduate courses (SD = 4, range 1-9). Three postgraduate courses had one module dedicated to research teaching and one reported nine modules. There was no correlation between the number of hours and number of modules ($r(13) = 0.31$, p=0.3).

The number of credits allocated to research also varied. Whilst the mean number of credits for undergraduate courses was 43.3 (SD = 23.6) and 68.8 (SD = 51.4) for postgraduate courses, this ranged from 15 to 90 credits and 15 to 130 credits respectively. There was a significant positive correlation between the number of credits and number of modules ($r(13) = 0.58$, p=0.04) but no significant correlation between number of credits and hours of teaching ($r(13) = 0.42$, p=0.15).

All undergraduate courses included research teaching in at least two years of study, with the exception of one course which included research in the first year only. Eight out of 10 included research teaching in the first year. All postgraduate courses included research teaching in the second year, with one course additionally providing research teaching in the first year.

Ten lecturers reported that they offered 'about (the) right' amount of research training, with 2 stating they offered 'too little', and another 2 reporting their programme included 'too much'. No clear pattern emerged between number of hours of teaching delivered and lecturers' perceptions of adequacy of quantity. For example, lecturers of courses offering the least amount of research teaching (0-5 hours) reported that their amount of training was either 'about right' or 'too much'. Two respondents perceived that they offered 'too little' research teaching, with both of these courses providing over 21 hours. There were no significant correlations between lecturers' perceptions of adequacy of amount and hours of teaching ($r(15) = 0.48$ $p=0.7$), modules ($r(13) = -0.23$, $p=0.45$) or credits ($r(13) = -0.16$, $p=0.61$).

All courses, with the exception of one undergraduate course, also embedded teaching of research and EBP in other elements of the curriculum.

Teaching staff

In house staff delivered the research teaching for 9 out of 10 undergraduate and 3 out of 4 postgraduate courses. For all courses, except one, the teaching was delivered by speech and language therapy lecturers, with some courses including lecturers from other disciplines, including psychology (2 courses), and linguistics (1 course). Statisticians covered the teaching of all research methods for one undergraduate course.

Content of teaching

Content of research teaching varied considerably across institutions (see Figure I). For undergraduate courses, 'finding literature' and using 'statistical software' were the only topics that were covered by all HEIs. The other most frequently taught topics were 'critical appraisal' (93%), 'data input' (80%) and 'data analysis' (80%). Seventy percent of courses also taught the application of 'research to practice', 'quantitative' and 'qualitative' methods,

'ethics' and 'disseminating research'. Only two (20%) institutions included teaching about 'service evaluation' and 'audit'.

For postgraduate courses, 'critical appraisal of research' was taught by all four HEIs. All other topics were taught by either two or one of the courses (with the exception of 'statistical software' that was taught by three). None of the postgraduate courses provided teaching on 'service evaluation/audit' or 'mixed methods'.

_____

INSERT FIGURE I ABOUT HERE

_____

Those courses that provided 0-5 hours of research teaching taught the fewest number of topics (1 to 3 topics in total).

Five respondents outlined the strategies they used to support students in their understanding of research and EBP. These included providing a variety of learning opportunities (such as taught sessions, using journal articles, and coursework), embedding EBP in teaching, clinical work and assessments throughout the course, 'hands on' practice (such as critical appraisal, data analysis and conducting a research project), using 'real-life' examples and providing support from peers and staff. Four of the respondents gave examples of drawing upon clinical work in their teaching, for example using case reports, session plans and clinical cases.

All institutions required the completion of a final year project (see Table 2). The nature of this project varied. For undergraduate programmes, 8 out of 10 HEIs included an empirical research project, one a systematic review and one, a research proposal. Three out of four postgraduate programmes included an empirical research project, and one a systematic review. One of the four postgraduate programmes offered a postgraduate diploma, and

therefore, did not require any research project for registration. This institution reported that 15-20% of students convert to a Masters degree, and in doing so, were required to complete an empirical research project.

_____

INSERT TABLE II ABOUT HERE

_____

Perceived confidence of graduates

When asked to indicate how confident their students would be on graduating in terms of research awareness, active research and leading research, lecturers rated confidence more highly for undergraduate programmes.   However, responses varied considerably for research awareness: with 9 rating their graduates as 'confident' or 'very confident', and 5 as 'not at all confident'. Respondents from all postgraduate programmes and 80% of undergraduate programmes rated their graduates as 'not at all' or 'a little' confident in research activity. As expected, confidence was rated lower for leading research for both undergraduate and postgraduate programmes (see Figure 2).

_____

INSERT FIGURE II ABOUT HERE

_____

There was a strong significant positive correlation between the number of hours of research teaching and perceived confidence in research awareness ($r(15) = 0.81$, $p<0.001$). Lecturers from all of the courses offering over 30 hours of teaching rated their graduates as 'confident' or 'very confident' in research awareness. In contrast lecturers from all remaining courses

(which offered less than 15 hours) rated their graduates as 'not at all (or) a little confident' in research awareness. There was no significant correlation between the number of hours of research teaching and perceived confidence in research activity (r(15) = 0.41, p=0.13) or leading research (r(15) = -0.37 p=0.17).

Discussion

This study aimed to audit the quantity and content of research teaching provided to pre-registration SLTs by accredited courses in the UK. Overall, more research teaching was provided by undergraduate courses, with 6 out of 10 providing over 30 hours. However, there was great variability in number of hours, modules and credits for research teaching in both undergraduate and postgraduate courses with no clear association between quantity of teaching and how adequate lecturers perceived this to be. There was also a strong correlation between number of hours of research teaching and perceived confidence of graduates in research awareness. Interestingly, despite a positive association between the number of credits and modules dedicated to research teaching, there was no association between the number of credits and hours of teaching. Across the seven courses providing over 30 hours of teaching, the number of credits ranged from 15 to 90. A similar finding was reported in a review of pre-registration nursing and AHP degrees in the North of England which found universities' credit systems were not directly comparable in terms of allocation of hours. Of the twenty modules investigated, fourteen allocated one credit per 10 hours of study (teaching sessions and independent study), reflecting national guidelines, but there were six exceptions to this, including two 10-credit modules, one with 100 and one with 200 study hours. Length of assessment was also not related to number of credits[34.] Variability in number of credits, in relation to number of hours, is therefore probably less surprising, considering that, even though most, if not all, degree programmes will have an academic credit system, the number of credits and how they relate to hours of study, modules and level of study differ widely across

and within countries, varying between subjects, courses and universities. For example a typical European undergraduate degree consists of between 180 to 240 credits whereas, in the USA, an undergraduate degree will usually be 120 credits. The variability seen in our study may reflect independence in curricula design and assessment across institutions in the UK. This is also seen in other countries, where, despite the existence of national guidelines on pre-registration curricula, variability and individual differences are evident. In Sweden, for example, where national guidance underpins curricula in nursing education, local curricula and profiling continue to be encouraged[35]. Whilst there will always be differences across universities, it is important for institutions teaching research and EBP to healthcare practitioners to adhere to some degree to national guidelines on an appropriate number of credits, hours and modules given to the teaching of critical areas of the curriculum. This will help ensure comparability across courses and assist in measuring and maintaining standards of proficiency of graduates. The number of hours, credits and modules devoted to research teaching gives us a measure of quantity of teaching. All except one course, however, reported that teaching about research and EBP was included in other elements of the curriculum. For this reason, it has been acknowledged that it is difficult to identify elements of EBP and research across a health profession degree due to the cross-cutting nature of the skills involved[36].

There was a high degree of variability in the content of research teaching provided to SLTs. The most common topics were finding literature, critical appraisal and using statistical software. Similarly, Badger et al.[34] reported a strong focus on literature review and critical appraisal in their review of pre-registration nursing and AHP degrees. In contrast to our findings, this review also found a strong focus on ethical issues in research. It is curious that despite the ever constant and growing presence of ethical processes in research, that ethics

was not covered across all the courses, and was particularly low in the postgraduate courses. This does appear to be an area where what occurs in practice is not adequately reflected in teaching. Another surprising omission, were the areas of audit and service evaluation. Considering how frequently audit and service evaluation are incorporated in routine clinical work[37], and that the HCPC standards of proficiency explicitly includes carrying out audit[15], it was remarkable that these areas were only taught directly by two programmes. It is possible that the expectation was that this type of training would be provided to students in their clinical placements. Supporting this view is one qualitative comment received which stated that "Service evaluation/audit may be included if students do a dissertation project based on this (e.g. with local SLT teams)". Models to enhance research capacity across healthcare and higher education settings have provided final year students with opportunities to engage in service audit, service evaluation and literature reviews through dissertations and placements[18] and not through direct teaching.

It is interesting to note that respondents reported a variety of ways to deliver EBP and research training within the context of a speech and language therapy programme, with a more explicit emphasis on the clinical aspects, for example drawing upon session plans, case studies and real-life clinical data, as well as, embedding EBP within the wider clinical curriculum. Similar approaches have been reported in the literature such as problem-based and case-based teaching[38,39]. A review of pre-registration EBP teaching in Australia also reported the use of strategies and resources to support the application of EBP to clinical practice, with proportionally more time spent on the application of EBP knowledge than teaching EBP concepts[40].

The variability in both amount and content of research teaching is unexpected given that all pre-registration programmes must meet the same competencies[16]. However, at present the curriculum guidelines in the UK are not prescriptive in terms of amount of teaching and do not provide detailed guidelines on content. Perceived confidence in research awareness and activity was lower than expected, with lecturers from five courses stating that their graduates were 'not at all confident' in research awareness, and all except one reporting to be 'not at all (or) a little confident' in active research. These findings suggest that graduating speech and language therapists may not be adequately prepared to embark on their careers as evidence-based practitioners and to meet their professional standards[13] and are consistent with studies that have reported low confidence of post-registration SLTs and other health professionals in EBP and research skills[23,19, 20, 21]. A survey of more than 4000 dieticians found that more value was placed on using and applying research than active participation in research[41]. This is consistent with our finding that confidence was generally rated more highly for research awareness than research activity and leading research.

Studies have found that exposure to EBP and research in initial training is associated with later attitudes of practicing clinicians[26] and is a predictor of subsequent research involvement[42]. Interestingly, a survey of SLTs carried out in Australia found that greater participation in EBP was associated with less clinical experience[43], suggesting the importance of pre-registration training. However, health professionals such as dieticians have reported that their pre-registration training did not prepare them for carrying out research in their later careers[44]. In another study which supports this result, Finch et al[24] found that research training was not retained after graduation.

Final year empirical projects were part of the curriculum for 11 out of 14 institutions. Involvement in empirical research projects is important in developing skills and attitudes to

research[45]. Whelan et al.[46] found that student dieticians reported that participation in empirical dissertation projects contributed to their research skill development. Participation also positively influenced students' attitudes towards involvement in future research and audit. Encouragingly, participation in collaborative projects with a clinician resulted in greater involvement in the research process and greater development of research skills. Moreover, a study carried out with psychology students found that knowledge and confidence in research methods was greater for students taught with 'real' research data collected by the students and active learning activities compared with students taught with existing data[47]. The UK Quality Assurance Agency for higher education states that successful undergraduate students will typically have shown that they have the skills necessary to carry out a research project[48]. However, there are concerns that fewer final year students will be able to undertake clinical research projects in the future due to ethical constraints[34] and the reduction in the overall years of training of SLT courses in the UK.

Recent initiatives are addressing the inequity in research teaching to pre-registration SLTs. The Council for AHP Research in the UK has recently published a position statement on developing research skills within AHP pre-registration education. This calls for AHP pre-registration programmes to prepare graduates to be able to use research in practice, take up early research opportunities and strengthen research skills and confidence[49]. Furthermore new guidance for pre-registration curricula is to be published which will give more guidance on research teaching content[32].

Not all HEIs that provide pre-registration training for SLTs responded to our survey, and no definitions were provided of 'research teaching', 'research awareness', 'research activity' and 'leading research', which may have resulted in variability in how these questions were perceived and answered. Confidence ratings were ratings of perceived confidence by staff, rather than a measure taken directly from graduates. It is important that future research

explores the perceived levels of confidence of students themselves, both during their time as a student and as graduates working as healthcare practitioners. A more detailed investigation of how research teaching methods and content are associated with later attitudes to research and research capabilities would provide important empirical evidence to inform future curriculum development.

Conclusions

This study has found that the quantity and content of pre-registration research teaching to SLTs varies considerably across institutions in the UK. Number of hours of research teaching appears important, and was strongly correlated with perceived confidence of graduates in research awareness. Activities, like audit and service evaluation, which are routine in clinical practice, were not included, as expected, across all the pre-registration teaching, and this may result in graduates not being prepared adequately for the work place. Whilst not all clinicians will be actively involved in research, an awareness of research and EBP is a requirement, yet the perceived confidence of graduates of some programmes, even for research awareness, was relatively low. The impact of these findings on the attitudes, knowledge, motivation and practice of qualified SLTs in relation to both using evidence in practice and conducting research needs further investigation. EBP and research awareness are essential to health care practitioners, and it is in the pre-registration years where these can be best taught.

References

1. Australian Government (2016). Australian Medical Research and Innovation Strategy 2016-2021. Retrieved [November 2017] from https://health.gov.au/internet/main/publishing.nsf/Content/mrff/$FILE/Australian%20Medical%20Research%20and%20Innovation%20Strategy%202016.pdf

2. Canadian Institutes of Health Research (2015). Health Research Roadmap II: Capturing Innovation to Produce Better Health and Health Care for Canadians: Strategic Plan 2014-15 – 2018-19. Retrieved [November 2017] from http://www.cihr-irsc.gc.ca/e/48964.html

3. NHS England (2017). NHS England Research Plan. London: NHS England. Retrieved [November 2017] from https://www.england.nhs.uk/publication/nhs-england-research-plan/

4. Knight RA, Botting N. Organising undergraduate research projects: student-led and academic-led models. J Appl Res High Ed 2016; 8 (4): 455-468.

5. Hanney S, Boaz A, Jones T, Soper B. Engagement in research: an innovative three-stage review of the benefits for health-care performance. Health Serv Deliv Res 2013; 1(8)

6. Downing A, Morris EJ, Corrigan N, et al. High hospital research participation and improved colorectal cancer survival outcomes: a population-based study. Gut 2017; 66: 89-96.

7. Harding K, Lynch L, Porter J, et al. Organisational benefits of a strong research culture in a health service: a systematic review. Aust Health Rev 2017; 41(1):45-53.

8. Council for Clinical Certification in Audiology and Speech-Language Pathology of the American Speech-Language-Hearing Association. (2013). 2014 Standards for the Certificate of Clinical Competence in Speech-Language Pathology. Retrieved [November 2017] from http://www.asha.org/Certification/2014-Speech-Language-Pathology-Certification-Standards/.

9. HEE. Developing a flexible workforce that embraces research and innovation: Research and Innovation Strategy. London: Health Education England, 2016.

10. Pickstone, C., Nancarrow, S., Cooke, J. et al. Building research capacity in the allied health professions. Evid Policy. 2008; 4(1):53–68.

11. Wenke RJ, Mickan S, Bisset L. A cross sectional observational study of research activity of allied health teams: is there a link with self-reported success, motivators and barriers to undertaking research? BMC Health Serv Res 2017; 17:114

12. Nursing and Midwifery Council .Standards for Pre-registration Nursing Education. London, UK, 2010.

13. SPA (2017) Competency-based Occupational Standards for Speech Pathologists: Entry Level. Melbourne, Australia: The Speech Pathology Association of Australia Limited. Retrieved [November 2017] from:

https://www.speechpathologyaustralia.org.au/spaweb/Document_Management/Public/CBOS.aspx

14. CORU (2014). Speech and Language Therapist Registration Board: Criteria and Standards of Proficiency for Education and Training. Dublin: CORU. Retrieved [November 2017] from

http://coru.ie/uploads/documents/SLT_CSoP_Final_MF_reform_21_02_14_(2).pdf

15. Health and Care Professions Council. Standards of Proficiency: Speech and Language Therapists. London: Health and Care Professions Council, 2013.

16. HCPC. Standards of education and training. London: Health and Care Professions Council, 2014.

17. Whelan K, Copeland E, Oladitan L, Murrells T, Gandy J. Development and Validation of a Questionnaire to Measure Research Involvement among Registered Dietitians, J Acad Nutr Diet 2013; 113 (4), 563-568

18. Whitworth A, Haining S, Stringer H. Enhancing research capacity across healthcare and higher education sectors: development and evaluation of an integrated model. BMC Health Serv Res 2012; 12:287-297.

19. Peterson G, Jackson SL, Fitzmaurice KD, Gee PR. Attitudes of Australian pharmacists towards practice based research. J Clin Pharm Ther. 2009; 34: 397–405.

20. Pager S, Holden L, Golenko X. Motivators, enablers, and barriers to building allied health research capacity. J Multidiscip Health 2012; 5: 53–9.

21. McMaster R, Jammali-Blasi A, Andersson-Noorgard K, Cooper K, McInnes E. Research involvement, support needs, and factors affecting research participation: a survey of Mental Health Consultation Liaison Nurses. Int J Ment Health Nurs. 2013; 22(2): 154–61.

22. Stewart D, Al Hail M, Abdul Rouf P.V. et al. Building hospital pharmacy practice research capacity in Qatar: a cross-sectional survey of hospital pharmacists. Int J Clin Pharmacy 2015; 37 (3): 511-521.

23. Finch E, Cornwell P, Ward E C, McPhail, S M. Factors influencing research engagement: research interest, confidence and experience in an Australian speech-language pathology workforce. BMC Health Serv Res 2013; 13:144.

24. Finch E, Cornwell P, Nalder E, Ward E. Uncovering motivators and stumbling blocks: Exploring the clinical research experiences of speech-language pathologists. Int J Speech-Lang Pathol 2015; 17:2, 138-147.

25. Brown CE, Kim SC, Stichler JF, Fields W. Predictors of knowledge, attitudes, use of future of evidence-based practice among baccalaureate nursing students at two universities. Nurse Educ. Today 2010; 30: 521-527

26. Zipoli R P, Kennedy M. Evidence-Based Practice Among Speech-Language Pathologists: Attitudes, Utilization, and Barriers. Am J Speech - Lang Pathol 2005; 14 (3): 208.

27. Jette D, Bacon K, Batty C et al. Evidence-based practice: Beliefs, attitudes, knowledge, and behaviors of physical therapists. Phys Ther 2003; 83(9): 786–805.

28. Dysart AM, Tomlin GS. Factors related to evidence-based practice among U.S. occupational therapy clinicians. Am J Occup Ther 2002; 56: 275–284.

29. McCluskey A. Occupational therapists report a low level of knowledge, skill and involvement in evidence-based practice. Aust Occup Ther J 2003; 50(3–12): 16.

30. Forsman H, Wallin L, Gustavsson P, Rudman A. Nursing students' intentions to use research as a predictor of use one year post graduation: A prospective study. Int J Nurs Stud 2012; 49 (9): 1155-1164.

31. Spek, B., Wieringa-de Waard, M., Lucas, C. and van Dijk, N. Teaching evidence-based practice (EBP) to speech–language therapy students: are students competent and confident EBP users. Int J Lang Comm Dis 2013; 48 (4): 444–452

32. Hodgkinson, P. Curriculum guidelines and NQP framework: we're all responsible for the future of the profession. Bulletin of the Royal College of Speech and Language Therapists, July, 2017

33. IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp

34. Badger, F.J., Daly, W., Clifford, C. Educating tomorrow's clinical researchers: A review of research preparation in undergraduate education. Nurse Educ. Today 2012; 32: 737-743.

35. Florin, J., Ehrenberg, A., Wallin, L. Gustavsson, P. Educational support for research utilization and capability beliefs regarding evidence-based practice skills: a national survey of senior nursing students. Journal Ad Nurs 2012; 68: 888–897.

36. Peckover S, Winterburn S. Teaching research to undergraduate community nursing students: reflections upon curriculum design. Nurse Educ. Pract 2003; 3: 104-111.

37. Bangera, S., Pagnamenta, E., Wallinger, J;,Joffe, V.L. Exploring Speech and Language Therapists' Understanding And Use of Research and Evidence Based Practice in Routine Clinical Work In The UK. In preparation.

38. Raghavendra, P. Teaching evidence-based practice in a problem-based learning course in speech-language pathology. Evidence-Based Communication Assessment and Intervention 2009; 3 (4); 232-237

39. McCabe, P., Purcell, A., Baker E., Madill, C., Trembath, C. Case-based learning: One route to evidence-based practice, Evidence-Based Communication Assessment and Intervention 2009; 3 (4): 208-219

40. Togher, L., Yiannoukas, C., Lincoln, M. et al. Evidence-based practice in speech-language pathology curricula: A scoping study, Int J Speech-Lang Path 2011; 13(6); 459-468.

41. Dougherty, C.M., Burrowes, J.D., Hand R.K. Why Registered Dietitian Nutritionists Are Not Doing Research - Perceptions, Barriers, and Participation in Research from the Academy's Dietetics Practice-Based Research Network Needs Assessment Survey. J Acad Nutr Diet. 2015; 115 (6): 1001-7.

42. Brancati FL, Mead LA, Levine DM, Martin D, Margolis S, Klag MJ. Early Predictors of Career Achievement in Academic Medicine. JAMA 1992; 267(10):1372-1376.

43. Vallino-Napoli LD, Reilly S. Evidence-based healthcare: A survey of speech pathology practice. Adv Speech Lang Pathol 2004: 6(2):107–112.

44. Harrison JA, Brady AM, Kulinskaya E. The involvement, understanding and attitudes of dietitians towards research and audit. J Hum Nutr Diet 2001; 14: 319-330.

45. Healey, M., Jordan, F., Pell, B. Short, C. The research-teaching nexus: a case study of students' awareness, experiences and perceptions of research. Innov Ed Teach Int 2010; 47 (2), 235-246.

46. Whelan K. Knowledge and skills to encourage comprehensive research involvement among dietitians. J Hum Nutr Diet. 2007; 20(4): 291-293.

47. Allen, P. J., & Baughman, F. D. Active Learning in Research Methods Classes Is Associated with Higher Knowledge and Confidence, Though not Evaluations or Satisfaction. Front Psychol 2016; 7: 279.

48. QAA (2008). The Framework for Higher Education Qualifications in England, Wales and Northern Ireland.

49. CAHPR (2016). Council for Allied Health Professions Research position statement: Developing research skills within AHP pre-registration education. Retrieved [November 2017] from: http://cahpr.csp.org.uk/documents/cahpr-position-statement

Appendix I : The Survey

1. Which best applies to your course?

• Undergraduate pre-registration

• Postgraduate pre-registration

• Both

2. How many hours are given to research training across your course?

• Less than or equal to 5 hours

• 6 and 10 hours

• 11 to 15 hours

• 16 to 20 hours

• 21 to 30 hours

• 30 or more

3. How many modules are devoted to research training across the course?

4. How many credits make up the research training on your course?

5. What year/s of study do you teach research (tick all that apply)?

• First

• Second

• Third

• Fourth

6. Who carries out the majority of your research training?

• In-house staff

• External staff

7. Which of the following best describe the person/s responsible for the teaching of research?

• SLT lecturer

• Psychology lecturer

- Statistician

- Other (please specify)

8. What is included in your research teaching (tick all that apply)?

- Finding relevant literature

- Critically reviewing literature

- Systematic review

- Generating research ideas

- Carrying out a service evaluation or audit

- Carrying out an empirical research project

- Writing a research proposal

- Levels of evidence

- Quantitative research methods

- Qualitative research methods

- Mixed methods

- Outcome measures

- Data collection

- Data input, and entry

- Data analysis and interpretation

- Writing and presenting a research report

- Application of research to clinical practice

- Impact of research

- Ethics

- Other / further comments

9. Briefly outline the areas covered under quantitative methods:

10. Briefly outline the areas covered under qualitative methods:

11. Do you teach your students to use statistical software?

- Yes

- No

12. Which statistical software do you teach students to use (select all that apply)?

- Minitab

- SPSS

- SAS

- STATA

- Other (please specify)

13. Which of the following best describes the final year project that your students complete?

- A final year empirical research project

- A final year systematic review

- A final year research proposal

- Other / further comments

14. Is research and EBP covered in other areas of the course?

- Yes

- No

- If yes, please give details:

15. What do you feel about the amount of teaching that is currently provided on research?

- Too much

- About right

- Too little

- Comments

16. How confident do you think your students are across the following levels of research activity on graduating?

- Research aware: Not at all confident / A little confident / Confident / Very confident

- Research active: Not at all confident / A little confident / Confident / Very confident

- Leading research: Not at all confident / A little confident / Confident / Very confident

- Comments:

17. What strategies/practices do you employ to support students in their understanding of research and

Evidence-based practice?

Supplementary questions for postgraduate courses only

1. Do you offer a pre-registration postgraduate diploma in SLT?

•	Yes

•	No

2. Do students have the option of converting their diploma to a Masters via a dissertation?

•	Yes

•	No

3. What type of dissertation do converting diploma students typically complete?

•	A final year empirical research project

•	A final year systematic review

•	A final year research proposal

•	Other/further comments

4. Approximately what percentage of students per year undertake this conversion?

Figure legends

Figure 1: Content of research teaching provided by undergraduate and postgraduate speech and language therapy programmes

Figure 2. Perceived confidence of pre-registration students at the point of graduation in research awareness, active research and leading research