

**Sheffield
Hallam
University**

**RESEARCH-
INFORMED
TEACHING
TOOLKIT**



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Research-Informed Teaching Toolkit

The Research-Informed Teaching Toolkit is hosted online as part of Sheffield Hallam University's Hallam Model and Teaching Essentials website. Students and University staff from Sport, Nursing, Midwifery, Biosciences and Chemistry were involved in the creation of this toolkit. This toolkit is most relevant for those looking to embed research-informed teaching in their practice.

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Section 1: Overview

Research-informed teaching is a term used to describe the different ways in which students are exposed to research content and activities during their time at university. Depending on your discipline this could also be called practice-informed teaching. Linking research and teaching by research-informed teaching benefits our students by:

- providing students with meaningful and deep learning experiences.
- enhancing the student experience of real-world practice and cutting-edge thinking.
- developing critical thinking.
- improving student confidence.
- enhancing employability.
- developing digital and networking skills.
- increasing the profile of undergraduate research.

Research involvement gives authenticity to students' learning and provides experiences of current techniques and how current knowledge is expanded.

Curriculum Design Principles

A four-year body of research involving over 600 students from across the university has been used to draw together the following five key Curriculum Design Principles to embed research and practice into teaching.

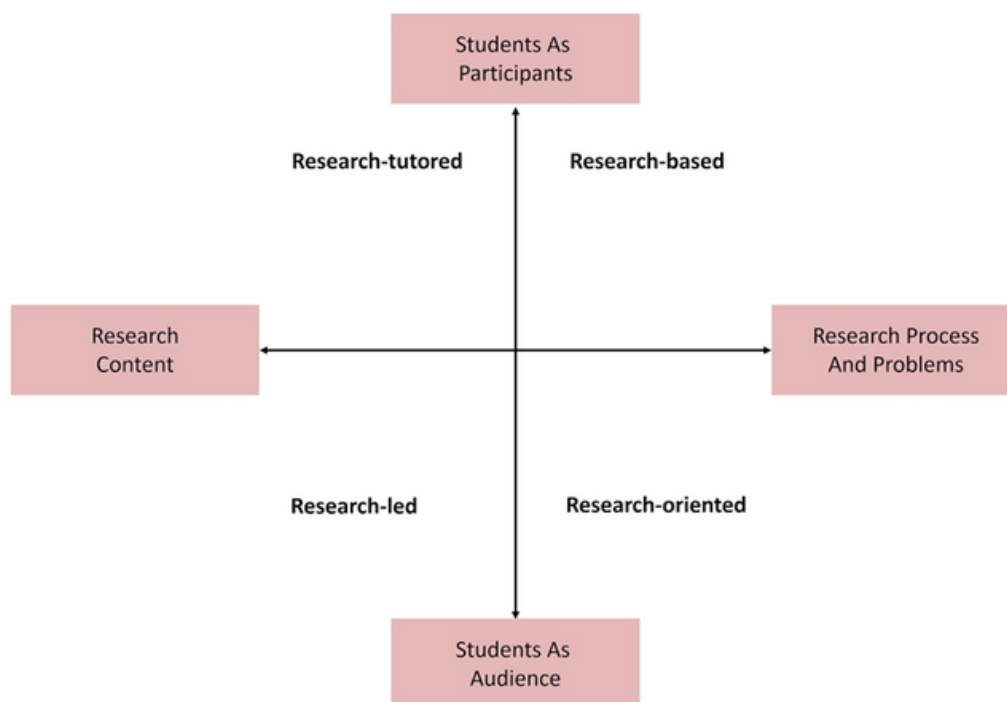
- 1) Embed research and practice skills at course level and develop them through the course. Moving students from consumers of research and best practice to creators of research and best practice.
- 2) Academic research and practice can form the basis of taught content and be used as direct examples of applied knowledge.
- 3) Accessing research literature is a high-level skill and requires scaffolding.
- 4) Research and practice skills should be taught in context and task linked.
- 5) Research undertaken by the students should be co-created, with students involved in the design process.

Section 2: What is Research-Informed Teaching?

Linking teaching, research and applied practice in higher education is a goal of many academic institutions, and there is a sector-wide expectation that academics should be both active researchers and effective teachers. The Hallam Model sets out expectations around the student experience. These are:

- Engage: Learning engages with the world beyond the University.
- Challenge: Learning is intellectually stretching.
- Collaborate: Learning with, from and alongside others.
- Thrive: Learning enables students to thrive personally, culturally and professionally.

Each of these principles can be addressed through research-informed teaching.



Research-tutored: Students and lecturers engage in critical discussions about the research process and outputs.

Research-based: The curriculum is designed so that students learn through activities that contribute to departmental research projects, simultaneously learning for themselves and progressing live projects.

Research-led: Existing research underpins curriculum content. This might be our own research findings or the research outputs of others.

Research-oriented: The process of asking questions and applying the scientific method to answering them. Students should recognise and apply research methods to solve issues in their disciplinary and professional context.

Pedagogical Theory

Research can be defined as the act of novel investigation leading to the generation of new knowledge. Typically, academic research outputs are expected to be peer-reviewed articles, books and publications. Research-informed teaching practices integrate the process of undertaking this research and practices as well as existing research into teaching. In terms of pedagogy, Griffith (2004) and Healey (2005) define the links between teaching and research through the following matrix. The matrix first described by Healey (2005) gives a visual representation of the four different teaching modes that can be used to describe how a degree course is designed and delivered. One axis relates to whether course delivery has a greater emphasis on either passive or active learning. The other axis relates to whether course delivery has a greater emphasis on teaching established subject knowledge or teaching research processes and problem-solving.

Ideally during a course of study students will experience each of the different sections of the matrix. Healey and Jenkins (2009) argue that getting students to participate in these activities using active learning rather than didactic pedagogies will create engaged and meaningful learning experiences.

Section 3: How do students perceive research?

These observations are drawn from a cross-discipline survey of over 400 students participating in questionnaires and focus group conversations within the College of Health, Wellbeing & Life Sciences between 2019 and 2021.

Headline Statements

- Research and applied practice are important to students as it demonstrates that their teaching is current.
- It is important that academics conduct research as it keeps the teaching up to date and interesting.
- Research being undertaken is not a driver for enrolment.
- Prior to study, students have had little exposure to research.
- Students would like to be more involved in active research where possible and do not feel part of the research or best practice community.
- Exposure to current theory and research gives students confidence in practice situations. However, research outputs can be made more accessible to students.

Methodology

Online questionnaires targeted towards students and academic staff members were used to collect data around research and evidence-based teaching. The research questionnaires were adapted from an original design by Healey (2005) to suit the requirements of a cross-College study and gained 418 responses from all undergraduate students in the department of Biosciences and Chemistry, Department of Nursing and Midwifery and the Academy of Sport. To gain a deeper understanding of the analysed data, we followed up the questionnaire with focus groups held in the departments of Nursing and Midwifery, Biosciences and Chemistry, and Sport and Physical Activity. Thematic analysis was used to identify and report on patterns within the focus group transcripts whilst maintaining the rich detail of the qualitative data.

Key themes elicited from the surveys and focus group data

Student understanding of research is an emergent property. Students in the early years of study at university have very little knowledge or exposure to research. As students move through their degrees their understanding of research and research skills develops through practice.

Student Quote: "It's like an emergence of awareness about what it's all about the more you're going through the process." [Bioscience]

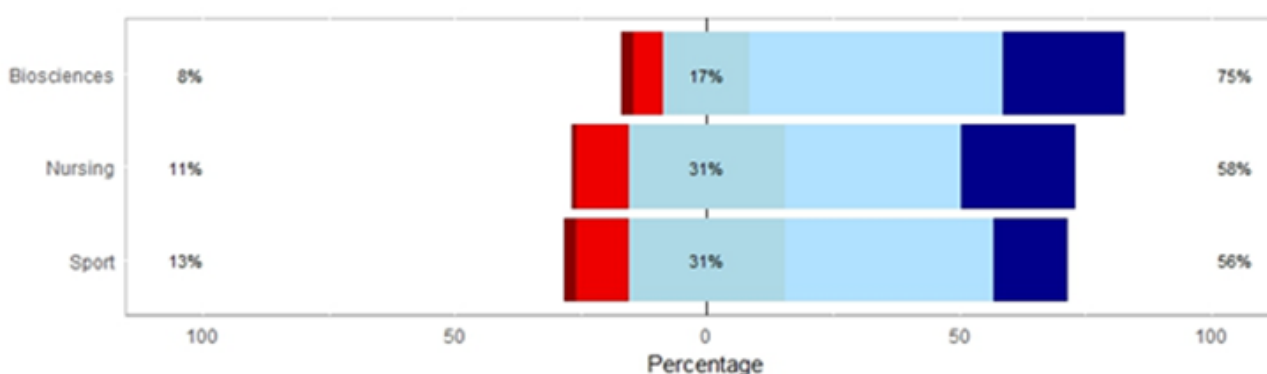
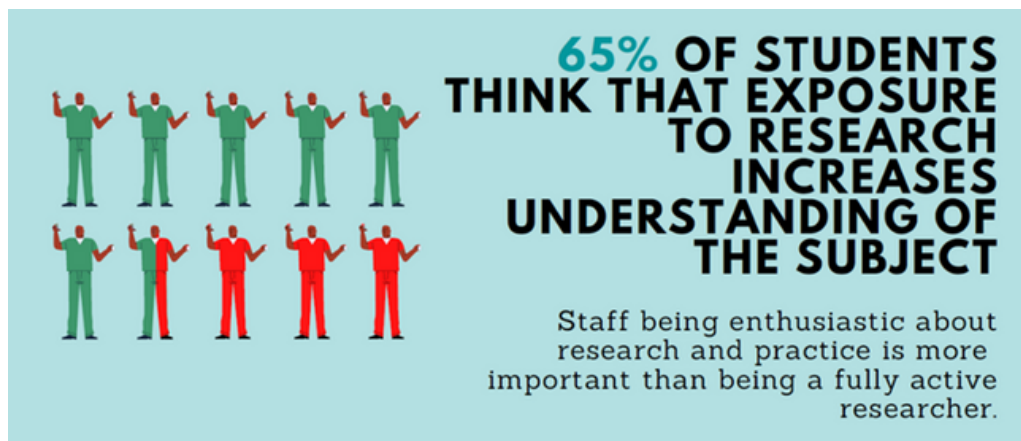
Student Quote: "I don't think I grasped the importance of research until my final year." [Sport]

Students value staff involvement in research. Research and evidence-based practice are essential to students as it demonstrates that the teaching is current. All students value staff involvement in research and report that it aids in their learning. Focus group data highlights that staff being enthusiastic about research would mean they have more knowledge of the subject area and they would be passionate about what they were teaching.

Student Quote: "I think it's important to be taught by lecturers involved in research."

Student Quote: "If lecturers haven't done research, they're just interpreting information rather than having the experience, you want them to be passionate about the topic they're teaching you rather than just reading from slides, relaying the information."

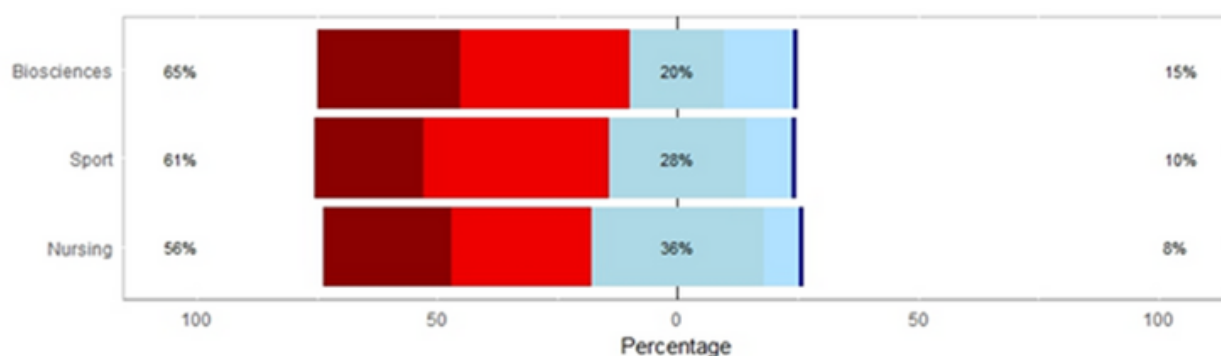
Student Quote: "Academics need to be up to date need evidence to practice nursing"
[Focus group]



Question: How important to you is it that those who teach you are involved in research or consultancy? [Likert Scale - 1 Not at all important (dark red) to 5 Very important (dark blue)]. Biosciences n = 204, Nursing n = 97, Sport n = 116.

Research is not a driver for recruitment. Undergraduates are unaware of the research undertaken in the College before starting the course and research activity is not a strong driver for recruitment. Many students commented that it was the course design and the interactions with staff at open days that made them apply.

Student Quote: "I didn't know much about the academic side before I applied, I looked more at the course structure." [Focus group]



Question: The research undertaken in my Department/Research Centre had? [Likert Scale - 1 No influence on my decision to study at SHU (dark red) to 5 a very strong influence on my decision to study at SHU (dark blue)].

Biosciences n = 204, Nursing n = 97, Sport n = 116.

Research enriches learning. Students felt that it was important that they were taught by lecturers involved in research. Exposure to research was felt by the students to increase understanding of the subject material. Research-informed teaching was not deemed to improve problem-solving abilities in first-year cohorts however this link was seen with final year students. This reflects the student experiences at the point of asking. First year students have typically experienced research in a passive manner (in that they hear about research but do not do it). Final year students are more actively involved, through projects and other work.

	Sport	Nursing	Biosciences
Increased my understanding of the subject	69%	58%	66%
Contributed to the development of my research/consultancy related skills	44%	53%	39%
Improved my problem-solving abilities	29%	35%	36%

Question: What impact, if any, has your exposure to the research and/or consultancy in your course, Department or Research Centre had on your learning? [Check all that apply]. Biosciences n = 204, Nursing n = 97, Sport n = 116.

RESEARCH AND APPLIED PRACTICE ARE IMPORTANT TO STUDENTS

"it shows that the knowledge is up to date and relevant"
LS Sports Student Quote

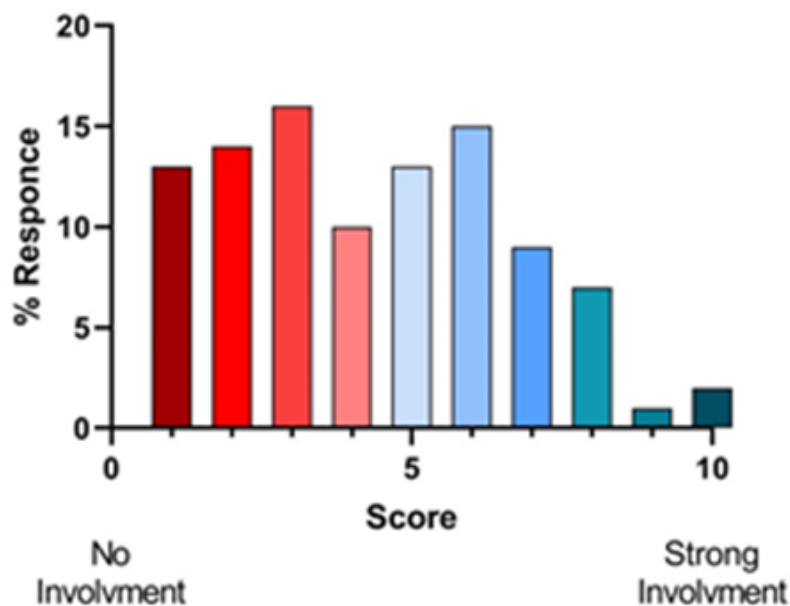


89%

of students think its important that those who teach are involved in research or practice

Students do not feel part of a research community. Students are aware that staff undertake research or are actively involved in discipline specific research and practice but do not feel a part of those communities. The vast majority said they would like to have been more involved in through their course if they had the opportunity.

Student Quote: "Through our projects I feel more involved in research I know with my project tutor what I am doing is relevant to their research so I do feel like I am helping towards something, it would be nice if we could experience that throughout the course."



Question: Do you feel part of a research community. Scale from 1 (no involvement) to 10 (strong involvement). Biosciences n = 204, Nursing n = 97, Sport n = 116.

Importance of research-informed teaching from a staff perspective. Over 30 members of academic staff from the College of Health, Wellbeing & Life Sciences were interviewed to gain a working perspective of the importance of research-informed teaching. Clear links to employability skills and research skills were highlighted alongside the development of evidence informed practices.

Content - provides context and applied nature of a course, move away from learning facts to critical thinking. Gives a unique experience to the student.

Course – RIT helps students develop evidence-based practice, apply their knowledge and develop an inquiring mind.

Engagement - bring in that element of interest to keep students engaged, enthusiasm to learn more and giving an awareness that learning can be furthered.

Future Career – highlights potential career options, exposure to cutting edge ideas, technology, and practice. Placements give students soft skills that employers want. Gives students an insight into how to deal with and think about evidence.

Student Quote: "Research skills are prime employability skills"

Critical thinking – how to think and analyse data and recognise good quality information, how to develop questions. Using evidence to inform practice. To be able to appreciate alternative interpretations and viewpoints and form one's own opinion.

Practitioners view research differently. Within nursing and the allied health professions, there is a perceived disconnect between research and practice and the two are seen as distinct activities. It is recognised that evidence-informed practice comes from a research base and informs guidance. There is an inherent trust in the system that this is done correctly and robustly. For the individual, there is a clear recognition that practice is based on robust research, but the practitioner is not inherently involved in that research, for example, those interventions like vaccinations.

Student Perspective. Students perceive research to primarily occur at a high level, through multi-site clinical trials and large-scale national studies. There is an expectation that staff are involved in these large clinical trials when, they are more likely to be involved in professional behaviour and values, to enhance care. Most have not experienced research directly.

Students recognise that practice is often research based with evidence informed guidance coming from agencies such as the National Institute for Health and Care Excellence (NICE). It is not seen as the role of the practitioner to write this guidance. There is also a theory practice gap, and it is unclear to the students how one directly relates to the other. The applied nature then is to understand and implement the guidance. Students report that they are unaware of the research undertaken in the discipline.

Staff Perspective. From an academic or practitioner point of view research practices are often seen to occur at a local level with activities around a service enhancement or care delivery on a ward or department. An understanding of research skills is required to be built into the students such that they can use research to aid in practice in each of the service groups. The ethos is to train practitioners to identify a problem or issue and know how to do address it based on evidence or the collection of evidence.

Section 4: Barriers

What are the barriers to undergraduate interactions with research in the curriculum?

Methodology

Following the themes identified by the staff interviews, focus groups were conducted in the Departments of Bioscience & Chemistry, Sport and Physical Activity, and Nursing and Midwifery. Seven focus groups were held in total with students from across all levels being involved (Biosciences: 2 focus groups with 6 students in each, Sport: 2 focus groups with 5 students in each, Nursing & Midwifery: 3 focus groups with 2 students in each). The focus groups were staff-led and followed a set template. Transcripts were created and thematically analysed.

Skills

Students expressed that they don't feel they have the skills to conduct research and would be more confident later in career to 'step up', when they know what areas they want to specialise in. They feel like they would need lots of experience before conducting research. Staff also expressed the opinion that students often lacked research skills particularly around data manipulation that often forms the core of research outputs.

Student Quote: "Shadowing would be really good we can like put it on a CV or our placement application and it would show like an employer that we actually have interest in what we're applying for"

Role Models

Lack of role models or people who are or have conducted research was seen as a barrier. This lack of role models was particularly seen in clinical research and in staff that the students can directly relate to. Access to academics to conduct and talk about research was also seen as a barrier.

Student Quote: "I don't feel any academics think they're too important to reply they are usually just busy."

Student Quote: "For me doing research is about improving the care we are giving, are there better ways of providing care... making a change"

Time and capacity

Staff commented on the challenges that academics faced to engaging in research-informed teaching. These included external time pressures, such as needing to research current papers in areas where they were not necessarily the expert and unaware of current developments in the field.

Concept of research

Staff expressed the option that students did not understand the concept of research in that there is no right or wrong answer and the research itself was the generations of knowledge. Research was seen as scary due to the lack of a definitive right answer.
Language

Students state that they are unable to interact with research literature due to the complex discipline specific language that is used in research publications. From the staff point of view this was voiced as a lack of fundamental knowledge required to understand core concepts.

Student Quote: "I am not the fastest of learners and it takes me a significant amount of time to understand things"

Student Quote: "Sometimes you'll see a topic you're like I don't know what the words in this mean"

Student Quote: "I was clicking on articles I didn't have a clue what half the words meant"

Searching

Finding information with databases is a skill that needs to be developed within students. Many are unaware of the availability of databases and then how to search them for key information. Staff also identified literature searching as a key missing skill.

Student Quote: "In my case it was where to find things. I only really had experience of using google scholar and I didn't have the necessary skills or knowledge to find things."

Student Quote: "It took me a while to figure out where the filter even though it's like just on the left-hand side"

Writing

Knowing what is required within academic research outputs is a key skill and often as set rules around creation and presentation that the students are unaware of. Statements around not knowing what was expected in a research output or how to construct one, formed a major theme. The ability to assess information for its inherent value and critically against other information is felt as a barrier.

Student Quote: "We have never really been taught what a literature review is"

Access.

Outside of placements there is little opportunity to experience research directly. Students note that final year projects and dissertations do however give the opportunity to put learning into practice. Staff note that students seem less willing to undertake placements and hence gain the experience that they need.

Student Quote: "If you don't want a placement year then there's like not much help to try and get experience anywhere else"

Student Quote: "I'd probably really benefit from that and being able to sort of either shadow or take part in some research in first year"

Student Quote: "I think its confidence of being involved in projects and gaining transferable teamwork and communication skills."

Section 5: Enablers

What are the enablers to undergraduate interactions with research in the curriculum?

Methodology

Following the themes identified by the staff interviews, focus groups were conducted in the Departments of Bioscience & Chemistry, Sport and Nursing and Midwifery. Seven focus groups were held in total with students from across all levels being involved (Bioscience 2 x 6 students, Sport 2 x 5 students, Nursing & Midwifery 3 x 2 students).

The focus groups were staff led and followed a set template. Transcripts were created and thematically analysed.

Introductions

Introductions to the research area of the academics. Students on arrival are generally unaware of the research and practice areas of the academics. Spending a short amount of time when students first meet the staff to engage with them about the research and practice being conducted by the lecturer increases awareness and familiarity with research.

Student Quote: "When you first get to meet a lecturer and they're first coming in to like teach you something on a module and they have like a little introductory slide."

Context

Research outputs and skills were seen as abstract entities and concepts by the students. The link to application and the students' own learning and developing skillset was not clear to the participants. Teaching research skills in a context whereby they are embedded as part of assessments, or the learning content was seen to be good practice and enabled students to see the direct application to their learning and career.

Link teaching to research

Linking teaching content to current research. Students being able to "see" directly where the teaching content is applied in research and practice helps bridge the gap between theory and research.

Student Quote: "A few examples but in the real world we didn't really know the true application of how it's being used"

Co-creation

Co-creation of research ideas and projects. When students are involved in the creation of a research question or the direction of the research, they feel more involved and engaged. This can take the form of determining their own essay titles to complete design of the research project.

Student Quote: "I've already had like a little taste of like working on like a publication and it's really cool and so it's something I definitely want to continue doing."

Student Quote: "In terms of skills, I think its confidence of being involved in projects and gaining transferable teamwork and communication skills."

Experience

Short time limited experiences (hours, days), summer studentships and placements can all be used to enable students to experience research. Setting tasks that allow the students to address a research question as part of the planned delivery. Students would also like opportunities for face to face or scheduled lessons explaining how to get into research and ways to develop career aspects.

Student Quote: "During my first year we had a fieldtrip to Aintree Racecourse where we had to design a survey and collect data from local businesses to understand what the impact of an event at Aintree is on these local businesses."

Pitching

Pitching the content at the level of the student and presenting the research in a way that is accessible to their current level of understanding. Lay descriptions are good examples of this and can be used to make research accessible. These could be written, verbal or video and presented to the students on the blackboard site, newsletters, or seminars.

Student Quote: "It's all right having the fancy words but if someone could just talk about your research you say this is the science version and this is the basic kind of gist of what I'm doing and you can understand it a bit better"

Student Quote: "If there was some form newsletter or something like that you could go and have like an extra zoom lecture just something that we can get involved and understand what's actually going, that would definitely make it more accessible."

Section 6: Skills

The involvement of students in research leads to the development of a wide range of skill sets in the student cohorts.

Research-Specific Skills

Research skills refer to an individual's ability to find and evaluate useful information related to a specific topic. These skills include performing investigations, analysing, and forming hypotheses or solutions to a particular issue.

Hypothesis generation. Taking what is known and making an educated guess about what will happen in a given situation. It helps the students apply what they have learned to come up with new ideas.

Data analysis (quantitative and qualitative). The ability to handle often numerical data to quantify a problem, or address the "what" or "how many" aspects of a research question. Qualitative data describes qualities, characteristics or opinions. Collected using questionnaires, interviews, or observation, and frequently appears in narrative form.

Statistics. Students are often required to carry out analysis and interpretation of data explaining the outcomes and gaining meaningful insight from data. The ability to understand statistics is a transferable skill as they are used to understand many aspects of life and inform the decision-making process.

Literature searching. Search and evaluation of the available literature in a given subject area. Demonstrating an understanding of the literature review justifies the value of doing research on a given topic by showing what is already known, what is yet to be learned and the relevance of work.

Employability Skills

Research skills are valued by employers in various industries and are beneficial to employees in all types of positions. Many employers value research skills in their employees, especially when it comes to research-oriented positions such as those in analysis and data management.

Teamwork In the research process, there is nothing wrong with comparing your findings with fellow researchers. Combining different results and listening to different points of view make it likely that your final output will be fully developed and useful.

Confidence Undertaking research can build confidence in the ability to apply subject knowledge and as an individual through the tangible demonstration of a skill set.

Project Planning / Time management skills are essential when researching as they require the individual to break down tasks into more manageable parts and effectively tackle each piece.

Communication A crucial element of the research process is preparing a detailed report. This requires excellent writing, presentation and compilation skills. Researchers must identify what information to put in a report depending on the target audience.

Transferable Skills

Many of the skills already mentioned are transferable to different situations but a few stand out as key.

Critical thinking is a self-directed process that involves using observation and deductive reasoning to analyse information and reach conclusions. The ability to think critically allows the individual to question the validity of the information presented to them in an unbiased manner and allows informed choices to be made. It is a core graduate attribute.

Networking To be effective in research - knowledge and support is required from a range of places. The student's ability to network and make connections with others is developed to foster the exchange of information and ideas among people with a common profession or special interest.

Section 7: Ideas for RIT

Embedding research in your teaching?

Some of these examples have come from the excellent 7 Steps to: Linking research and teaching (Winter 2019).

Talk about your research or practice and use it as content.

In all the focus groups and open text responses students highlighted that hearing academics talk about (their own or others) research and practice demonstrate that the content was current, relevant, and applied. From the student's point of view, they are hearing about current and evolving information, from the academic's point of view we get to speak on our interest.

Student Quote: "Knowing that the lecturers are doing their own research means that we're keeping up to date with what's being used in the current world"

Student Quote: "Having real life examples of research that has happened in a commercial setting or academic setting makes it easier for us to learn about various topics and gives us something to add to our work."

When taught with enthusiasm and passion students also reported that it made the content more exciting and interesting to be part of even if it's not your own direct research or practice.

Student Quote: "I love it when she's teaching because of how passionate she is she was showing us a video on YouTube about inside the cell and I've never seen anything like it she was just beaming it was lovely to see"

Student Quote: "One of my lecturers worked with Hawkeye on the goal-line technology in football and it is great because you appreciate the expertise within the department, and it gives you inspiration"

What can you do? Information from research articles or your own practice can be used to illustrate the theory that is being taught. Data sets from your own research or generated by the students can be used to practice research skills and analysis.

Teach research and practice skills in context.

Students can find learning how to use research methods difficult when data is separated from content. The exercise is perceived as technical with the relevance for their future employment being lost (MacInnes, 2012). Linking research skills and teaching them context helps students engage and understand the research process. It can facilitate the critiquing of research outputs and is an important vehicle in the development of critical thinking.

What can you do? Use current research questions and real data to increase perceived relevance to students. Introduce real life scenarios and ask students to propose and critique research questions to develop an understanding of what constitutes an effective question. Getting students to collect small amounts of data themselves and involving them in current research projects by providing data you have collected for them to analyse or develop longitudinal data sets that students add to each year.

Demonstrate links to current practice and applications.

Research can often be seen as abstract and unconnected to applications in the workplace or society at large. Equally methods, theory and ideas can be observed in isolation of the application they support or the research that draws on them.

Student Quote: "Hearing guest speakers helped put the learning into context."

Student Quote: "I think understanding what research has been done and how can we take this on is really important."

What can you do? When delivering core concepts follow up with how these ideas or theory is used in research and what the final applications maybe. This can be done through discussion in tutorials and seminars, at the start and end of a taught session or by providing further material on the VLE.

Use lay descriptions.

Students often struggle with the complex language used in research outputs. Typically, papers are written by experts for other experts to read. Especially at the early stages of learning students do not have the understanding and vocabulary to get the most out of research outputs. Interaction with the public and communication of your research is now a key skill. Many grant applications and media outlets ask for description for a lay audience, these can be shared with the students to help them understand the research process.

Student Quote: "Directing people to knowing the background and the papers of the lecturers and having those accessible is a good thing"

What can you do? When you next publish a paper or practical guidance, write a lay description to share with your students. You can even blog these as a way of disseminating your own work more widely. As part of an assessment task, ask students to write the lay descriptions for research output. The ability to describe complex work simply without losing meaning is a key employability skill.

Enable your students to find and access research literature.

Students often struggle to find and then interpret relevant articles. Spending time covering Boolean logic functions (AND, OR, NOT) and the merits of different databases can help students access literature. Time within seminars and tutorials can be used to search for relevant information as a group. This works especially well when the literature searching is linked to an assessment task. You can also ask students to rank the validity or value of different data sources as means of critically evaluating information.

Student Quote: "Clearer guidance on where to find outputs and potentially an output or resource bank for research done by SHU staff / research centres would be excellent because then we know where to look"

Student Quote: "I think it would have been a lot more useful if we've just been like in a computer room and then been told oh try and find papers on this topic and to pick out keywords and then search through it."

What can you do? Structured worksheets or proformas can be used to help students think critically about the content

Emma Finney has created several resources through the learning centre that enable students to search and critic relevant research literature.

Including the library resource (Sheffield Hallam University, 2023a), Referencing – Assessment Essentials (Sheffield Hallam University, 2023b) and Teaching toolkits have been updated to reflect APA 7 (Sheffield Hallam University 2023c).

Katherine Hubbard from the University of Hull has written extensively on enabling undergraduate students to access research literature (Hubbard 2017, Hubbard 2021).

Build research skills early.

The sooner and more frequently students are exposed to research-based experiences, the more they can contribute and feel part of a research community (Walkington, 2015). Inquiry, problem, project and team-based teaching approaches are all examples of teaching methods that enable students to practice research skills.

What can you do? By embedding research skills throughout the degree you can help prepare your students for their dissertation type assessment. To do this have opportunities for students to undertake inquiry-based learning throughout their degree programme and flag the research skills being used. Learning outcomes and assessments can be rewritten to include inquiry, problem-based learning, and small projects.

Link to employability.

Healey and Jenkins (2009) suggest that research skills are essential to help graduates negotiate the complexities of the 21st century: uncertainty, risk, the knowledge society, and the information economy. This is echoed by the demands of employers who want to see research skills embedded within graduate attributes. It is therefore important to make clear the links between research, teaching and employability.

What can you do? When choosing research questions to explore in class, select appropriate sector, industrial, social and environmental – based problems and make explicit the vocational and professional dimensions of the research process and outputs. Bring in external speakers and promote knowledge transfer research partnerships using student expertise.

Link to assessments.

Assessment is a key driver for student motivation, and so it is vital to develop ways of assessment that reflect and support research activity. As seen in the earlier sections, research is seen as an emergent property and the skills need to be built with time. Creating opportunities for formative and low risk assessment is a good idea to build confidence in the students (Boud and Falchikov, 2007). Assessment of research-based work varies depending on context but can include blogs, podcasts, research projects, group work, posters, peer review, briefing documents, conferences, publication in student journals and student-led seminars (Walkington, 2015).

What can you do? When designing the assessment think about the appropriate points for introducing the research skill, processes needed to complete it and what the outcome will be. Use a range of methods which promote inclusivity and employability by assessment which reflects the applied nature of the work. Build in opportunities for students to reflect on participation in research as this develops their metacognitive capacity and can express learning in cases where outcomes have failed. The Connected Curriculum resource (Fung and Carnell, 2017) gives some good theoretical and practical ideas on how to do this.

Co-creation leads to engagement and belonging.

Student Quote: “We came up with my project together and I was able to input my own ideas onto it which made me feel like even though I wasn't in the lab I was still like helping further the amount of information on a topic.”

Student Quote: “I find research enjoyable when I am passionate about the topic, I have done a research proposal and because I got to choose the topic it really interests me.”

Co-creation involves developing deeper relationships between student and teacher, and between students and other students. Education and in this case research is perceived as a shared endeavour where learning and teaching are done with students not to them (Felten et al. 2014).

What can you do? Within research- and proactive informed teaching this can take many forms. Students can be allowed to pick their own topic for literature or written assessments. They can be involved in the creation or validation of questionnaire or focus group questions. Within research projects or dissertations students can be given the lead in setting parts or even the whole research question, guided by the academic. Students can be involved in collecting data sets (or parts of data sets) that are then analysed in class.

Student Quote: "When I have engaged with research projects at SHU I have had a really good experience. I support on the data collection of a live football finance research project and because I see the point in the research, I am interested in it and I buy into it."

Section 8: References

Boud, D., & Falchikov, N. (2007). Developing assessment for informing judgment. In *Rethinking assessment in higher education* (pp. 191-207). Routledge.

Felten, P., Cook-Sather, A., & Bovill, C. (2014). *Engaging students as partners in learning and teaching: A guide for faculty*. John Wiley & Sons.

Fung, D., & Carnell, B. (2017). *UCL Connected Curriculum: Enhancing programs of study*. UCL.

Griffiths, R. (2004). Knowledge production and the research-teaching nexus: The case of the built environment disciplines. *Studies in Higher Education*, 29(6), 709-726.

Healey, M. (2005). Linking research and teaching to benefit student learning. *Journal of Geography in Higher Education*, 29(2), 183-201.

Healey, M., & Jenkins, A. (2009). *Developing undergraduate research and inquiry* (p. 152). York: Higher Education Academy.

Hubbard, K. E., & Dunbar, S. D. (2017). Perceptions of scientific research literature and strategies for reading papers depend on academic career stage. *PLoS ONE*, 12(12), e0189753. <https://doi.org/10.1371/journal.pone.0189753>

Hubbard, K. (2021). Disciplinary literacies in STEM: What do undergraduates read, how do they read it, and can we teach scientific reading more effectively? *Higher Education*

Pedagogies, 6(1), 41-65. DOI: 10.1080/23752696.2021.1882326

MacInnes, J. (2012). *Quantitative Methods Teaching in UK Higher Education: The State of the Field and How It Might Be Improved*. University of Warwick.

Sheffield Hallam University. (2023a). Library resource. Retrieved June 20, 2023, from <https://libguides.shu.ac.uk/pages/referencing>

Sheffield Hallam University. (2023b). Referencing - Assessment Essentials. Retrieved June 20, 2023, from <https://blogs.shu.ac.uk/assessmentessentials/>

Sheffield Hallam University. (2023c). Teaching toolkits have been updated to reflect APA 7. Retrieved June 20, 2023, from <https://libguides.shu.ac.uk/referencing/studentref>

Walkington, H. (2015). Students as researchers: Supporting undergraduate research in the disciplines in higher education. *The Higher Education Academy*, 1-34.

Winter, J. (2019). *7 Steps to: Linking research and teaching*, 7 Steps Series, Teaching and Learning Support (TLS), University of Plymouth.

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