Using design thinking to address challenges faced by students with special educational needs and/or disabilities in assessment within higher education assessment

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Abstract: This paper describes the development of a prototype framework to support students with special educational needs and/or disabilities (SEND) in assessment within an undergraduate physiotherapy course. Students with SEND are at high risk of not reaching their academic potential due to the lack of individualised and inclusive approaches taken to assessment design and delivery. Using a design thinking methodology, the approaches and learning from four stages of design thinking are described, including empathise, define, ideate and prototyping. A range of methods was used to understand the end user needs, including surveys, discussion, and anonymous data from the central university resources. Several ideas were generated before deciding on a final idea to move forward to the prototype phase. The identified prototype, an individualised educational plan developed using a student-centred approach, has the potential to provide an inclusive and individualised approach to assessment in education. Whilst designed for the specific programme, the framework has the potential to be embedded across a range of programmes within higher education.

Keywords: Equality, diversity, inclusion, disability, assessment, design thinking

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Background

The landscape of student demographics in higher education is evolving, marked by increasing diversity and the growing number of students with a special educational need and/ or disability (SEND) In 2021/22, over 240,000 students with a special educational need progressed to higher education in England (Office for statistics, 2023) with this number likely to be only a small reflection of the true number attending. Transformation agendas, such as widening access strategies (Education Policy Institute, 2020), have had a positive impact in supporting those who previously did not have the opportunity to or consider progressing to higher education, and the opportunity to do so.

This diversification of students has been noted within our Bachelor of Science (with Honours) Physiotherapy programme at Ulster University. A reduction in entry requirements, coupled with the operationalisation of the University strategy, People, Place and Partnership (Ulster University 2022), has led to cohorts characterised by increased diversity, in terms of their educational, personal and emotional support needs. In recent years, the overall cohort size has also increased as a direct result of workforce needs to ensure delivery of the transformation of healthcare agenda in Northern Ireland, 'Delivering Together' (Department of Health, 2017). Whilst the academic staff team is dedicated to fostering personal and professional development in students through embedding principles of inclusive education at both a modular and programme level, there remain some challenges when meeting the needs of this diverse cohort. This is not unique to our physiotherapy programme; nationally the student pool has been changing considerably over the past decade in higher educational institutions, which includes every type of disability (Paul, 2000, Pasque, et al., 2023).

It is well established that students with physical disabilities are often at a higher risk for mental health problems (Bradley, 2021). Whilst this can be attributed to several

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factors, attitudinal barriers are recognised widely as an impediment to the success of persons with disabilities (Rao, 2004). Prioritising intentional support, such as the use of the Universal Design for Learning framework (Mayer & Rose, 2000) when creating or renewing modular design and content and ensuring students are provided with a reasonable adjustment recommendation (RAR), are some strategies which can help towards ensuring those with SEND are supported in their higher education journey to meet their potential.

To initiate the review of our programme provision for students with SEND, we adopted the assessment-driving-learning pedagogical approach (Fisher, 2024) and therefore, assessment emerged as the primary area of focus. The physiotherapy programme employs a range of assessment methods to facilitate both the practical and theoretical learning content. However, anecdotal evidence from both staff and students frequently notes that the RAR in place for students with SEND is too generic and does not align to the range of assessment types in the programme. Provision of clear assessment guidance, marking criteria and rubrics, alongside formative feedback opportunities, provides some level of support; however, staff and students with SEND and staff continue to report a lack of specific provision in assessments across the programme. To address this, a design thinking approach was taken to identify potential solutions.

Design Thinking is not a new concept. First identified in the 1950s (Brown, 2008), it was introduced in computing as a theoretical approach to problem solving, focused on understanding the end user's needs. The use of this approach has been demonstrated to generate both innovative and effective solutions (Liedtka et al., 2011). The process includes five key stages; empathising with end users (empathise), defining the main problems identified by the users (define), generating ideas to address the identified problems (ideate), creating several prototypes (prototype), before testing the prototype (testing) [see figure 1]. The process is designed to be cyclical and therefore once testing occurs and feedback is gained from end users / stakeholders, the prototype is adapted before re-testing occurs

(Oliviera et al., 2021). Whilst originally used in product design, there has been a recent popularity of its use in education (Dundar, 2022).

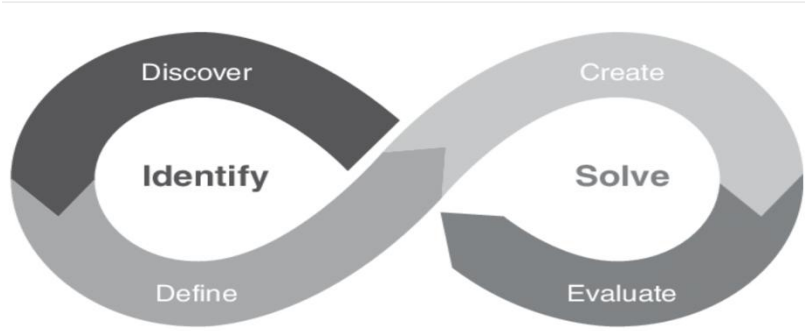

Figure 1; *Design thinking framework (Michael, 2015).*

This paper outlines a learning and enhancement project, using the first four stages of the design thinking process, to identify a suitable prototype solution to support students with SEND in assessment within the physiotherapy programme. A full evaluation of this project, including the testing of the prototype, will be described in a future paper.

Design thinking process

Stage 1; Empathise

Five sources of data were obtained for this stage. [1] Anonymous data obtained from student registration and school officers in January 2024, to provide an understanding of student and staff demographics. [2] An anonymous survey was sent to all students to understand their experiences of assessment in relation to their SEND (see appendix 1). [3] Discussions with three students with SEND, [4] An anonymous staff survey sent to all academic staff within the physiotherapy programme, to understand their experiences of RAR and supporting students with SEND within different

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assessment types (see appendix 2). [5] Anonymous data from student wellbeing to identify the support needs requested by the end users, physiotherapy students.

The empathise stage outlined several key learning points fostering a better understanding of end users and their context. The first source (student records / school officer information) outlined that the physiotherapy programme is guided by a team of 14 staff, 50% of whom have been in academia for less than 18 months. A recent move of campus, coupled with retirements, has resulted in a higher than usual staff turnover. The programme currently has 263 students enrolled across three cohorts (levels 4/5/6), with many students being female (66%) and aged between 18-24 (84%). In 2024, 31 students had a reasonable adjustment recommendation (RAR) in situ; this has risen by over 50% since 2014. There were eight assessment types used across the three levels of learning, including written assignments, Objective Structured Clinical Examination (OSCE), live interviews and multimedia assessments.

The second source was a student survey completed by ten students. Students reported to have a range of SEND including, learning difficulties, e.g. dyslexia (n=6), mental ill health (n=3) and developmental disability, e.g. autism (n=2); some reported to have more than one SEND. Most students (80%) reported their performance in assessments would improve if additional adjustments / support were put in place, with 40% reporting that staff did not understand how their SEND impacted their assessment performance.

Written assignments, multiple choice tests and OSCEs were reported to be most suitable for students to best demonstrate their knowledge and understanding; a live interview was the least preferred. Barriers impacting performance included environmental aspects during OSCEs and a lack of breaks. Pre-assessment opportunities and extra time were identified as useful support strategies currently implemented.

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The third source was in-depth discussions that were completed with three students with a range of SEND: one with mental ill health, one with dyslexia and one with Autism. These conversations reflected the findings of the survey and provided a deeper understanding of students' needs and experiences.

The fourth source was an anonymous staff survey completed by nine staff, with 33% reporting they were unaware of how a student obtains a RAR. Most staff (67%) reported RARs were unsuitable for all programme assessment types, being most suitable for written assessments and least suitable for OSCEs. Staff identified training needs relating to implementing RARs and linking RARs to different assessment types.

The fifth source was anonymous data obtained from the academic year 2023/2024 identified physiotherapy students were above the university average for the percentage of students with a RAR in place for a learning difficulty. Most attendances to wellbeing from physiotherapy students related to anxiety, depression, and low mood, with 27% of the cohort receiving awards from the student hardship fund.

Stage 2; Define

All data from the empathise stage was synthesised, and the main points extracted to develop problem statements. The purpose of such statements was to ensure the ideas created within the next stage were reflective of the needs of the end-user.

Three problem statements were identified for each data source (see table 1).

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Table 1; *Problem statement generation*

Source	Problem statements
Student records / school officer	1. Half of the staff team have limited experience in supporting students within academia. 2. There is a significant increase in students with RARs in place. 3. The programme has a wide range of assessment types placing a range of demands on students.
Student survey	1. The lack of adjustments / support is impacting student performance in assessment. 2. Staff do not understand how SEND impacts assessment performance. 3. There are a range of barriers impact assessment performance.
Staff survey	1. Most staff do not know the RAR process. 2. RARs are not suitable for all assessment types. 3. Additional training is required to link RARs to assessment types
Wellbeing	1. There are many in the cohort with SEND. 2. Students from the programme are frequently attending due to anxiety, depression, and low mood. 3. Students are experiencing financial hardship.

Note: Table outlining the problem statements generated within the define stage.

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Stage 3; Ideate.

Based on the problem statements, a brainstorming exercise was conducted by the author, with the emphasis on quantity of ideas rather than quality. A mind map (figure 2) was completed which identified 14 ideas to address the problem statements.

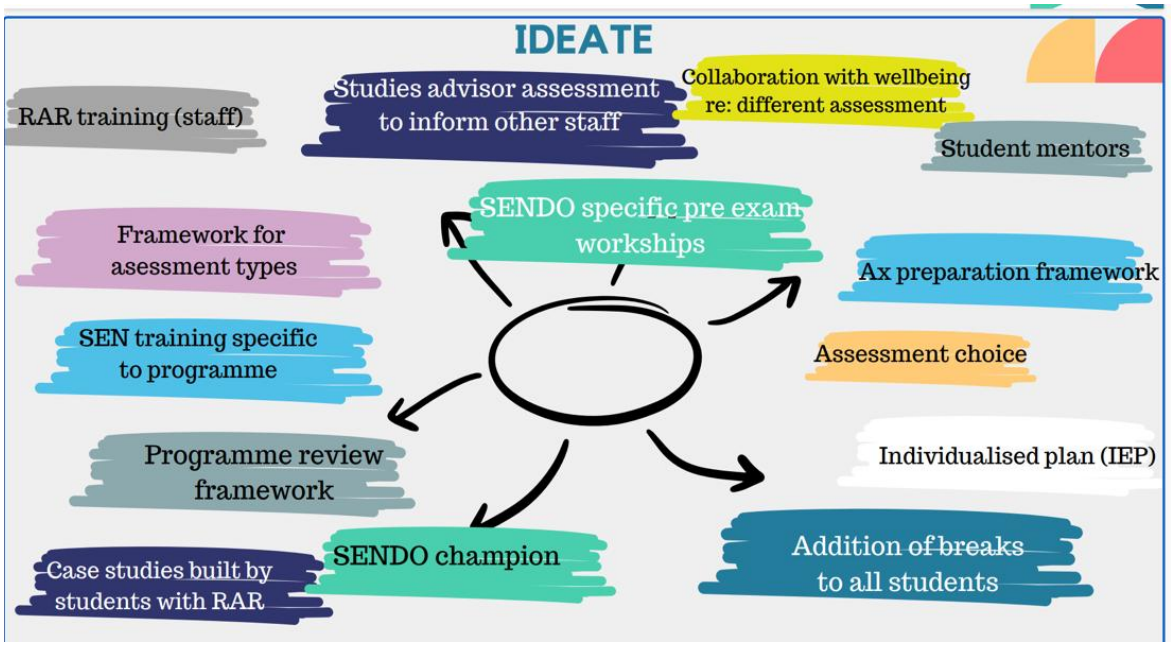

Figure 2*; Idea generation*

The author discussed all ideas in depth with two colleagues and two students independently, before implementing a voting system to identify the top five preferences. The five ideas identified were (not in preference order): A process for assessment choice, a process to support staff in identifying assessment choice, staff training focusing on assessment type linked to RAR, staff training focusing on RAR processes and an individualised education plan in collaboration with student wellbeing.

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Stage 4; Prototype

The author developed a paper-based prototype outlining the five different ideas generated (see Appendix 3). These prototypes were shared with three students and three staff members and discussed to identify one option to move to the final testing phase.

The final idea moved forward to testing was identified as an individualised education plan to be created in collaboration with student wellbeing. Whilst other prototypes created are valid and in future may be implemented, the one identified as a priority.

The individualised education plan places students at the centre, ensuring individualised approaches are taken. On enrolment into the programme, a dedicated staff member from the physiotherapy course team would have a discussion with the student to understand their SEND and its impact on learning and engagement. Student wellbeing would complete their standard assessment with the student before the academic staff member would have a discussion with wellbeing to align the SEND needs to the course approach to assessment. An individualised plan would then be written collaboratively between wellbeing staff, academic staff, and the student. Importantly, once the initial plan is implemented, an iterative approach would be taken, with continual review and adaptation of the programme as the student reaches various levels of learning and experiences different assessment types.

The development, testing and evaluation of this prototype will be described in a future paper.

Discussion

The application of the design thinking process in this learning and enhancement project proved successful in understanding the needs and challenges faced by both

students and staff regarding the completion of assessments in the physiotherapy programme at Ulster University by students with SEND. Unique challenges were identified, specifically in relation to the range of assessment types within the programme due to the lack of specific information within the RAR based on the programme needs. This issue is not unique to this programme; it has been identified as a broader challenge for those attending higher education, with support plans being generic and not individualised to the person or the programme they are completing (Kendall, 2016).

Within higher education, those attending with SEND have traditionally been viewed as having deficits that require accommodation rather than enrichment to academia (Morina et al., 2020). Whilst adjustments made within the learning environment are often unseen, it is during assessments which students with SEND are highlighted as being 'different' (Nieminen, 2024) due to the extra time allocated or completion of assessments in a separate room, leading to a sense of difference. There is a need to fully understand the individual needs of students whilst diversifying the accommodations provided to ensure assessments are inclusive in nature and authentic to the person completing them.

The proposed prototype identified within this project provides an opportunity to take an inclusive and authentic approach to assessment practices. Bringing together the expertise of those who complete SEND assessments and academic staff provides an opportunity to move from a generic to an individualised approach. The key, however, is having the student at the centre of these discussions. Student centred approaches within higher education are crucial to foster meaningful learning experiences (Trinidad, 2019), irrespective of whether a student has a SEND. Providing this centric approach from the outset of an educational journey empowers learners to take ownership of their education and creates an environment that promotes active engagement and relationships between students and staff (Wright, 2011). Whilst the proposed prototype focuses on physiotherapy students at one

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institution this framework could easily be applied across this and other institutions resulting in transformational impact. Clearly aligning with both inclusive education and equality, diversity and inclusion agendas, the proposed framework provides a platform for individuals with SEND to reach their full academic potential using a positive approach.

The use of design thinking as a model to generate solutions to educational challenges was a positive experience. Fostering creativity and problem solving, the framework encouraged a critical thinking approach to develop solutions. The empathise stage highlighted the importance of understanding the user's needs from a range of perspectives. Gaining insight from multiple sources provided a rich understanding of the needs and challenges, supporting the author to appreciate the complexity of the topic. The iterative approach taken to the final stage is a positive one which will ensure learning can occur from initial testing, ensuring the final designed framework is underpinned by quality.

Some limitations of this project include the small number of students who completed the survey. Whilst the sample included students with a range of SEND needs, they may not have fully represented the views and experiences of those across the student cohort. Whilst the small number of in-depth conversations with students provided valuable insight into needs and challenges, completing this approach more widely would have enhanced this stage.

Conclusion

This learning and teaching enhancement project has generated a framework based on user needs to support those with SEND in assessments in higher education. The student centric approach within this framework has the potential to ensure students are provided the best opportunities to demonstrate their learning and understanding in higher education settings.

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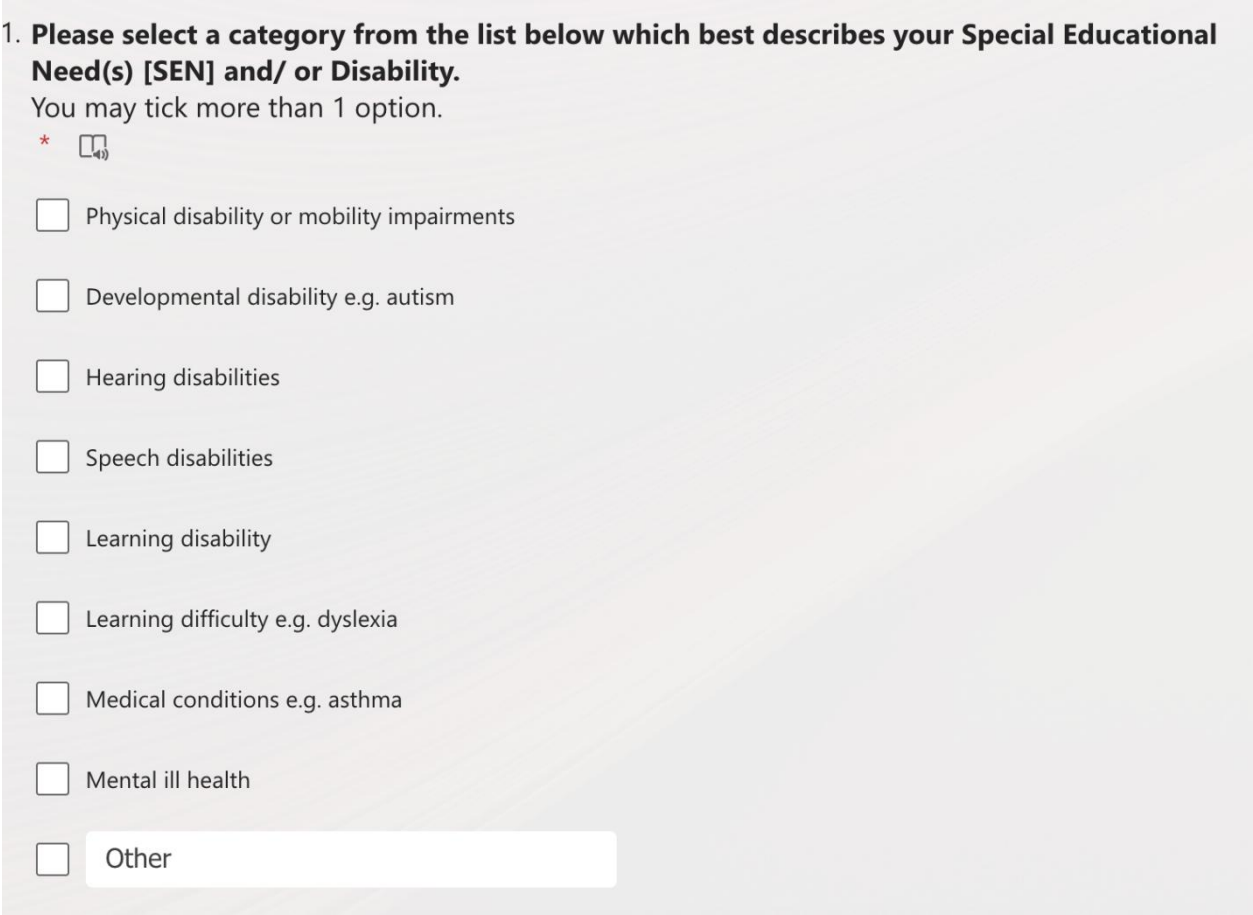
Appendices

Appendix 1; Student survey


1. **Please select a category from the list below which best describes your Special Educational Need(s) [SEN] and/ or Disability.**
You may tick more than 1 option.
*

- [ ] Physical disability or mobility impairments
- [ ] Developmental disability e.g. autism
- [ ] Hearing disabilities
- [ ] Speech disabilities
- [ ] Learning disability
- [ ] Learning difficulty e.g. dyslexia
- [ ] Medical conditions e.g. asthma
- [ ] Mental ill health
- [ ] Other

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2. **Please provide additional details on your answer to question one**.
For example if you have ADHD and ticked 'Developmental Disability', please type ADHD in the box below. This will enable us to understand specific needs and challenges linked to specific educational needs and disabilities.

Enter your answer

3. Considering your SEN or Disability, **consider if each assessment type enables you to demonstrate your knowledge and understanding i.e. supports you to perform well.**

For example, if you have dyslexia you may find written assignments challenging and therefore you would select no for this assessment type. *

	This type of assessment allowed me to demonstrate my knowledge and understanding from the module	This type of assessment didn't allow me to demonstrate my knowledge and understanding from the module	Not applicable- I have not completed this assessment type
Written assignment	◯	◯	◯
OSCE / practical	◯	◯	◯
Multimedia assessment e.g. Neurorehab module	◯	◯	◯
Presentation (pre recorded)	◯	◯	◯
Live interview e.g. PPC or PDE	◯	◯	◯
Multiple choice e.g. Structure, Function and Assessment	◯	◯	◯
Short answer written questions e.g. Cardiorespiratory 1	◯	◯	◯

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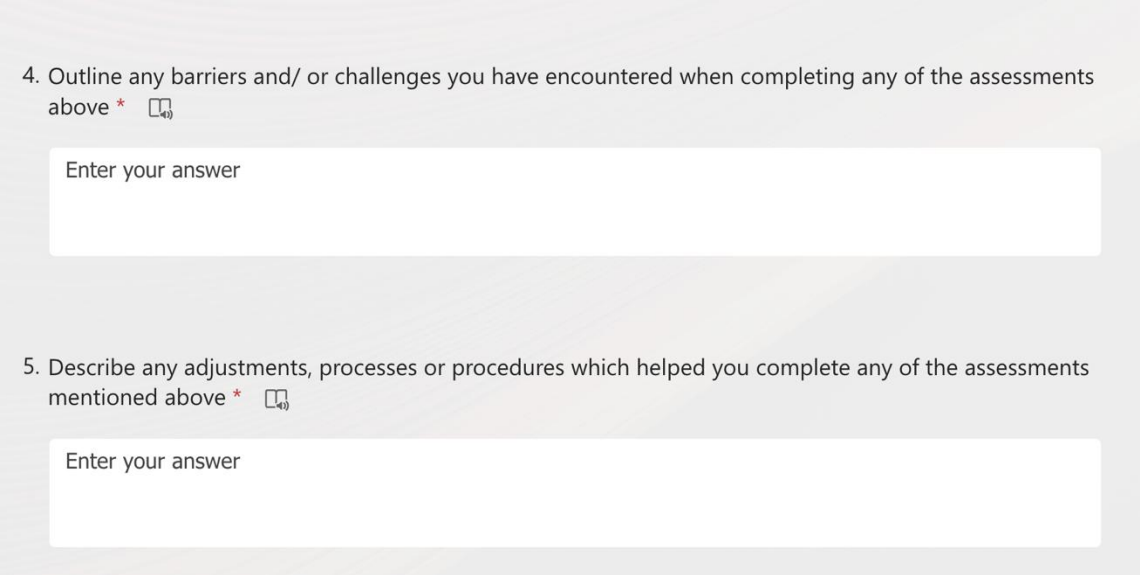

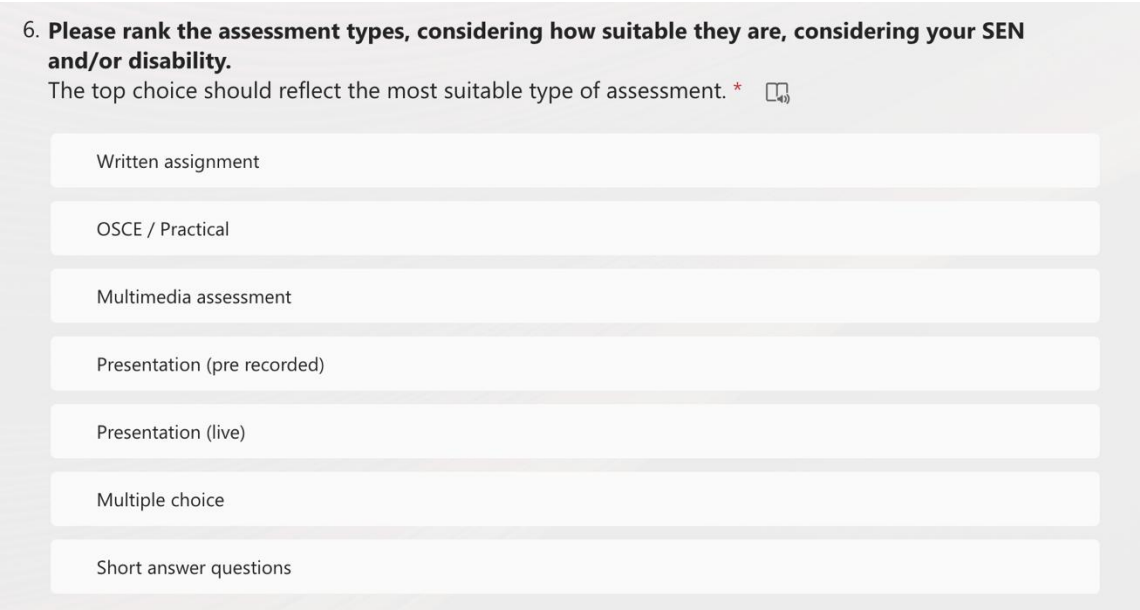

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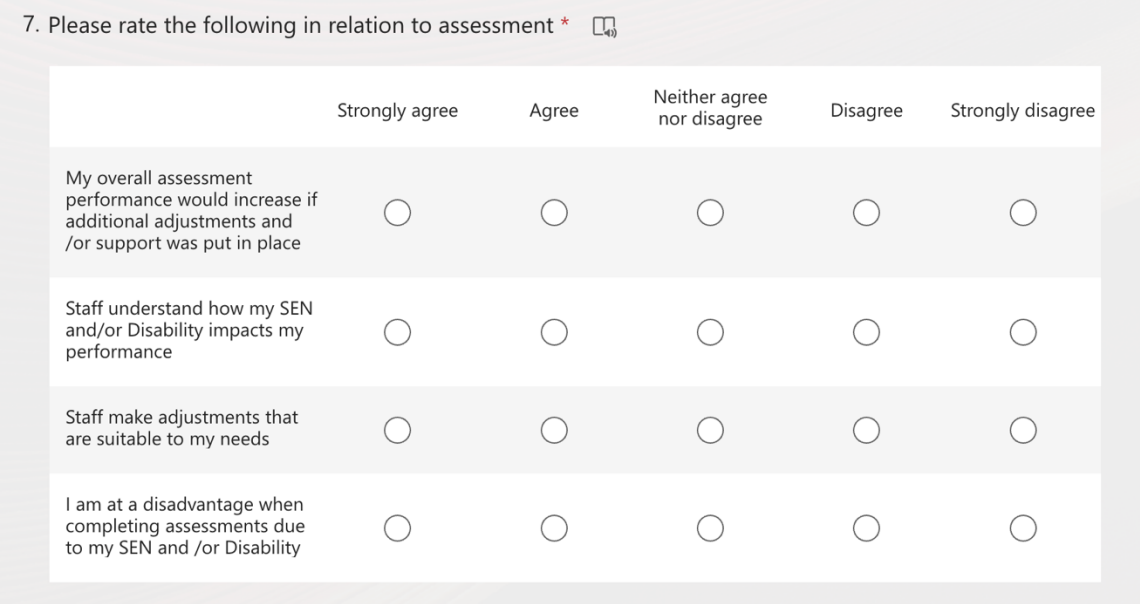
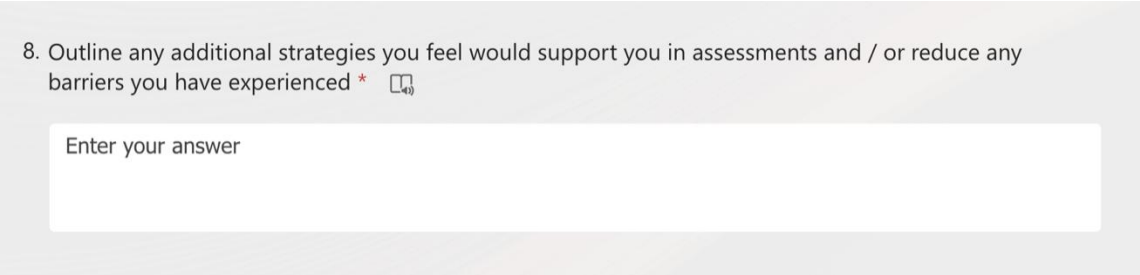


7. Please rate the following in relation to assessment *

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My overall assessment performance would increase if additional adjustments and /or support was put in place	○	○	○	○	○
Staff understand how my SEN and/or Disability impacts my performance	○	○	○	○	○
Staff make adjustments that are suitable to my needs	○	○	○	○	○
I am at a disadvantage when completing assessments due to my SEN and /or Disability	○	○	○	○	○



8. Outline any additional strategies you feel would support you in assessments and / or reduce any barriers you have experienced *

Enter your answer

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Appendix 2; Staff survey

1. This question considers the processes related to Reasonable Adjustment Recommendations (RARs) *

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I understand how a student obtains a RAR on entry to Ulster University	○	○	○	○	○
I understand how to support a student to obtain a RAR during the physiotherapy programme	○	○	○	○	○

2. This question considers the RAR report programme staff receive *

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
The RAR provides **sufficient detail** to enable me to make adjustments in assessments	○	○	○	○	○
The recommendations within the RAR are **appropriate to support the needs of the student**	○	○	○	○	○
The recommendations within the RAR are **suitable for all assessment types within the programme**	○	○	○	○	○

3. Please identify which assessment type the recommendations within the RAR are **most often suitable for** *

Enter your answer

4. Please identify which assessment type the recommendations within the RAR are **least often suitable for** *

Enter your answer

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5. Please rank the assessment types in terms of *most to least suitable* for students with a **diagnosis of dyslexia** *

- OSCE
- Live interview / presentation
- Presentation (pre recorded)
- Multiple choice
- Short answer questions
- Multimedia (computer based assessment with a mix of video and still images. Students type answer)

6. Please rank the assessment types in terms of *most to least suitable* for students with a diagnosis of **mental ill health** *

- Written assessment
- OSCE
- Live interview / presentation
- Short answer questions
- Multiple choice
- Multimedia assessment
- Presentation (pre recorded)

7. Please rank the assessment types in terms of *most to least suitable* for students with a **diagnosis of a developmental disorder e.g. Autism, Aspergers syndrome** *

- Multimedia assessment
- Presentation (pre recorded)
- Short answer question
- Live interview / presentation
- OSCE
- Written assignment

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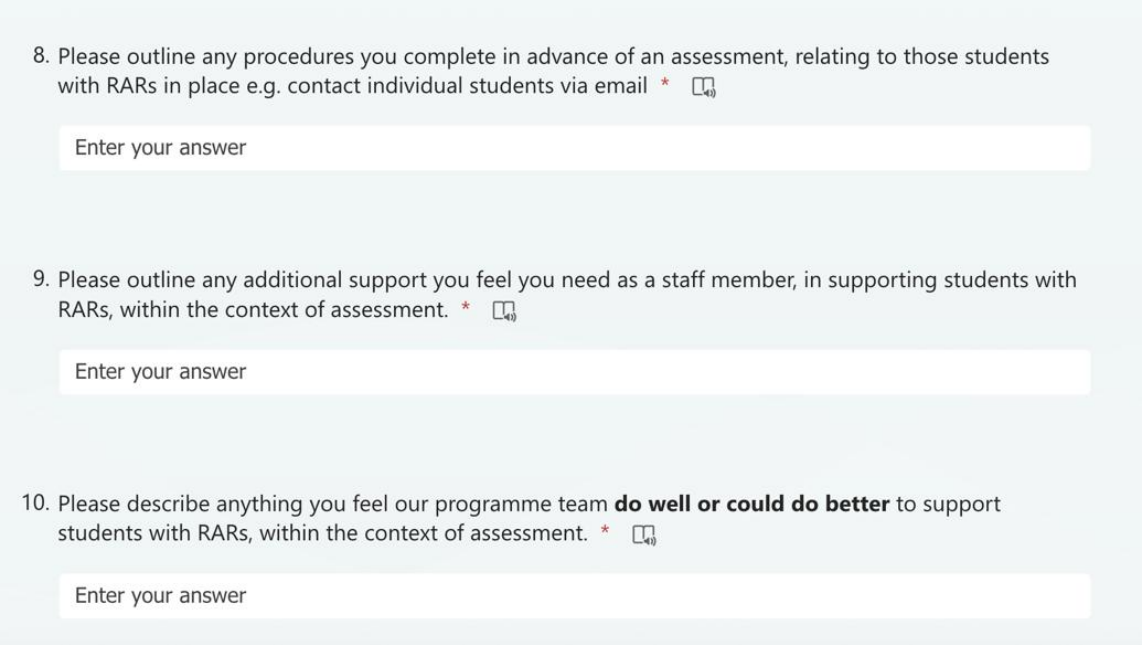

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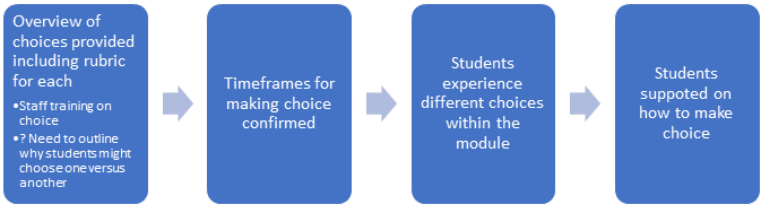
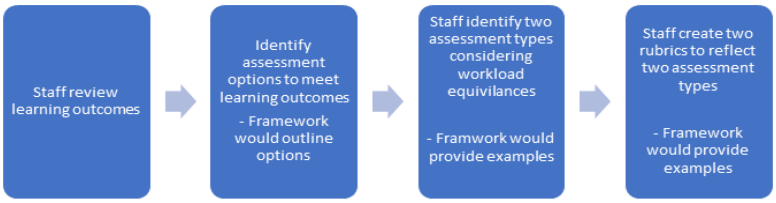
Appendix 3; Prototypes

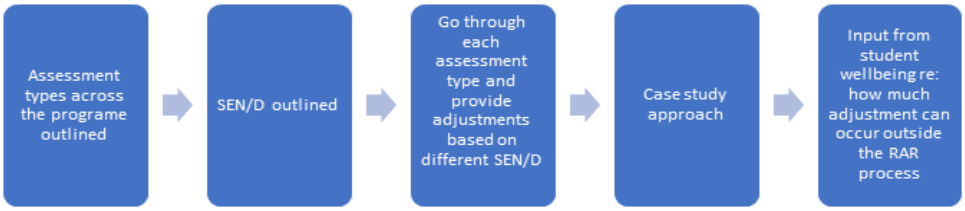
Prototype 1; Process for assessment choice.



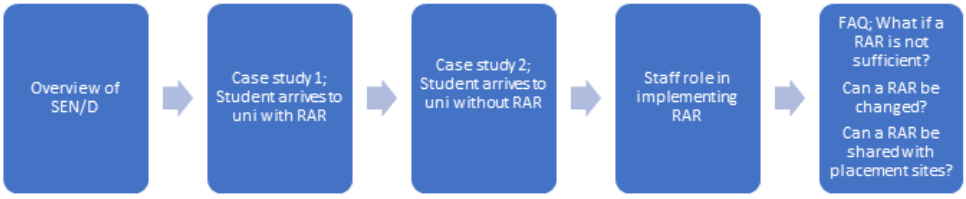
Prototype 2; Process to support staff to identify assessment choice.



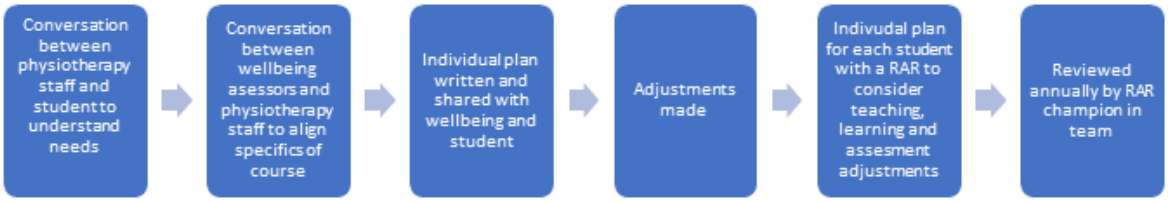
Prototype 3; Staff training aligns RAR to assessment types.



Prototype 4; Staff training on RAR process



Prototype 5; IEP for students



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