Student With Hidden Disabilities' Perceptions of Online versus On-Campus Education, and Disability Support Services.



A thesis submitted to Technological University Dublin in partial fulfilment of the requirements for the award of Masters (M.Sc.) in Education (Digital Innovator)

by

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Declaration

I hereby certify that material which is submitted in this thesis towards award of the Masters (MSc) in Education (Digital Innovator) is entirely my own work and has not been submitted for any academic assessment other than part-fulfilment of the award named above.

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Date: 30th June 2022

Abstract

A focus on widening access and participation in Higher Education has resulted in increased numbers of tertiary students with hidden disabilities in recent decades, globally. While academic supports at an institutional level are available for this student population, issues are reported with them consistently, which often leads to their non-utilisation. This is one possible explanation for why these students experience inequitable academic circumstances compared to their peers concerning lower grades and welfare levels, and higher withdrawal and failure rates.

There is a paucity of research available on adequate accommodations that support the academic success of students with hidden disabilities in Higher Education. In addition, few studies focus on how alternative tools such as online learning methods could be of use. This study addresses these gaps in the literature.

Quantitative and qualitative research methods were employed in the form of an online questionnaire and in-depth, semi-structured follow-on interviews to explore how to support students with hidden disabilities in Higher Education from their perspectives.

The form was completed by 22 respondents with different conditions, of whom 2 were in a control group. In addition, the interviews were conducted online with two students who had several different conditions, diagnostic statuses, and disability registration statuses. Questions centred on perceptions of online learning tools, on-campus classes, and disability support services, through the lens of academic compatibility, hidden-disability compatibility, and welfare.

Analysis of the results leads to the conclusion that the most suitable curriculum for students with hidden disabilities is flexible, and affords them online and on-campus learning options in addition to accommodations. It is recommended that staff in third-level institutions

receive more training concerning how best to accommodate this student population, and, in addition, designated online learning staff with specialist training could be employed.

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Table of Contents

Table of Contents

Preliminary Pages	
Declaration	2
Abstract.	3
Acknowledgements.	4
Table of Contents.	5
Chapter One - Introduction	
1.1 Introduction and Rational for the	
research	17
1.2 Context of the Research	17
1.3 Theoretical Framework	20

1.4 Research Aims and Objectives201.5 Research Questions21

Chapter Two – Literature Review

2.1 The Review Process	22
2.2 Findings	25
2.2.1 Demography	25
2.2.2 Themes	
2.3 The Modus Operandi of Students with Hidden	
Disabilities	27
2.4 Reasonable Adjustments	
2.5 Online Learning	35
2.6 Discussion	
2.7 Recommendations	43
2.8 Conclusions	44

Chapter Three – Research Design

Research Design	45
3.1Methodology	45
3.1.2 Epistemology and Ontology	45
3.1.3 Research Paradigm	46
3.1.4 Ethnography	46
3.1.5 Reflexivity	47
3.2 Research Approaches Used in this Study	48
3.2.1 Convergent Mixed-Methods	
3.3 Pilot Phase	55
3.4 Data Collection	55
3.5 Implementation	59
3.6 Ethical Considerations	62
3.7 Delimitations	64

3.8 Conclusions
Chapter Four – Results, Evaluation, and Discussion
4.1 Introduction
4.3 Online Questionnaire Response Rate and Associated Limitations
 4.5 Participant Teaching Experiences and Preferences
4.6.2 Strengths and Weaknesses 81 4.6.3 Academic Compatibility 82 4.6.4 Hidden Disability-Compatibility 86
4.6.5 Well-being
4.6.7 Student Perceptions of Online Tools by Conditions
4.7.1 Unique Strengths: Connection, Interaction, and Engagement984.7.2 Unique Weaknesses
4.7.4 Campus Environment Benefits
4.8.1 Limitations1024.8.2 Hidden Disability-Compatibility
 4.8.4 The Sequential Interrelationship of the Three Themes in HE108 4.9 Why Do Students With Hidden Disabilities Register or Not Register with their HEIs' Disability Support Services?
4.9.1.1 Assistive Technology
4.9.2 The Disability Services
Adjustments?

Chapter Five – Conclusions

5.3 Introduction	
5.4 Academic Circumstances	
5.5 Online and On-Campus Learning	
5.6 Online Study Tools.	
5.7 Non-Disclosure	
5.8 Perceptions of Disability Support Services	129

5.9 Replacing Accommodations with Class-Wide Online Learning	
Tools	129
6. Recommendations	130

Word count: 21,880

List of Tables and Figures

Figure 1. Relational factors to Higher Education in the context of the research **(p.17)**

Figure 2. Two-topic review process and relational analysis (p.22)

Figure 2.1. Common themes identified among HD students in HE in relation to experiences (p.27)

Figure 2.2. The percentage of students with ADHD reported executive dysfunction DHD compared to peers in Jansen et al. (2016)'s survey (p.28)

Figure 2.3. Post popular reasonable adjustments identified across the experience studies (**p.30**)

Figure 2.3. Categories of conditions and corresponding disability registration rates in Irish HEIs. Reprinted from "19/20 Report on Numbers of Students with Disabilities in HE" (Ahead, 2021) (p.38)

Figure 2.4.. Reported impact of reasonable adjustments and online learning on academic success and well-being across 29 studies (**p.39**)

Figure 2.5 The modus operandi of students with disabilities in higher education and the corresponding incompatible characteristics of reasonable adjustments. **(p.41)**

Figure 2.6. Incompatibility and compatibility of RAs and Online Learning with

HD student modus operandi and well-being needs (p.42)

Figure 3. Convergent mixed-methods design. Reprinted from "A concise introduction to mixed-methods research" (Creswell, 2015, p.56) (p.48)

Figure 3.1. Barriers and supports to online questionnaire survey and completion as determined by the researcher (**p.50**)

Figure 3.2. Statistics on internet use per device. Reprinted from "Frequency of Internet Usage" (CSO, 2019) (**p.51**)

Figure 3.3. Likert scale question grouping options on Google Forms and Microsoft Forms (**p.52**)

Figure 3.4. Online questionnaire poster pinned to noticeboards at TU Dublin, Grangegorman and Trinity College, Dublin (p.57)

Figure 3.5. Second online questionnaire poster with amendments posted to approved noticeboards at NUI, Maynooth, and University College, Dublin.

Figure 3.6. Social media post on the TU Dublin SU Instagram page inviting students to participate in the online questionnaire (**p.57**)

Figure 3.7. Interviewee correspondence process (p.58)

Figure 4. Four types of triangulation in data analysis. Reprinted from "Performing [Auto] Ethnography Politically" (Denzin, 1970) (**p.66**)

Figure 4.1. Word cloud of programmes survey participants reported they were enrolled on (**p.69**)

Figure 4.1.1 Range of conditions disclosed by questionnaire respondents (p.70)

Figure 4.1.3. Demographic profile of Interviewee Two (IV1) (p.74)

Figure 4.1.2. Demographic profile of Interviewee One (IV2) (p.75)

Figure 4.2. Percentage of online learning tools respondents had experience with during the academic year of the survey (**p.76**)

Figure 4.2.1. Ideal teaching methods of respondents in percentages (p.77)

Figure 4.3.1. Likert scale responses to statements relating to live online lectures **(p.79)**

Figure 4.3.2. Likert scale responses to statements relating to lecture recordings published online after class (**p.79**)

Figure 4.3.3. Likert scale responses to statements relating to virtual learning environment resources (**p.80**)

Figure 4.4. Strengths and weaknesses of online teaching and learning tools in relation to academia, hidden disabilities, and welfare (**p.81**)

Figure 4.4.1. Percentages of participant stances on how supportive VLE resources and live online lectures were to their academic independence (**p.84**)

Figure 4.4.2 Survey responses by percentage in relation to perceived effectiveness of different online learning tools for academic support (**p.85**)

Figure 4.4.3. Accumulation of results pertaining to the statement "they are vital to my studies" in relation to VLE resources and lecture recordings. to academia, hidden disabilities, and welfare (**p.85**)

Figure 4.5. Comparative data by percentage on responses in relation to peace of mind and online study resources (**p.89**)

Figure 4.5.1. Comparative data by percentage on responses in relation to flexibility and online study resources (**p.89**)

Figure 4.5.2. Comparative survey responses in relation to online learning (p.90)

Figure 4.5.3. Likert scale responses to statements relating to online discussion boards (**p.91**)

Figure 4.5.4. Compatibility of online study tools (VLE resources and lecture recordings) in relation to academia, hidden disability, and welfare with condition-specific issues of Interviewee One. **(p.92)**

Figure 4.5.5. Hidden disability specific support of openly available online study tools for IV1 compared to difficulties in RA access process identified in literature **(p.93)**

Figure 4.6. Strengths and weaknesses of on-campus lectures and tutorials (p.95)

Figure 4.6.1 Participant responses to Likert scale questions about face-to-face lectures in big lecture halls (**p.96**)

Figure 4.6.2. Survey responses to Likert scale questions about face-to-face tutorials in smaller tutorial rooms (**p.96**)

Figure 4.6.3. Accumulation of responses to the question "they are distracting" in relation to tutorials in small tutorial rooms and lectures in big lecture halls, represented in percentages up to 45% (**p.98**)

Figure 4.7. Most compatible teaching and learning resources per theme (p.101)

Figure 4.7.1. Percentage of reports by survey participants of the incompatibility of teaching delivery methods with respective conditions (p.102)

Figure 4.7.2. Strengths of Online and On-campus learning tools (p.103)

Figure 4.7.3. Summary of the strengths of online and on-campus tools for the general survey respondent population, as quoted by Interviewee One (**p.104**)

Figure 4.7.4. The most helpful HE support, according to respondents (p.105)

Figure 4.7.5. Weaknesses of online and on-campus learning tools (p.106)

Figure 4.7.6. Student responses to visibility in online/on-campus environment (**p.107**)

Figure 4.7.7. Negative relational consequences of the three themes in Higher Education for students with hidden disabilities. (p.108)

Figure 4.7.8. Consequential success for students with hidden disabilities **(p.109)**

Figure 5. Likert scale response on assistive technology (p.112)

Figure 5.1. Accumulation of respondent perceptions of the usefulness of all assistive technology products (**p.112**)

Figure 5.2. Examples of independent applications reported to be useful by survey respondents (**p.114**)

Figure 5.3. Survey responses to question 33 on RAs (p.115)

Figure 5.4. Percentage of 53 Likert scale ratings of RAs by usefulness (**p.116**)

Figure 5.5. Percentage of respondents who agreed with statements about RAs and AT (p. 119)

Figure 5.6. Sample findings of reported levels of impact of conditions on HE according to questionnaire respondents (**p.123**)

Figure 5.7. Examples of emerging themes identified in the qualitative date- not related to the research questions (**p.124**).

Table 2. Literature review: inclusion and exclusion criteria	24
Table 2.1. Total participants per disability type and percentages across twenty- nine studies.25	
Table 2.2. Totals of complaint or satisfaction reports by category, and corresponding percentages.	31
Table 2.3. Online learning case studies by research methods and research methods as a percentage of overall online learning study research methods.	35
Table 3. Mapping research aims to Gibbs' (2012) recommendationsfor the use of online questionnaires.	49
Table 3.1. Disability and HEI Access office responses to expressions of interest in survey dissemination.	55
Table 4Respondent conditions by category, frequency of occurrences, and frequency of comorbidities.	70
Table 4.1. Diagnostic statuses of questionnaire respondents and corresponding percentages.	72

Table 4.2. Percentage of report types in qualitative feedback of on-campus classes.	99
Table 4.3. Live-online lecture solutions for hard-of-hearing participants.	104
Table 4.4. Percentages of reasons for registration and non-registration of students with disability support services identified by the researcher.	111
Table 4.5. Mean of survey respondent perceptions of AT as rated by Likert scales in order of highest to lowest mean ratings.	113

Glossary

Accommodation Any action or change to the curriculum in a Higher Education context that reduces barriers for people with a disability and/or a significant ongoing illness.

Attention Deficit Disorder A neurological and developmental disorder associated with sustained focus and distraction difficulties.

Attention Deficit Hyperactivity Disorder A neurological and developmental disorder associated with difficulties with sustained focus, distraction, and behaviour control.

Anxiety disorder A mental health condition associated with chronic panic or worry about a range of issues.

Autism A neurological and developmental disorder associated with repetitive behaviours, nonverbal communication, and social functioning issues.

Assistive Technology Any technology product or service that reduces day-to-day or specific barriers for people with disabilities or ongoing illnesses.

Blended learning A style of learning that includes face-to-face teaching delivery methods and online learning methods.

Comorbidity The simultaneous presence of two or more diseases or medical conditions in a patient.

Condition An illness or other medical issue

Disability A physical or mental condition that limits a person's activities.

Executive dysfunction A range of cognitive impairments that limit a person's ability to plan, organise, prioritise, manage time, or sustain focus etc.

Hard-of-hearing A person's limited ability to hear which may require assistance.

Hidden disability A non-visible disability such as a mental or physical health condition that limits daily activities.

Hyflex A combination of the terms 'hybrid' and 'flexible' – a teaching delivery method which includes simultaneous face-to-face classroom teaching with live online lectures, which provides students with a flexible attendance option.

Inclusive curriculum There is no universal agreement on an inclusive curriculum definition, however in a general sense, it limits barriers to learning and considers all students from different backgrounds.

Online discussion board An online forum where students can discuss subject matter, respond to lecturers or peers, read comments, and post comments.

Neurological condition Any disorder that results from dysfunction in part of the brain or nervous system.

Neurodiversity Diversity in the human brain that encompasses a range of neurological or developmental conditions.

Physical condition An illness or disorder that affects a person's body or specific parts of the body.

Reasonable adjustment See accommodations.

Sensory processing disorder A condition that affects the way in which the a person's senses process information – often associated with autism as it often co-occurs with it.

Specific learning difficulty or disorder An umbrella term for neurological or developmental conditions that impact how someone learns inclusive of dyslexia, dyspraxia, and dyscalculia.

Scoliosis A physical condition in which a person's spine is twisted to one side.

Universal design for learning An educational framework that promotes flexibility in order to support inclusivity.

List of Abbreviations

ADHD Attention deficit hyperactivity disorder

ADD Attention deficit disorder

- AT Assistive technology
- HD student a student with a hidden disability
- **HE** Higher Education
- HEI Higher Education Institution
- PTSD Post traumatic stress disorder
- **RA** Reasonable adjustment
- SpLD Specific Learning Difficulty
- VLE Virtual learning environment

List of Appendices

Appendix A: A detailed account of the specific literature review	
search terms per database.	146
Appendix B: A detailed account of each study's country of origin.	148
Appendix C: A detailed account of participant conditions and	
occupations per literature review study.	151
Appendix D: A detailed account of the related themes per	
literature review study.	156
Appendix E: Shared experiences of students with	
hidden disabilities in higher education across 29 studies.	159
Appendix F: Reports of accommodation types identified in each study,	
and totals.	
Appendix G: Student complaints by category and study in relation to	
reasonable adjustments, including satisfaction reports.	166
Appendix H: Academic outcomes in online learning case studies with	
various hidden disability participant types and	
control groups.	171
Appendix I: Assessment results of survey tools based on	
accessibility criteria.	174

Appendix J: Sample factors from other studies that influenced	
this study's questionnaire questions.	176
Appendix K: Sample open question on questionnaire.	180
Appendix I: Microsoft Forms technical support forum: troubleshooting	
issues with questions.	181
Appendix M: Full list of Higher Education Institutions' disability	
and access offices contacted to disseminate an online	
questionnaire.	182
Appendix N: Expressions of interest in survey dissemination	
email to HEI disability and access offices, and	
several hidden disability organisations.	184
Appendix O: Informed Consent form forwarded to interview participants	5,
of which a synopsis featured on the online questionnaire	
front matter.	185
Appendix P: Research Ethics Committee approval of study.	186
Appendix Q: Questionnaire information for respondents including	
exclusion method of participants under the age of 18.	187
Appendix R: SAFEAssist: Researcher certification.	188
Appendix S: Demography of survey respondents, reports of conditions,	
and disability service registration status.	189
Appendix T: Frequencies of respondent conditions by category and	
comorbidities.	193
Appendix U: Respondent perceptions of online learning tools by	
category of conditions.	196
Appendix V: List of all respondent comments related to campus	
environment and academic compatibility of all tools,	
respectively.	199
Appendix W: Voluntary non-structured feedback from survey	

respondents with hidden disabilities.	202
Appendix X: Survey respondent Likert scale ratings of the	
effectiveness of individual RAs by response frequency	
and mean.	204
Appendix Y: Mean scores of AT products and services by condition	
category.	206
Appendix Z: List of qualitative comments related to reasons for	
disability disclosure and registration status provided by	
survey respondents.	208
Appendix AA Additional themes	209
Appendix BB Living with a disability in Higher Education	213

Chapter 1: Introduction

1.1 Introduction and Rationale

This section will introduce the research topic, rationale, aims and objectives, context, and associated scope.

1.1.2 Background: The Problem

A focus on widening access and participation in Higher Education in recent decades has increased the numbers of tertiary students with hidden disabilities globally (Ahead, 2018, Sachs & Schreur, 2011, UNESCO, 1994). However, it has been reported that this population experience inequitable academic circumstances compared to students without hidden disabilities concerning lower grades and welfare levels and higher withdrawal and failure rates (Auberach et al., 2018, Aro et al., 2018, Jansen et al., 2016, Kilpatrick et al., 2018, Office for Students, 2018, 2020). This inequality is possibly a result of several incompatibility issues associated with the disability supports afforded to these students and, as a consequence of these issues, their non-utilisation (Bunbury, 2020, Kilpatrick et al., 2016).

1.1.3 The Opportunity

The recent COVID-19 pandemic has provided students with unprecedented levels of experience with online education at an institutional level. Remnants of the pivot-online phase students and staff experienced during worldwide lockdowns are still visible in Higher Education Institutions (HEIs) today, observed in HEIs' adoptions of a more blended approach to teaching and learning (TU Dublin, n.d.).

Considering the academic and welfare circumstances of students with hidden disabilities and their increased rates of entry into Higher Education programmes, HEIs must prepare accordingly and effectively accommodate their needs.

1.2 Context of the Research

This study encompasses several areas of research, as demonstrated in Figure 1. The core focus is the experiences of tertiary students with hidden disabilities in Ireland concerning: online learning, on-campus learning, and disability services through the lens of academic compatibility, hidden-disability compatibility, and welfare.



Figure 1. Relational factors to Higher Education in the context of the research.

1.2.1 What defines an inclusive curriculum?

While a universally agreed definition of an inclusive curriculum does not exist (Institute of Child Education & Psychology, 2010), for students with hidden disabilities, it could be considered as one that:

- minimises barriers to participation (Davies & Elliott, 2009).
- Enables them to achieve academically on a par with their peers (Bunbury, 2018).

In addition:

- Their academic achievement reflects their efforts (Bunbury, 2018).
- Their academic achievement is not to the detriment of their well-being.
- Best practice in inclusive curriculum design involves co-creation with the student body (Bunbury, 2018).

In summary an inclusive curriculum for HD students supports their academic success without detriment to their welfare.

1.2.2 What constitutes a hidden disability?

Hidden disabilities are an umbrella term for physical, neurological, or mental conditions that impact daily activities and are not visible to others. These conditions include diabetes, arthritis, Chron's disease, depression, and anxiety (Invisible Disability Ireland, n.d.).

Global and local reports from the World Health Organisation (2018) and Irish organisations highlight increased rates of mental health conditions among tertiary students which could account for a significant proportion of students with hidden disabilities globally (Auerbach et al., 2018, Jigsaw & UCD School of Psychology, 2019, Mahon, Fitzgerald, O'Reilly, & Dooley, 2022). In addition, there is a relationship between disabilities and mental health conditions: mental health conditions can be considered a disability, and disabilities may harm mental healthreported among Irish students (The Kings Fund & Centre for Mental Health, 2012, Union of Students in Ireland, 2018). With reports of students with disabilities, including mental health conditions rising, HEIs should endeavour to accommodate their access to the curriculum with an informed approach.

1.2.3 What are HEIs Doing to Support Students with Hidden Disabilities?

HEIs appear to exclusively offer reasonable adjustments, also known as accommodations, to students with hidden disabilities (HD students). This sole offering is possibly due to outputs from The UN Convention on the Rights of Persons with Disabilities (CRPD, 2016), which requires HEIs to provide accommodations to HD students to increase their access and participation (Emmers et al., 2014).

No available data confirms why HD students have such inequitable experiences in HE concerning academia since universities follow expert advice from the UN. More research is needed in this field to support their inclusion in the curriculum.

1.3 Theoretical Framework

1.3.1 Some Models of Disability

A theory underpinning this research is the social model of disability- that is, disability is caused by "a lack of fit between a body and its social environment" (Goering, 2015, p.134). The medical model of disability considers disability to be "a problem that exists in a person's body" (p.134), and something to be treated or fixed. The social model differentiates an impairment from a disability. It considers the disability as a "disadvantage or restriction of activity caused by a contemporary social organisation which takes no or little account of people who have physical impairments and thus excludes them from participation in the mainstream of social activities." (Oliver M, 1996, p.22 as cited in Goering, 2018).

Skrtic (1991) argues that "student disability is...an organisational pathology... [- a student] not fitting the standard programs of the prevailing paradigm..." (p.169). In the context of the social model of disability, a HEI whose student body with hidden disabilities regularly fails, withdraws from studies, or achieves less in an academic context than their peers is responsible for the disablement of those students.

1.4 Research Aims and Objectives

This research aims to support students with hidden disabilities in Higher Education in the context of academic affairs and welfare. There are three main research objectives to support this aim:

1) To explore the potential cause of inequitable academic achievements on the part of students with hidden disabilities (HD students) in Higher Education (HE).

- 2) To explore best inclusive practices for HD students in HE.
- 3) To explore how online learning tools can support inclusive practice.

1.5 Research Questions

The research questions were based on literature review findings which established academic, disability, and welfare issues for HD students in relation to three elements of HE: 1) online learning, 2) on-campus learning, and 3) disability support services. The research questions were developed to gauge a deeper understanding of HD student perceptions of the three elements and to identify more suitable practices for a hidden-disability inclusive curriculum.

- 1. What are HD student perceptions of online learning in HE?
- 2. What are HD student perceptions of on-campus learning in HE?
- 3. Why do HD students register or not register with disability support services?
- 4. What are HD student perceptions of HE disability support services?
- 5. To what extent could online learning replace individual accommodations in HE?

The first four questions could be answered through direct questions to participants, e.g., Question One could be answered by asking participants opinion-based questions about online learning. The final question could be answered through a comparative analysis of results from previous questions.

Chapter 2: Literature Review

This chapter will present the literature review, including the research approaches, scope, findings, discussion, recommendations, and conclusions.

2.1 The Review Process

A mixed-methods systematic and thematic review of international literature was conducted. The process started in 2021 and continued until the beginning of 2022. A paucity of literature was available on the synthesised topics of digital education, higher education, and disability. This shaped the scope of the review. Consequently, the approach took two steps (Figure 2). The frequencies of several data sets were analysed to explore perceptions of existing disability supports and how online learning could support the academic success and well-being of HD students. The data from both topics were then extracted and exported to Microsoft Excel. Essential information and summaries from these findings are dispersed throughout this review. The complete tables used to analyse the data i.e. themes and findings in each study are included in several appendices for future research and referenced throughout the review.



Figure 2. The two-topic review process and relational analysis.

The research questions that informed the review were:

- What factors influence the inequitable academic success and well-being rates for HD students in HE?
- 2) How compatible are the current disability supports in HEIs with how HD students work?
- 2) How can online learning support students with disabilities to thrive in higher education?

Once commonalities and themes were established, findings were organised into four thematic sections: 1) The modus operandi of students with hidden disabilities in higher education, 2) Issues with current disability supports in higher education, 3) Effective adjustments, 4) Online learning.

2.1.2 Search Criteria and Scope

In alignment with best practice in curriculum design, that is, of co-creation with students (Bunbury, 2018), journal articles that focused on the experiences and opinions of HD students in HE about several themes were included. There were no themes searched for exclusively with the e-learning studies. For both the e-learning and experience studies, the themes included were:

- Hidden disability
- Academia
- Well-being

The themes searched for with just the experience studies were:

- Reasonable adjustments
- Disability support services
- Assistive technology.

Case studies that focused on the measurable impact online learning had on the grades of HD students were included. Various terms concerning hidden disability, academia, well-being, and online education were input across numerous library databases. Inclusion and exclusion criteria were established and adhered to, as demonstrated in Table 2. Kilpatrick et al. (2016)'s article included interviews with disability service managers only, which would otherwise have excluded the study from the review process; however, the research included an analysis of the retention and success rates of HD students in Australian HEIs, therefore. Therefore an exception was made to include this study and extract the interview data. A detailed account of the specific search terms per database are outlined in Appendix A for future research.

Table 2Literature review: inclusion and exclusion criteria

Research Methods Included Case Studies Focus Groups Interviews Questionnaires Surveys Primary Research Primary with Secondary Research

Research methods excluded:

Secondary Research

Topics included in relation to HE:

Topics excluded:

Reasonable adjustments	Compulsory education
Disability support sevices	Curriculum design process
Online learning	Access to HE rather than access to
Well-being	the curriculum
Academic success	Experiences of teachers or staff
HD student experiences	only
Specific hidden disabilities	Curriculum inclusion in terms of:
Non-specific hidden disabilities	gender, sexual orientation,
All disabilities	socioeconomic background,
All students	ethnicity, culture, physical
	disabilities only.
	General student experiences that did
	not cover disability supports or
	online learning.

Note. 'All students' if data about HD students could be extracted.

2.2 Findings

2.2.1 Demography

Many eligible articles were discovered through references in previously identified papers. The final 29 selected articles covered countries across several continents,

including Africa, Asia, Australia, Europe, the US, and Europe. The articles included several research methods. Table 2.1 demonstrates the percentages of disabilities found across total student participants and studies. Control groups included; just 27.32% of all participants across the 29 studies disclosed were HD students.

A detailed summary of each study's country of origin, participants' conditions, and occupations are available in Appendix B, Table C1, and Table C2, respectively.

Table 2.1

		-
Disability Type Totals	No. participants across	% of total HD students
	all studies	
ADHD	242	17.85%
Dyslexia	70	5.16%
Dyspraxia	2	0.14%
Autism	120	8.85%
Sensory (hearing and sight)	267	19.70%
Mental Health Disorder (e.g.	211	15.57%
anxiety, depression)		
Physical Disorder/illness	209	15.42%
Non-disclosed learning	125	9.22%
disability		
Other	109	8.04%
No disclosed disability	2435	NA

Total participants per disability type and percentages across twenty-nine studies.

Note. *HD= hidden disability students or students with hidden disabilities.

2.2.2 Themes

Of the 29 identified papers, 22 related to the HD student experience from several perspectives:

- Barriers to the curriculum,
- reasonable adjustments,
- disability disclosure,
- experiences of autistic students, and
- general experiences.

Of these 22 studies, 72.73% focused on all disabilities: general or hidden. The remaining studies focused on specific disabilities: autism (18.18%), ADHD (4.55%), and blindness or partial sight (4.55%) with occurrences of comorbidities. The majority were e-learning case studies with interviews. It was necessary to differentiate these studies for a more accurate data representation. For example, to analyse trends in HD student experiences with RAs, a more precise frequency of occurrences could be established when the e-learning studies were discounted. This was because e-learning studies did not often provide participants with the opportunity to discuss RAs. The two types of studies were differentiated as *'experience studies'* and the *'e-learning studies*.' A complete list of these 29 studies and their related themes are outlined in Table D1. The E-learning studies and their associated research methods are detailed in Table D2.

2.3 The Modus Operandi of Students with Hidden Disabilities in Higher Education.

Figure 2.1 represents common themes identified in the experience studies related to HD student participation in HE from a social and academic perspective. There were consistent reports of academic struggles and less consistent reports of social struggles. Three recurrent themes were identified concerning how HD students *operate* in HE: 1) Extra time, 2) Executive functioning issues and 3) Environment. Appendix E includes a detailed summary of the studies in which these themes were identified.



Figure 2.1. Common themes identified among HD students in HE in relation to experiences.

2.3.1 Extra time.

HD students spent extra time on, for example, the study of course materials (Sachs & Schreuer, 2011) or making the written word accessible (Hopkins, 2011). For example, students with dyslexia and other specific learning difficulties (SpLDs) took longer to read, write, and retain information than their peers (Mullins & Preyde, 2013). In addition, 54.55% of the studies included reports of additional time spent on the access and negotiation of RAs, and 41.37% of the studies included reports of academic struggles, despite the extra time HD students spent studying accessing accommodations (Figure 2.1).

2.3.2 Executive Dysfunction

Executive dysfunction includes difficulties with prioritisation, procrastination, organisation, attention span, planning, and time management (Barklay & Murphy, 2011). The majority of studies in which executive dysfunction was identified focused on neurodiverse students, including ADHD and autism. Jansen et al. (2016)'s survey of 214 students in Belgium, 86 of whom had ADHD, found that all students suffered from executive dysfunction to some degree, but it was more present in the ADHD group (Figure 2.2).



Figure 2.2. The percentage of students with ADHD reported executive dysfunction DHD compared to peers in Jansen et al. (2016)'s survey.

2.3.3 Environment

Over half of the studies included reports from HD students on struggles related to the physical HE environment, which many said interfered with their academic performance (Figure 2.1, Appendix E). These struggles ranged from sensory issues related to bright lights or loud noises for students with autism (Gurbuz, Hanley, & Riby, 2019), distractions in the typical face-to-face teaching environment for students with ADHD (Jansen et al., 2015), and large lecture sizes for students with autism (Cox et al., 2020). As a student with autism in Gurbuz, Hanley, and Riby's (2019) study described:

Lectures and tutorials are noisy and crowded; I often become anxious and struggle to process the content above the background noise. The biggest challenge was finding a quiet place to work and revise (very distracted by noise), but I live near home and moved home during exam time. (p.625)

2.4 Reasonable adjustments

The most common academic support identified across the literature for HD students in HE was access to reasonable adjustments (RAs), reported in 62% of the total studies and 81.82% of the experience studies. The most common RAs reported are outlined in Figure 2.3. RAs were seen as integral to success by some (Sarrett, 2018, Mullins & Preyde, 2013), particularly students with SpLDs, but inadequate by others. Their perceived inadequacy was often a result of poor access and utilisation processes which involved: more work, meetings, negotiation, stress, and a loss of privacy and dignity, on the part of HD students. In addition, HD students often viewed these supports as inappropriate. Based on student complaints, researchers' analysis, and staff suggestions, this review

30

identified four common issues with reasonable adjustments: 1) non-disclosure, 2) privacy and dignity, 3) excessive self-advocacy, 4) unworkable adjustments, followed by some popular or satisfactory reports of RAs. Table 2.2 summarises the complaints identified and their frequencies.

Appendix F outlines the studies in which each accommodation was identified and corresponding frequencies. Appendix G outlines the nature of complaints identified in each study and their frequencies.



Figure 2.3. Post popular reasonable adjustments identified across the experience studies.

Table 2.2

Totals of complaint or satisfaction reports by category in percentages

Complaints/Satisfaction Type	As a percentage	Percentage
	of total studies	excluding e-
		learning studies
Excessive self-advocacy	24.13%	31.81%
Poor staff compliance	51.72%	68.18%
Fear of stigma	37.93%	50%
Non-disclosure	20.68%	27.27%
Unworkable adjustments	34.48%	45.45%
Not using adjustments	31.03%	40.90%
Bureaucracy	41.37%	54.54%
Identity/label/privacy	24.13%	31.81%
Negative staff/student attitudes	34.48%	45.45%
about disability		
Happy with staff/faculty/disability	34.48%	45.45%
support/adjustments		

2.4.1 Non-disclosure

Most of the HEIs in this review required students to register with their internal disability support services to access RAs. Consistent with Union of Students in Ireland (2018) report, the review process found that many students did not disclose their disability to their institution for several reasons, which included: extended wait periods for formal diagnosis (Redpath et al., 2013), lack of personal identification with disability terminology (Couzens et al., 2015), and issues with privacy and dignity (Mullins & Preyde, 2013). A detailed summary of non-disclosure reasons identified per experience study is available in Appendix H. The disability service managers across eight Australian HEIs that Kilpatrick et al. (2016) interviewed suggested that the primary reason for non-disclosure was poor data collection, that is, the terminology used on their general university registration forms. As one manager stated, "I hazard a guess that many people living with a mental health condition would never consider themselves as having a disability so … do not contact the service … we have a fundamental issue about terminology and how you communicate that." (p.757)

The researchers and interviewees attributed non-disclosure to higher HD student withdrawal and failure rates. The researchers based the suggestion on their analysis of Australia's Higher Education Student Data Collection between 2007 to 2013 (Department of Education, Skills, and Employment, Australia, n.d.). They found that students with SpLDs had lower withdrawal rates than other HD groups and were registered with disability services at higher rates, which may have given them access to accommodations that supported their studies.

Their study also identified that some students only disclosed at a point of crisis to access vital support (according to staff), consistent with findings from Blockmans (2015) interviews with students.

2.4.2 Privacy and Dignity

Non-disclosure was sometimes associated with privacy, dignity, or identity issues. Some participants did not want to label themselves as disabled to access support. Problems with disability labels were reported in 31.81% of the experience articles (Table 2.2). As Adam, a student with autism in Cox et al.'s (2020) interview explained, "I don't like being labelled. I'm fine to say, to call myself autistic ... but I don't like it when other people label me and make assumptions about me." (p.263).

Disclosure could also lead to exposure of a disability through the use of RAs. Fears of stigma were often reported and warranted. Almost half of the experience studies included reports from HD students of hostile staff or peer attitudes or negative comments about disability (Table 2.2). As Megan, a student with dyslexia in Kendall's (2016) interview stated, she wouldn't use a Dictaphone in class "because people might say, "oh, she has a disability, so she will get this and that for free." I don't want to be treated differently." (p.12)

On the contrary, Blockmans (2015) found that some students preferred to expose their disability to gain understanding and further peer support:

I think it is quite handy [for all peers to know] as I need to stand up and lie down, and that will stick out and people will have many questions [...] It

is handy, from a social perspective, to explain it once (Britt, I, who needs to stand up or lie down to deal with chronic pain). (p.168)

2.4.3 Excessive Self-Advocacy

When HD students did register with their HEI's disability services, the onus was often left on them to access or negotiate RAs. They were usually required to fill out forms to request adjustments throughout the academic year (Barkas, Armstrong, & Bishop, 2016), advocate for their right to an RA (Bessant, 2012), or continuously negotiate RAs with individual lecturers for each course module (Hopkins, 2011, Blockmans, 2015). Some lecturers refused to comply with requests for accommodations. However, it should be noted that these issues were based on student interpretations of interactions with lecturers, not reports from staff of their own beliefs and attitudes. In addition, 34.48% of the studies included reports of HD students' satisfaction with RAs.

Some students' additional efforts and conflicts lead to further anxiety and undue stress for HD students (Fossey et al., 2016, Hopkins, 2011). As a student with autism explained, "If the accommodations listed had consistently been provided without excessive difficulty from professors and the need to advocate for myself constantly, then yes [the accommodations would have been useful]. But realistically, no." (Sarrett, 2017, p.686)

2.4.4 Unworkable Adjustments

When students did disclose and received access to RAs, many found them to be unsuitable or cause more issues (34% of studies), which often led to their nonutilisation (34% of studies) (Table 2.2). Personal lecture recordings had several issues in inclusive of the hours it took to replay them, the requirement of an ill students' presence in class to record, or issues with sound quality (Beyene, Mekonnen, & Giannoumis, 2020, Moriña, Cortés, & Melero, 2012).

2.4.5 Effective accommodations

Kilpatrick et al. (2016) suggested that accommodations were effective if utilised. Sachs and Shreuer (2014) found that 92% of the 170 tertiary students surveyed in Israel used accommodations, which correlated with positive academic outcomes, and 45.45% of studies included accommodation satisfaction reports. However, there were inconsistent reports across the literature about which accommodations were effective. While it was reported that extra time created issues for some, others found this RA to be the most suitable. Jansen et al. (2016) found that students with ADHD were most satisfied with extra time in exams and designated seats in exams compared to other accommodations.

The authors suggested that student satisfaction with extra time could have been due to the high-stakes nature of their exams. In favour of RAs, a participant in Sarrett's (2018) online focus group who self-reported as autistic noted, "with these accommodations, I graduated in the top 4% of my class." (p.685) The accommodation that supported the success of this student was not detailed. To reiterate, a list of each study that complaints or satisfaction reported were identified in is available in Appendix G.

2.5 Online Learning

Seven studies were identified and reviewed that focused on online learning in HE in the context of academia and well-being, including HD student participants (Table 2.3, Table E2). Three case studies focused on the academic outcomes of HD student access to different online learning methods. A further three studies explored student perceptions of online learning through interviews and online questionnaires with contradictions identified in the other results. A final case study focused on the experiences of one student with ADHD and autism (in addition to peers) through a follow-on interview. The students' academic results were not a focus of the study. Appendix H details the nature of the educational improvement per e-learning case study, corresponding participant conditions, and the elements in place to affect these outcomes, as used in the analysis process.

Table 2.3

Study Type	Total	As a percentage of	
		online learning	
		studies (to nearest	
		decimal place)	
Case study	4	57%	
Interview	2	29%	
Questionnaire	4	57%	
Focus Groups	1	14%	

Online learning case studies by research methods and research methods as a percentage of overall online learning study research methods.

2.5.1 Academic Success and Online Learning

One hundred per cent of the online learning case studies found a positive correlation between online learning and an improvement in the grades of HD students (Appendix H). These ranged from an improvement in grades for students with SpLDs and their peers when utilising lecture recordings as study tools (Nightingale et al., 2019), and improvements in grades and satisfaction rates in online learning environments for students with SpLDs compared to 'excellent' and 'average' students (Shonfeld & Ronen, 2015, p.14).

If you are in a lecture room, and think "I don't get this", instead of panicking you can think "Oh well – I'll watch it later" People were a lot more relaxed, about just sitting back and listening to the lecture and knowing that the information is somewhere else, and you can use the lecture recording to get your head around it. (Participant disclosing dyslexia) (Nightingale et al., 2019, p.22)

Although the research focus was not on online learning, Couzens et al. (2015)'s case study on disability supports in an Australian HEI found that as web-based learning was increasingly made available to students, fewer availed of note-taking services.
2.5.2 Engagement and interaction

Three e-learning studies identified a direct correlation between e-learning environments and HD student satisfaction. Shonfeld & Ronen's five-year longitudinal case study observed students with SpLDs, "average" and "excellent" students in an online module (p.14). They found that the SpLDs group selfreported greater satisfaction levels with asynchronous online tasks like discussion groups than the control group. The remaining two studies, which monitored the online learning activities of hard-of-hearing participants and peers, found that this group benefited most from online instructor interaction (Alamri & Tyler-Wood, 2017, Long, Marchetti, and Fasse, 2011). The former studied participants with many disabilities, but the hard-of-hearing data was extractable. The latter researchers noted that deaf and hard-of-hearing students relied on visual cues to engage in class, which could cause delays and distress. Therefore online discussion boards could have been more compatible. A hard-of-hearing participant in their study explained, "What I liked best about this course was that it was easier for me to participate in discussions without getting behind due to a delay through an interpreter. I was on the same 'playing field,' which was nice." (p.13)

2.5.3 Considerations: stress, isolation, and disorientation.

Students with hidden disabilities reported greater levels of stress and isolation when learning online compared to control groups - identified in two e-learning studies (28.55%). However, the authors of both studies concluded that these feelings had little to do with the online learning environment. They suggested the feelings were based on either false perceptions about a lack of support available or similar levels of stress reported in on-campus environments respectively (Lambert and Dryer, 2017, Laslo-Roth, Baraket-Bojmel, and Margalit, 2020). "Navigational disorientation" in a student with ADHD and autism was also identified when a virtual learning was not adequately organised (Christopher & Richard, 2015, p.216).

However, all students experienced this to a lesser degree. In addition, the student with ADHD and autism was older and had not been in education for decades. The

disorientation issue was resolved when the researchers made improvements to the VLE and removed excessive links.

2.6 Discussion

2.6.1 Limitations

A limitation of this review is one that is often associated with interview and questionnaire-based studies. The data from the experience studies were based solely on student perceptions and researcher interpretations, therefore subject to bias on the part of the researchers. In addition, researchers' presence in interviews, focus groups, or during case studies could have affected participant behaviours (Anderson, 2010).

In addition, the comparison of e-learning utilisation outcomes and RA utilisation was not a direct parallel - due to the different research methods employed, where the case studies demonstrated a measurable effect on student grades. The experience studies could only establish perceptions of grades, apart from one study which reviewed government statistics of withdrawal and failure rates but could not determine student grades or reasons for withdrawal and failure based on those reports. It was possible, however, to identify trends from both article types and compare them.

2.6.2 Inflation of outcome

HD students experienced inflation of outcome – both positively and negativelyconcerning academia and welfare and, more specifically, executive dysfunction. For example, the students with ADHD in Jansen et al. (2016)'s survey reported executive dysfunction symptoms at higher rates than their peers. The student with ADHD and autism experienced navigational disorientation at higher rates than his peers. Students in Long, Marchetti, and Fasse (2011), Nightingale et al. (2019), and Shonfeld and Ronen's (2015) study obtained higher grades than their peers in online environments.

2.6.3 Effective accommodations

Some HD students considered RAs vital to success. Kilpatrick et al. (2016) and Sachs and Shreuer (2014) discovered a positive correlation between the use of accommodations and improved grades, specifically among students with SpLDs, compared to students with other disabilities. The researchers did not disclose respondent conditions in the latter study. In addition, the researchers did not disclose the specific accommodations respondents used in either study. Findings in Ireland from Ahead (2021)'s report on *Numbers of Students with Disabilities in HE* from 2018 to 2019 demonstrate that students with SpLDs were the most registered group in the country. However, the academic circumstances of this group in Ireland for comparison were not obtainable. In addition, in contrast to suggestions from the disability service managers in Australia, students with disability services in Ireland.



PROFILE OF STUDENTS REGISTERED WITH THE DISABILITY SUPPORT/ACCESS SERVICES BY CATEGORY OF DISABILITY IN 2018/19

Figure 2.3. Categories of conditions and corresponding disability registration rates in Irish HEIs. Reprinted from "19/20 Report on Numbers of Students with Disabilities in HE" (Ahead, 2021).

2.6.4 Disability services versus online learning





Note. *** = definitive across all studies that measured grade outcomes.

Unsuitable disability supports were a possible cause of the inequitable academic circumstances and welfare levels of HD students (Figure 2.4). In particular, the bureaucracy, additional workload, and stress involved in the access process, the extra workload and unsuitability involved in their utilisation, and the issues surrounding identity, privacy, and dignity regarding the same. These issues often resulted in their non-utilisation and, as a consequence, poor academic performance or, when utilised, a decrease in well-being. In contrast, online learning studies demonstrated a consistently positive impact on HD student academic success and well-being, supported by assessment components in case studies and interviews, with few reports of decreased well-being.

2.6.5 Undue Burden

Though some studies reported student satisfaction with RAs, some suggested that it had more to do with their necessity than enthusiasm. The UN's Convention on the Rights of Persons with Disabilities Act 2008 (CRPD) and its national output defined RAs as "*necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden*" (United Nations, n.d., Article 2). However, this review found that HD students were burdened by the RA access process and the utilisation of accommodations.

2.6.6 Incompatible with HD students' modus operandi

Figure 2.5 demonstrates why, for some HD students, accommodations are entirely incompatible with their needs, wants, and ways of working concerning academia and well-being. There were issues detected even for students who considered them vital to their studies, with researchers' suggesting they only requested them at a point of crisis. Therefore, to offer RAs as sole support is an exclusionary practice that makes HD students outliers in the curriculum. Their peers do not have to carry this additional load- they are already supported within the curriculum.

The lack of suitable support systems may result from the UN's output (CRPD, 2008). If HEIs provide HD students with what is required, why would they have to deviate from the status quo?

There is some evidence that inequitable HD student success rates are due to the non-utilisation of RAs. However, the solution for HD students' success is not to ensure RA access. Their reasons for non-utilisation must be considered, in addition to their problems associated with well-being, privacy, additional work, and identity.

In addition, it was surprising to learn of a gap in the literature concerning appropriate accommodations per disability symptom. Jansen et al. (2016) aimed to close this gap by surveying ADHD students and assigning accommodations to executive functioning issues.



Figure 2.5. The modus operandi of students with disabilities in higher education and the corresponding incompatible characteristics of reasonable adjustments.

2.6.7 Online Learning

Although not explicitly stated by study participants, this research found that students reported several issues with RAs that were not present or reported when they learned online in the case studies (Figure 2.6). Benefits were identified in online learning tools that could resolve issues reported with RAs. For example:

- Online lectures could solve the environmental issues some students experience on-campus.
- Widely available lecture recordings could remove the need for personal recordings that exposed hidden disabilities, required hours of play-back without visual cues, required physical presence in lectures, and often produced inaudible recordings with a consequential loss of information.
- Recorded lectures could remove the need for note-takers.

- Recorded lectures did not require students' presence in class to record if they were sick or had doctor's appointments.
- Finally, bureaucracy could be abolished if generalised access to online learning content were made available.



Figure 2.6. Incompatibility and compatibility of RAs and Online Learning with HD student modus operandi and well-being needs.

2.7 Recommendations

Further investigation of the following areas (in the context of the three themes: academia, disability, and welfare) is required to support students with hidden disabilities in HE:

- The strengths and weaknesses of online learning tools.
- The strengths and weaknesses of the on-campus learning environment.
- Adequate accommodations for a broader hidden-disability population as opposed to students with ADHD alone.
- The perceptions of HD students, specifically those with mental health conditions, on disability and identity in HE.

2.8 Conclusions

RAs have been correlated with positive academic outcomes when utilised by students with hidden disabilities. However, they are insufficient as sole support since they cause more distress to some, are not available to all, and often go unutilised due to the additional effort or privacy and dignity issues associated with them. In addition, they to not address campus environmental issues. In contrast, online education tools were found to be highly compatible with the modus operandi of HD students and directly improved grades in addition to well-being. However, fully online teaching delivery methods risk feelings of isolation and increased stress levels for some HD students.

A gap in the literature is a narrowed focus on HD student perceptions of online learning tools compared to accommodations and on-campus learning in the context of academic success, disability compatibility, and welfare. Research of this nature is now more attainable due to the experiences of learning online and in newly-adopted blended environments due to the COVID-19 pandemic.

Chapter 3: Research Design

This chapter presents the research process, including the methodology, methods, pilot phase, data collection, implementation, ethical considerations, delimitations, and conclusions.

3.1 Methodology

This study used a convergent mixed-methods approach including quantitative and qualitative primary data collection and analysis methods. Based in the post-positivist paradigm, the research used an ethnographical strategy with an etic approach to explore HD student perceptions of HE. The three elements of HE explored with them included 1) online learning, 2) on-campus learning, and 3) disability support services through the lens of three themes: 1) academic compatibility, 2) hidden disability-compatibility, and 3) welfare. These themes were explored to determine best-inclusive practice for HD students, and, in addition, the extent to which online learning could replace RAs. This chapter describes the research paradigm, approach, and design used to achieve this.

3.1.2 Epistemology and Ontology

According to Crotty (1998), the first step of any research process should be to take ones' stance on the nature of knowledge. This stance then dictates every element of the research process from the theoretical perspective to the research questions, and all methods and tools selected to answer them. While epistemology focuses on how "what is" comes to be known by the researcher, ontology simply focuses on what exists, and, as Crotty asserts, these two beliefs are informed by one another (Crotty, 1998, p.10). This research takes an objectivist stance, that is, that there is a universal truth about reality, and assumes a realist ontology – therefore, the research was designed in adherence with scientific processes. However, it was further enhanced by post positivism and critical theory, which influenced the interpretation of results. Results were not interpreted as the absolute truth (Phillips & Burbules, 2000). Rather, that the truth in the findings could be deemed to be as accurate as the tools designed to measure them could

45

allow. In other words, the exploration of truth in the analysis phase was directly limited by the limitations of the survey instruments.

3.1.3 Research Paradigm

The research was based in the post-positivist paradigm and lead by critical theory in which a core objective was "the emancipation of individuals and groups in an egalitarian society" (Cohen et al., 2007, p.26 as cited in Mack, 2010, p.5). The "passion" for justice that motivated this research was cited by Anne B. Ryan (2006) as one of the elements of the post-positivist approach that differentiates it from positivism (Eagleton, 2003: 134 as cited in Ryan, 2006, p.18). In the context of this study, the aim was to establish best-inclusive practice in the HE curriculum for HD students in relation to digital tools, disability support services, and the campus environment. The need to explore this was established from literature review findings, which identified areas in need of improvement for HD students in HE. In addition, it was observed during this research that post-positivism is as much about problem-setting as it is about problem-solving (Ryan, 2006). The review identified that more research of a narrowed focus was needed to explore student perceptions of HE. The research methodologies and tools were selected and designed in accordance with this.

3.1.4 Ethnography

Methodology is the "strategy, plan of action, process, or design" that informs the choice of research methods (Crotty, 1998, p.3). The recommendations that informed the literature review strategy also influenced the research design. These were Bunbury's (2018) guidelines for best practice in inclusive curriculum design, that of co-creation with the student body. For this reason, in-depth, semi-structured interviews and surveys with HD students were selected as data collection methods to capture the student voice, a core element of ethnography in Higher Education, according to Farrer-Williams, Sullivan, and Woodall (2018). This research aimed to explore HD student perspectives of three elements of HE: online learning, on-campus learning, and disability support services. The research aim was inspired by an identified problem concerning equity in HD student grades

and welfare, a common rationale for ethnographic research (Eriksson, & Kovalainen, n.d.)

An online questionnaire was chosen for dissemination to all third level students and recent graduates. The survey alone could not support an ethnographic strategy as it was too-far removed from participants, but the frequency of results could be used to make generalisations about the wider HD student population. In-depth semi-structured interviews with HD students were chosen to further explore their perceptions of the three elements of HE during the COVID-19 pandemic, when observation was not possible. Data from both primary research methods and the literature review were triangulated and continuously scrutinized to explore HD student perceptions of the three themes in HE, and their perceived effects on academia and welfare.

3.1.5 Reflexivity

Objectivity is required in ethnographic research, conducted with an emic approach (Eriksson & Kovalainen, n.d.). Reflexivity – self-reflection of the researchers' background and values – is required to remain objective (Reeves, Peller, Goldman, & Kitto, 2013).

My background included a role in a university, a Students' Union, in digital education, and, in addition, experience as an undergraduate student with a chronic illness. These experiences could have fostered bias in several directions. My professional background in learning and development, experience with e-learning content development for education and the workplace, and proclivity for online learning (which led to my selection of the 'Digital Innovator' pathway on the MSc Education), could have fostered a positive bias towards online learning tools. This, in turn, could have influenced the design and analysis phases of this research (Maxwell, 2005, Corbin & Strauss, 1998), where I could have interpreted perceptions of digital tools in an excessively positive manner. In contrast, my experience working directly with a technological university could have fostered a positive bias towards HEI procedures, where student perceptions were underappreciated compared to the efforts of HEI staff. Yet, my experience as a Student Advisor in a Students' Union could have fostered a positive bias towards student experiences over HEI procedures, where student complaints could have been been

47

analysed with positive bias, and the efforts and processes of HEIs undervalued. In addition, my experience as an undergraduate university student with a chronic illness could have also fostered a positive bias towards the former. Yet, it was these very experiences that influenced my passion to explore ways in which HD students could be better supported in HE. An etic approach was still possible due to the fact that several aforementioned factors were no longer at play during the time of the study. I did not:

- Work in Higher Education (during the second year of this study).
- Work in digital education.
- Work for a Students' Union.
- Have a chronic illness that prevented the continuation of my studies.

I acknowledged my possible biases throughout the research process, through to analysis, recommendations, and conclusion. To mitigate these possibly biases, data was repetitively scrutinised. Interpretations of data that identified student preferences for online or on-campus learning, or student complaints about HEI staff or procedures were revisited and analysed to address possible sub-text or alternative explanations.

3.2 Research Approaches Used in this Study

3.2.1 Convergent mixed-methods

The study took a convergent mixed methods approach to generate a nuanced and in-depth understanding of HD student perspectives (Figure 3) (Creswell, 2015) in relation to three elements: 1) online tools, 2) on-campus classes, and 3) disability support services - in the context of academic affairs and welfare.

The convergent mixed-methods approach provided the opportunity to triangulate and validate the different forms of data from this study and with the literature review data. The mixed method tools included an initial online questionnaire with open-ended and closed questions, and follow-on semi-structured in-depth interviews. A questionnaire could reach a larger population of students' compared to interviews alone; thus, could be used to collect quantitative and qualitative data. The quantitative data from the questionnaire could be used to determine the frequency of results but could not be used to explore respondent perspectives in an in-depth manner. The qualitative data from open-ended questions on the survey the semi-structured in-depth interviews could be used to explore student perceptions on a deeper level but could not be used to make generalisations about HD student experiences. In addition, open-ended questions on the form and in interviews provided the opportunity to problem-set in alignment with the postpositivist paradigm (Ryan, 2006).

Combined, the convergent mixed-methods approach included the strengths of both quantitative and qualitative research methods where the latter gave context and meaning to the former, and the former demonstrated frequency of results which further validated the qualitative data (Griffin & Museus, 2011).





3.2.2 Primary Data Collection from other sources

Anonymous academic records pertaining to grades, withdrawals, failures, and RA use were requested from the researchers' disability and exams offices, respectively. This was to establish the true academic circumstances of HD students compared to their peers, to address a gap in the literature which was also found to lack valid comparative data on HD student performance across HEIs (Kilpatrick et al., 2016), and to potentially validate research claims that HD students perform worse academically than their peers (MacLeod, Allan, Lewis & Robertson, 2017, Kilpatrick et al, 2016, Strnadová, Hájková & Květoňová, 2015). The requests were denied by both departments due to the technological university's data protection policy (TU Dublin, 2020).

3.2.3 Questionnaires

An online questionnaire was chosen as the primary research instrument. The rationale behind this decision was based on the alignment of the research goals with Gibbs' (2012) recommendations for the use of questionnaires (Table 3).

Table 3

Mapping research aims to Gibbs' (2012) recommendations for the use of online questionnaires.

Gibbs (2012) rationale for questionnaires	My research goals.		
as research instruments.			
1) "The researcher has already	1) The literature review provided me with		
formed a good idea of what	extensive pre-existing knowledge of HD		
questions need to be asked."	student experiences with RAs and online		
	learning through in-depth interviews.		
2) "The researcher is interested in	2) Mean, Mode, and Median responses		
the frequency of results."	were necessary to establish the level to		
	which the HD student population		
	preferred particular teaching and		
	learning tools, and RAs.		
3) "The researcher is interested in	3) If frequencies were identified that		
making generalisations to a wider	skewed in favour of particular aspects of		
population."	HE, and those preferences matched results		
	from similar studies in the literature		
	review, this data could be used to fulfil		
	the post-positivist drive to incite positive		
	changes for HD students in HE.		

Note. Questions taking from "Question types and piloting [YouTube]." (Gibbs, 2012).

3.2.4 Survey Tool Selection Criteria

A considerable amount of time was spent on the research, pilot phase, and final design of the online questionnaire due to additional disability accessibility requirements.

Multiple survey tools were assessed. The three objectives that guided the choice of survey tool were 1) accessibility, 2) completion, and 3) affordability which would all contribute to survey completion rates (Figure 3.1).



Potential barriers to access and completion.

Potential supports to access and completion.

Figure 3.1. Barriers and supports to online questionnaire survey and completion as determined by the researcher.

3.2.5 Accessibility

Online survey tools were assessed to determine the most accessible for use in this study. The assessment was completed in addition to cross-checking each tool's Web Compliance Accessibility Guidelines 2.1 status (WCAG 2.1., 2018). Microsoft Forms and Google forms were determined to be the most accessible

options and were trialled. Microsoft Forms was the ultimate choice by way of *general accessibility* and *disability accessibility* due to its WCAG 2.1 status, preintegrated screen reader, dyslexia-friendly off-white background (British Dyslexia Association, n.d.), cost, section or "chunking" options (CAST, n.d., para 1), and finally, mobile optimisation. Mobiles were the primary mode of web access for college-aged students (CSO, 2019), therefor tools that enabled mobileoptimisation would increase immediate student access to the questionnaire and increase potential participation rates. A progress bar was incorporated to provide navigation to respondents and drive completion rates (Jenkins & Dillman, 1995).



Figure 3.2. Statistics on internet use per device. Reprinted from "Frequency of Internet Usage" (CSO, 2019).

In relation to chunking, MS Forms enabled multiple Likert scales per question, whereas Google Forms required an additional question to be created for each Likert scale, which lengthened the form, and required additional sections to be created to group related questions. This risked "navigational disorientation" (Christopher & Richard, 2015, p.216) for HD respondents, and difficulties with sustained focus for ADHD respondents. A side-by-side comparison of the sectioning options is demonstrated in Figure 3.3.

		ne lecti	ires?			
em to class	room le	arning.				
	1	2	3	4	5	
oletely Disagree	0	0	0	0	0	Completely Agree
e that I can learn f	rom the	e comfo	ort of m	y home		
completely Disagree	1	2	з	4	5	Completely Agree
I like that I can learn f	rom the	e comfo	ort of m	y home		
	1	2	3	4	5	
Completely Disagree	0	0	0	0	0	Completely Agree
like that I don't have	to trav	el to th	em.			
	1	2	3	4	5	
Completely Disagree	0	0	0	0	0	Completely Agree

B:

Note. A = Google Forms, B = Microsoft Forms.

Figure 3.3. Likert scale question grouping options on Google Forms and Microsoft Forms.

In accordance with CAST's (2018) Universal Design for Learning (UDL) guidelines, accessibility should be achieved while still maintaining standards. Thus, accessibility was sought, but not to the detriment of research quality and potential completion of the survey. The complete assessment process of each survey tool, their corresponding results, and WCAG 2.1 statuses are detailed in Appendix I.

3.2.6 MS Forms Question Design

Questions were constructed that could answer the research questions. They were guided by the three elements in HE and centred on the three themes: academic compatibility, hidden disability compatibility, and welfare. Some questions were devised based on findings from literature review studies to analyse divergence and convergence from other HD student perceptions, if they could in-turn answer the research questions. Appendix J outlines the studies, their associated questions, and

A:

the corresponding questions in this study. The vast majority of questions featured Likert scales in order to gather quantitative results in relation to Means, Modes, and Median responses related to student perceptions of teaching and learning tools.

Oppenheim (1992) recommends that all Likert scale questions start out openended during the pilot phase. The data would then be extracted, and closed-ended questions developed based on the prior open-ended results. For this research, previously reviewed articles provided the necessary information to shape questions, including data extracted from in-depth interviews, thus, this step was deemed unnecessary (Bauman & Adair, 1992). However, many open-ended questions were included where prior research was not possible, for example, to query the hidden disabilities of respondents (Appendix K).

Efforts were made to avoid leading questions, for example, "why don't you go more often to the supermarket" would have suggested that a person should go more often (Gibbs, 2012, 12:19) Simple language was used to be comprehensible to the general student population.

3.2.7 Interview Design

The literature on interview question design was consulted, and a semi-structured, in-depth approach was taken in accordance with an ethnographic strategy. This method was chosen to provide the opportunity to explore a more detailed and meaningful perspective of the HD student experiences. More accurately, the interview fell somewhere between unstructured and semi-structured. Open endedquestions were first. The main focus was to support interview participants to tell their stories, to hear their perspectives about the three themes in HE, and to provide the researcher with data that could support problem-setting (Ryan, 2006). In addition, to "activate the respondents'...stock of knowledge." (Richie & Rigano, 2001, p.744, as cited in Ryan, 2006, p.19). The structured questions, asked at the end of the interview, provided the opportunity to answer research questions if they had not already been addressed voluntarily by the interviewee, and to explore the meaning behind certain responses (Harvard University, n.d., Nadan, 2018). Some questions were inspired by the participants' questionnaire answers if they were deemed relevant to the interview or to have required further exploration. Field notes were recorded, but only occasionally. The core objective

54

of this process was to engage in active listening. Too many field notes could have caused the interviewer to become distracted (Raymond, 1992).

3.3 Pilot Phase

3.3.1 Pilot Participants

A retired primary school Special Educational Needs teacher, a board member of the National Disability Authority in Ireland, a university staff member with dyslexia at the researcher's university, a student with ADHD who had completed their final year of a level eight degree online during the pandemic at a different HEI, and a Master's student with a hearing impairment piloted the survey. Their feedback was implemented in the redesign process. A recent graduate with ADHD took part in a pilot interview.

3.3.2 Pilot process

The pilot phase took place over a two-month period- longer than anticipated – due to technical issues with MS Forms. Several question were not visible to pilot participants, or in MS Forms' preview mode. A troubleshooting process was conducted with research into potential causes and solutions. Other MS Forms users reported similar difficulties on the Microsoft technical support community forum in 2020 with no official resolution (Appendix L). The issue was determined to be related to the branching feature. Branching was removed, which lengthened the survey, thus, the questions were revised. Some were excluded to shorten the form and contribute to potential completion rates.

3.4 Data Collection

3.4.1 Sampling

Selective-sampling was used to invite third-level students and recent graduates in Ireland to participate in an online questionnaire and follow-on interview. The aim was to recruit students with and without hidden disabilities in order to analyse the data with a control group present. The literature review found control groups to be a useful tool in the exploration of HD student opinions and noted an inflation of outcome, positive and negative, for HD students compared to their peers in several areas. This study aimed to further explore this trend.

The invitation to participate was extended via email to several HEIs, Students' Union Officers, and disability organisations in Ireland (Appendix M). Expressions of interest requests in the survey's dissemination were emailed to disability offices and access departments in 22 Irish HEIs on February 16th, 2022 (Appendix N). The same email was sent separately to Education, Welfare, Disability Officers and Presidents of 20 Students' Unions in Ireland, and the Union of Students' in Ireland on March 4th, 2022, and individually to five organisations that focused on disability in Ireland. Just five responses were received, all from within HEIs, with agreements and rejections of dissemination for several reasons – in particular, data protection policies prevented dissemination of surveys from third parties (Table 3.1).

Table 3.1

Disability and HEI Access office responses to expressions of interest in survey dissemination.

Service	HEI	Disseminated	Via	
Disability Office	University College	Yes	Weekly newsletter to	
	Number 1.		disability service users.	
Disability Office	University College	No	Cannot share surveys	
	Number 2.		from third parties to	
			users.	
Disability Office	Technological	No	Data Protection Policy.	
	University			
Learning	Private HEI	No	Long ethics approval	
Support Office			process incompatible	
			with research timeline.	
Access Office	National College	No	Data Protection Policy.	

Note. University College locations not provided in order to protect anonymity.

3.4.2 Posters

A poster with a quick access code (Figure 3.4) was created on Canva.com and posted to approved notice boards and other areas on March 1st on the following campuses in Dublin city:

- Trinity College Dublin.
- TU Dublin, Grangegorman

In order to appeal to more male participants, a different version of the poster without the image of a female (Figure 3.5) was created and posted in designated areas on March 19th in:

- University College, Dublin.
- National University of Ireland, Maynooth.

Approval was sought from the TU Dublin Students' Union Education Officer in November 2021 to disseminate the survey to class representatives in advance of its development. Approval was received. The survey was shared on the TU Dublin Students' Union Instagram page on March 1st (Figure 3.6).



Figure 3.4. Online questionnaire poster pinned to noticeboards at TU Dublin, Grangegorman and Trinity College, Dublin.



Figure 3.5. Second online questionnaire poster with amendments posted to approved noticeboards at NUI, Maynooth, and University College, Dublin.



Figure 3.6. Social media post on the TU Dublin SU Instagram page inviting students to participate in the online questionnaire.

3.5 Implementation

3.5.1 Online Questionnaire

The online questionnaire was open to students in the four participating HEIs for an extended period of time from March 1st to April 12th, 2022 due to the low response rate. There were a total of 22 responses. The form was closed on April 16th, 2022. It was reopened on April 16th, 2022 for an interview participant who was recruited by way of selective sampling and closed again once they had completed the pre-interview survey. This will be discussed further in Chapter 4: Results, analysis and discussion.

3.5.2 Interviewee Recruitment

Online questionnaire participants who progressed to the final hidden disabilitythemed section of the survey were asked to optionally submit their email in order to be invited for interview. They were advised on this section of the form that the interview would be about their experiences with online learning, on-campus learning, and disability support services. Ethical procedures were strictly followed and participants were advised that the disclosure of their email would negate the anonymity of their of their form responses. They were advised in this section also that the interview would take place online and be recorded, and that they could withdraw at any stage before, during, or after the interview took place.

3.5.3 Interviewee Correspondence

Two participants volunteered their emails. The researcher remained in correspondence with both interview volunteers up until the time of interview. Details of the correspondence process are outlined in Figure 3.7. The Zoom platform was chosen due to an issue with the researchers' Microsoft Teams account which disabled the record feature, as was discovered during the pilot phase.



Figure 3.7. Interviewee correspondence process.

3.5.4 Interview Processes

The two interviews proceeded with the first volunteer on April 4th, 2022 at 4pm and the second on April 20th, 2022 at 12pm on Zoom. The interviews began with a reiteration of the research purposes, and ethical, research, and safety procedures (detailed in **Appendix O**). The first interview question was open and general to support both the stimulation of recall, and the participants' comfort with dialogue. They were asked about their journey in HE so far. Points of interest were picked up on by the researcher and asked of the participant, whether they were related to the research questions, repeated consistently by the interviewee to the point of importance, or required further information in order to gather an accurate picture of the interviewee's situation and opinions.

The researcher took a small number of field notes since the purpose of this interview was to actively listen to the interviewees (Raymond, 1992). The interviewees were informed that all results, analysis, and conclusions made about their interviews would be sent to them for approval before publication.

61

3.6 Ethical Considerations

A number of ethical considerations have already been addressed in sections of this research design chapter where relevant. This section will address the overall approach to ethics in this research.

3.6.1 Ethics in Research Design

Creswell (2009) recommends that researchers consider ethics at every stage of their study and anticipate appropriate ethical responses to unplanned dilemmas. Ethical considerations were made at each stage of this research during the design, participant recruitment, primary research, analysis, and results phases.

3.6.2 Ethics Committee Approval

Approval was sought from the researchers' university ethics committee for several reasons. Participants were asked to disclose information about their disability on the online questionnaire and during the interview process, which could have caused distress to some. Consent was also sought to record the online interviews, for the collection of student academic data from the disability office and exams office, the collection of voluntary student data on the online questionnaire, and the disclosure of a hidden disability by students on the online questionnaire and during the interview process. The Research Ethics Committee approved the study procedures on May 16th, 2022 (Appendix P). Students under the age of 18 were excluded from participation. Should students under this age have selected a corresponding age bracket on the demography section of the form, they were taken to the end of the survey and advised that they were ineligible to participate (Appendix Q). In addition, the researcher was a trained Student Advisor with certificates of completion in both SAFETalk and SAFEAssist (Appendix R), which interviewees were advised of.

3.6.3 Participant Anonymity

Every effort was made to protect the anonymity of participants. The online surveys were anonymous- emails and names were not recorded, and age-range information rather than specific age information were requested. As mentioned, the small number of participants who disclosed their email in order to be invited to interview were advised before the online submission of the form that the act of doing so would reveal their identity to the researcher, which would in turn be associated with their questionnaire answers. The gender-specifics of some interviewees were not disclosed due to the minority in which some fell. This is explained further in the findings. The results were reviewed by a published author in the area of data anonymity, who validated the processes in place (Gordon, n.d.).

3.6.4 Informed Consent

Full information was provided on an information sheet above the survey outlining the purposes of the research, what was required of the participants, and a check box to confirm their understanding of the process (Appendix Q). The form included information that participants could withdraw from the study at any stage, stop the interview at any stage, or request to withdraw their results after the study.

Prospective interview participants were advised before, during, and after the interview that they were under no obligation to participate and could withdraw from the interview at any stage. Final interview participants were contacted prior to interview with information about:

- Informed consent.
- The purpose of the research.
- Possible benefits of the research.
- The structure of the interview.
- Non-obligation to continue at any stage.
- Right to withdraw at any stage before, during, or after the interviews.
- Interview recordings and university cloud storage of the same.
- The interview transcription process.
- Correspondence after the interview of the interpretation of their results for approval by them.

Artefacts of the correspondence with interview participants are not included in this study for data protection purposes, since the content of the emails revealed information about email providers, which would reveal their HEI.

3.6.5 Incentives

A decision was made against the provision of incentives to encourage survey participation for two reasons; acknowledgement of the British Educational Research Association (BERA) (2018)'s ethical guidelines, and practical considerations. BERA noted that payment to research participants is generally discouraged (p.25), and since the form was to be anonymised, participants could not be identified for a raffle process nor contacted to provide the incentive. In addition, there was no definitive data available in the literature to conclude that the provision of incentives would increase survey response rates (Bernstein & Feldman, 2015).

3.7 Delimitations

This research is about student and HD student experiences in higher education in relation to online learning, on-campus learning, and disability support services through the lens of academic success, hidden-disability compatibility, and welfare. That is, it is about HD student engagement with the curriculum, and the effects that engagement has on their academic performance and well-being. This research did not focus on:

- Access or entry to third level education.
- HD Student experiences of second-level or primary-level education.
- HD Student experiences outside of the HE curriculum.

Data protection impacted the scope of this research on three occasions:

- *Dissemination*: some disability offices could not forward surveys from third-parties to their registered users.
- *Data collection*: The researchers' own HEI could not forward anonymous student data to do with academic performance or use of accommodations, thus, primary data analysis could not be carried out to validate reported rates of lower academic success in HE students, nor could they be compared to the grades of this study's population. In addition, analysis could not be conducted on the academic circumstances of HD students who utilised and did not utilise accommodations (TU Dublin, 2020).
- *Implementation:* The Covid-19 pandemic reduced the possibilities of physical interactions with research participants, and on-campus attendance that was possible during the implementation phase.

These factors influenced the greater proportion of focus on student perceptions of teaching and learning tools and academic compatibility, rather than a combined case-study of the academic circumstances of HD students with a perceptions-based study of teaching and learning tools. Respondents were not asked to disclose their grades as there was nothing to compare that data to. What started as a limitation became a delamination.

3.8 Conclusions

The design of this study was considerate of the research questions, aims and objectives, and barriers that shaped the scope of the design. An ethnographic strategy, supported by an online questionnaire and in-depth, semi-structured interviews with HD students could provide an opportunity to collect data on their perceptions of different aspects of HE life through the lens of academia, disability, and welfare. The analysis and publication of this data could then inform HEIs of appropriate inclusive curriculum practices from the point of view of students with hidden disabilities.

Chapter 4: Results, evaluation, and discussion.

4.1 Introduction

This chapter presents the results, with their evaluation and discussion. Ethnographic research is used to gain a deeper understanding of participant perspectives, whether quantitative or qualitative data is collected (Eriksson, & Kovalainen); thus, the discussion section has been combined with the results to provide more opportunity to focus on meaning. Interview results are interspersed that validate or contrast with the online questionnaire data, or provide more context to the quantitative and qualitative questionnaire results. Results are presented in sections relating to the research questions, preceded by an overview of the data analysis methods, respondent profiles and demographic data analysis. Results pertaining to online and on-campus learning are presented concerning the three themes: academic compatibility, hidden-disability compatibility, and welfare. Emerging themes identified in the interviews that did not relate to the research questions are presented summarised at the end of this chapter, and detailed in Appendix AA.

4.2 Analysis of results

4.2.1 Quantitative Data Analysis

Questionnaire responses were exported to Microsoft Excel. Inferential statistical analysis was conducted on the quantitative data from Likert scale responses to determine Medians, Means, and Modes per teaching and learning tool and, in addition, to examine similarities and differences in student perceptions of each tool. Results per respondent hidden disability-type were extracted and examined to derive similarities and differences in perceptions between groups. This process was implemented since several studies from the literature review focused on specific conditions; thus, findings between groups could be assessed for divergence or convergence from literature review results and, potentially, used for comparative analysis in future research.

66

4.2.2 Qualitative Data Analysis

Interview recordings were downloaded as MP4 files from the Zoom platform and uploaded to Otter.ai. Interview transcripts and qualitative data from the online form were thematically analysed. Results from both sources were triangulated to derive a deeper meaning from the quantitative data (Creswell, 2015). This is also known as method triangulation (Denzin, 1970) (Figure 4). According to Reeves, Peller, Goldman, and Kitto (2013), triangulation in ethnographic research is an "important aspect of data synthesis" that is a "contextually rich and representative articulation of what is being studied" (p.1369). Themes were identified based on prior themes in the literature review, repetition of ideas, the interviewee disclosed a topic as important (Sadala & Adorno, 2001). Themes were coded and revisited until no new themes emerged.

Туре	Descriptor
Data triangulation	Involves the use of different sources of data to examine phenomenon across settings and at different points in time
Method triangulation	Entails the use of multiple research methods to compare and contrast different insights each method may provide
Investigator triangulation	Involves different investigators gathering data to produce more complex empirical accounts by understanding possible differences
Theory triangulation	Where different concepts and theoretical per- spectives are used to see how each illumin- ates the data in different ways

Figure 4. Four types of triangulation in data analysis (Denzin, 1970). Reprinted from "Ethnography in qualitative educational research: AMEE Guide No. 80" (Reeves et al., 2013, p.1370).

4.3 Online questionnaire response rate and associated limitations

The online questionnaire received 22 responses. This number ensured a rich diversity of perspectives was captured (Agresti & Min, n.d.). However, it was too

low to make statistically significant generalisations about the wider HD student population (Gibbs, 2012).

What was possible was a comparative analysis of the samples' perspectives with respondent perspectives in similar studies. There were no restrictions on the analytical possibilities of the qualitative results from the survey, which provided meaningful data, and supported the process of problem-setting in this postpositivist research paradigm (Ryan, 2006). In addition, Lanford, Tierney and Lincoln (2019) argue that individual accounts may support a 'multi-dimensional frame that can elucidate many social processes and critically examine others,' and are as valuable as more extensive data sets, which the interviews and qualitative data provided (p.459).

Although, as outlined in Chapter Three, the data collection process was designed to recruit a sample of all students with and without hidden disabilities, 20 (90.91%) respondents reported living with at least one condition. A control group of just two respondents was present, and, in addition, both were female, which also limited the range of perspectives within the group. For this reason, adequate comparative analysis with a control group was not possible but was carried out for context and comparisons in future research. In addition, inflation of outcome for HD students was identified in the literature review, but could not be observed in comparison to a small control group.

4.4 Demography

This section will address the demographic details of survey respondents concerning:

- gender
- age range
- academic profiles
- reported conditions
- medical diagnostic status
- disability service registration status

A complete profile of each respondent with the corresponding demographic details are outlined in Appendix S. Age ranges were reported in place of specific ages to protect anonymity. Just one participant was transgender, thus, in order to preserve their anonymity, the male or female aspect of their gender has not been disclosed. In addition, 100% of the control group (two respondents) were female.

4.4.1 Academic Circumstances

One Master's students fell into the age range of 30-35. The Mode profile of respondents (81.82%) was that they were:

- undergraduate students
- not repeating a year of their third level qualification at the time of participation
- had never repeated a year of third-level education before participation
- had never taken a year off between years or between second-level and third-level
- fell into the typical age range of an undergraduate student (18-23).

One participant fit the above profile but was in the age range of 24-29 years old. Of all participants, one, who was still enrolled on the first year of a programme, disclosed that he would be repeating a full year of study the following academic year. This respondent explained in the optional comment box (connected to a form question about repeating a year) that mental health was his reason for repeating.

4.4.2 The academic circumstances of this population compared to the broader population

This study's population were quite academically successful compared to government reports and findings from the literature, which stated that the average age range for HD students to complete third-level studies has increased since 2011 (NDA, 2018). However, this population matched the Modal age range of the general third-level student population (Higher Education Authority, 2018). There was also a low percentage of the respondents in a position to repeat; however, due to the data protection limitations, this cannot be compared to data on HD failure rates in Ireland. In addition, the control group was too small to compare academic circumstances to.

4.4.3 Respondent programmes of study

Figure 4.1 represents the range of programmes on which respondents were enrolled. The highest reported programme was in the field of science, reported by 23% of respondents. Individuals' programmes have not been associated with participant profiles to protect anonymity.

Clinical Measurement analysisFilm and broadcasting Measurement Science Physics Medicinal Chemistry Medical Physics Science Applied bioanalysis DNA and Forensic Biomedical Pharmaceutical Sciences Forensic Science International Business Visual Effects Mechatronic engineering

Figure 4.1. Word cloud of programmes survey participants reported they were enrolled on.

4.4.4 Hidden Disabilities

Two of the total 22 respondents reported no conditions (9.09%). The remaining 20 respondents reported a range of conditions. Figure 4.1.1 represents the range of conditions disclosed by respondents with the terminology they used to describe them. Their associated condition categories are presented in Table 4 with the frequency of occurrences by respondent and frequency of comorbidities. The National Disability Authority's *Appropriate Terms to Use* (NDA, n.d.) informed the category naming conventions. Regardless of the respondents' official diagnostic status, all disclosed conditions have been included.

A more detailed presentation of the specific conditions in each category and their frequencies are presented in Table T1. The details of each respondent and their associated number of conditions per category are presented in Table T2. An

analysis of the most common comorbidities is presented in Table T3. These tables were created to display the variety simultaneous conditions participants lived with during this study.

5 respondents (25%) answered Any	xiety Disorder for this questio	n	
ovary syndrome	ADHD diagnoses	Hearing implement	
bowel syndrome Social Anxiety	Anxiety Di	Processing Disorder kidney disease SORDER bipolar disorder	
Disorder and Scoliosis Compulsive Disord	kidney ADHDdo	spectrum disorder Spression depression and BPD	
	hormone deficiency	/ Myalgic encephalomyelitis	

Figure 4.1.1 Range of conditions disclosed by questionnaire respondents.

Table 4

Respondent conditions by category, frequency of occurrences, and frequency of comorbidities.

Condition	Number of	Percentage of	% with	% without
	rospondonts	HD	another	another
	respondents	respondents	condition	condition
Deaf/hard-of-	3	15%	66.66%	33.33%
hearing				
Mental Health	11	55%	63.63%	36.37%
Neurodiversity	7	35%	28.57%	71.43%
Neurological	2	10%	100%	0%
Physical	9	45%	66.66%	33.33%

4.4.5 Hidden disabilities, mental health, and the wider population.

A point of concern among this study's population was the Modal condition anxiety disorder - present in 45% of the hidden disability group. This finding was consistent with several national and international studies which reported the prevalence of mental health conditions among third-level students (Auerbach et al., 2018, Jigsaw & UCD School of Psychology, 2019, USI, 2018). Three respondents reported mental health as a sole condition. However, further analysis of their responses did not reveal personal identification with disability since the form was open to all students. They were asked to name their condition, not disability. In addition, the most common occurrence of comorbidities was in participants with physical and mental health conditions – 30% of the hidden disability respondents and 54.55% of respondents with comorbidities.

4.4.6 Diagnoses and Disclosure

Table 4.1 outlines respondents' respective diagnostic and disability service registration statuses in percentages. Complete participant profiles, which include the specific diagnostic and registration status per respondent, were outlined in Appendix S. These results demonstrated a direct correlation between diagnostic status and HEI disability services registration status: 100% of the undiagnosed group were also 100% of the unregistered group. In total, one-quarter of the HD respondents fit this description. Within this group, three-quarters were in the process of obtaining a diagnosis, and one-quarter were not. Those with a mental health condition were the most likely to be unregistered and awaiting diagnosis. Those with a mental health condition and no other conditions were the most likely of all students to fit this description. These findings are discussed further in Section 4.9.

Table 4.1

Diagnostic statuses of questionnaire respondents and corresponding percentages.

72
Disability	Percentage	Diagnostic status	Percentage
registration status			
1. Registered:	75%	Officially diagnosed	70%
		for all conditions:	
1. Of whom were	0%	In the process of being	20%
officially diagnosed		diagnosed for one or	
for one or more		more conditions:	
conditions:			
2. Not registered:	25%	Not officially	5%
		diagnosed for any	
		conditions and not	
		awaiting diagnosis:	
2. Of whom were	100%		
officially diagnosed			
for one or more			
conditions:			

Note. ** hidden disability.

4.4.7 Comorbidities in the context of this research and associated limitations. As would be typical, multiple respondents reported co-occurring conditions, thus reports that differentiated results by condition categories include repetitions of the same answers. Thus, some answers have been reported multiple times across condition categories. The only group in which all participants reported one condition was the SpLD group which consisted of three participants – two with dyslexia and one with dyspraxia.

4.4.8 Demography of the interview participants

As discussed in Chapter Three, two participants went forward with the interview process. They are referred to as IV1 (interviewee one) and IV2 (interviewee two) throughout this study.

4.4.8.1 Interviewee profiles

A full demographic profile of IV1 is outlined in Figure 4.1.2 A full demographic profile of IV2 is outlined in Figure 4.1.3.

IV2 was recruited through convenience sampling after another interviewee withdrew. Their HEI was not included in the list of HEIs the survey was advertised to. In addition, his programme was originally delivered on-campus but moved online after COVID cases started to rise. He explained that other programmes eventually returned to campus, but his remained fully online to accommodate high-risk staff.



Figure 4.1.2. Demographic profile of Interviewee One (IV1).



Figure 4.1.3. Demographic profile of Interviewee Two (IV2).

4.4.8.3 Interview Limitations

One of the two interview participants was not registered with their HEIs disability support services, so it was impossible to explore their perceptions of those services. The second interview participant was also an outlier in that they had arranged to repeat their year of study due to failed assignments and exams that year – unlike other respondents. In addition, they were contacted via convenience sampling, so their experiences were based on attendance at a HEI that the other respondents did not attend.

4.5 Participant Teaching Experiences and Preferences

This section presents participants' preferences and experiences with various online and on-campus teaching and learning tools.

4.5.1 Experiences with online learning tools.

One hundred per cent of respondents were engaged in some form of online learning during the academic year that the survey took place, as represented in Figure 4.2.



Figure 4.2. Percentage of online learning tools respondents had experience with during the academic year of the survey.

Note. The full sentence for '*Notes and resources on Bright*' was '...Brightspace or your campuses' VLE, or Hyflex.'

4.5.2 Ideal Teaching Delivery Methods

Most of the 22 survey respondents said they would prefer a blended-delivery method for their programme (online and on-campus) (Figure 4.2.1). Just one respondent, who had several physical and mental health conditions, which included IBS and anxiety, selected that their ideal delivery method would be entirely online. Among the 39% of respondents who would have preferred to learn entirely on-campus were 100% of the control group. In addition, the majority were engaged with a wide range of online teaching and learning tools such as lecture recordings, VLE resources, and live lectures.



Figure 4.2.1. Ideal teaching methods of respondents in percentages.

4.5.3 Fully online versus fully on-campus

Interviewee two was one of the respondents who would have preferred a 100% on-campus learning environment. This preference was explored further during the interview. He attributed his academic circumstances (he was due to repeat the first year of his programme due to several missed assignments) to the online learning environment and mental health. IV2 associated online learning with more organisational responsibility in relation to assignments and submission dates, and an inability to focus on online lectures.

However, further analysis of his transcript revealed that, when asked what aspects of online learning he has issues with, most of his answers focused on the benefits of the on-campus environment, as opposed to severe issues with the online environment. In particular, on-campus classes provided opportunities to discuss assignments with lecturers and peers. Thus, his issue with the online environment was that it was entirely online and disconnected him from staff and peers, whom he would usually converse with for academic support. This analysis was submitted to IV2, who agreed that the complete removal of on-campus classes played a major role in his circumstances, while less significant aspects of the online environment did.

It was interesting to identify a repetitive pattern in the interview results of IV2 and the three literature articles that focused on completely online learning

78

environments. Participants in both studies perceived increases in stress, isolation, and loneliness in online environments, yet, both research groups suggested that these feelings were not reflective of their online environment or lack of supports but student misconceptions (Lamber & Dryer, 2017, Laslo-Roth, Baraket-Bojmel, & Margalit, 2020). However, researchers should not discount student perceptions. Perhaps disability support services could do more to reach out to students who learn entirely online ?

4.6 What are HD Student Perceptions of Online Learning?

Participants rated the level to which they agreed with several statements about online and on-campus teaching and learning tools. Most questions centred on hidden disability compatibility, academic compatibility, and welfare. Optional comment sections were included with each Likert scale question to generate qualitative data and provide context or deeper meaning to the quantitative data. The Likert scale results of each online learning tool are presented different figures:

- Figure 4.3.1 Live online lectures,
- Figure 4.3.2: Lecture recordings,
- Figure 4.3.3: VLE (virtual learning environment) resources,
- Figure 4.3.4: Online discussion boards.

4.6.1 General overview of perceptions.

Likert scale responses about live online lectures produced the most symmetric data (Figure 4.3.1). For example, 45.5% of respondents did not prefer them to classroom-based learning, 22.7% did prefer them, and 31.8% were neutral. VLE resources were associated with the most skewed data, which was skewed towards an agreement with positive statements between the ranges of 70% - 94.4% of responses and disagreement with a negative statement about them in the same bracket. Lecture recordings and online discussion boards had more symmetrical response data, with skewed responses to some questions.



Figure 4.3.1. Likert scale responses to statements relating to live online lectures.



Figure 4.3.2. Likert scale responses to statements relating to lecture recordings published online after class.



Figure 4.3.3. Likert scale responses to statements relating to virtual learning environment resources.

4.6.2 Strengths and weaknesses

Respondents had varying perceptions of different online tools. In general, online study tools (VLE resources and lecture recordings) received higher marks than online lectures concerning the three themes: academia, hidden disabilities, and welfare. In contrast, live online lectures, of which respondents had differing views, received significantly higher marks among respondents with specific conditions (hard-of-hearing respondents and those with physical conditions) in several areas. Figure 4.4 outlines the most compatible online tools in all areas, and their specific strengths and weaknesses, according to respondents.



Figure 4.4. Strengths and weaknesses of online teaching and learning tools in relation to academia, hidden disabilities, and welfare.

4.6.3 Academic Compatibility

Respondents rated Likert scale questions about academic compatibility. Questions differed per study tool but have been combined and compared under the theme of

academic compatibility. Samples of Likert scale statements that relate to academia include:

- I get better grades when I study with them (lecture recordings).
- They make learning easier (live online lectures).
- They are vital to my studies (VLE resources, lecture recordings).

4.6.3.1 The Least Academically Compatible Online Tool.

Live online lectures were perceived as the least effective online tool by the general student population. However, they still received high marks in connection with academic compatibility (Figure 4.4.1). Those who agreed that they made learning easier were:

- Half of all respondents.
- Hard of hearing respondents (100%)
- Respondents with physical conditions (55.56%).

One possible reason for the negative perceptions of online lectures, found in 36.2% of responses, was inconsistencies with how they were delivered, or technical issues. As Respondent 22 expressed: "They can be good if they are done Zoom style; poor if the lecturer tries to do them classroom style."

In addition, live online lectures were likely more compatible with hard-of-hearing students and those with physical conditions, in all areas, inclusive of academia, due to some of their symptoms. This is discussed further in Section 4.6.4: *Hidden Disability Compatibility*.

4.6.3.2 The Most Academically Compatible Online Tools

Study tools were the most popular online tools, represented by different academiabased questions in Figure 4.4.1, Figure 4.4.2, and Figure 4.4.3. VLE resources were the most compatible in terms of ease of learning and independent learning, Followed by lecture recordings, in which over half of respondents agreed that they got better grades when they studied with them. According to Respondent Three, VLE resources were a "Godsend when you may have missed a lecture an can catch up" and lecture recordings were essential, "Cannot express how helpful lecture recordings are to my studies. I just wish all lecturers recorded videos."

There were a few reported issues with VLE resources. One respondent described inconsistencies in their quality, which depended on the lecturer who provided them. However, this could be said of all classes and resources.

A major issue with lecture recordings was time commitments: 54.2% of respondents thought they took too long to re-watch. This could explain why VLE resources were more academically compatible. Both interviewees reported non-utilisation of lecture recordings due to their associated time commitments, which is a point of concern if students believe their grades improve when they study with them. Interviewee Two compared them to live online lectures and described the impracticalities of *'going back and forth'* to find the information he required. Interviewee One confirmed that they took too long to re-watch, and only did so if speed modulation was enabled:

I only watched recordings if I could modulate the speed. Being able to put it at twice the speed and blast through those notes has been a huge help [but] the lecture recordings, having to watch that whole hour, like that hour could be condensed into ten minutes. (IV1)

IV1 described a possible solution for the issue with recording length. Their lecturer the year prior created condensed lecture-summary recordings after each online lecture. These were akin to the PowerPoint recordings offered to students in Nightingale et al. (2019)'s case study:

We had one module last year where the lecturer, she basically posted all the lectures (online) in that kind of style, where she just went through the information in ten minutes and then we had a quiz at the end of it. I found that really helpful because I could get all the information there. (IV1)

84

There is some additional research to support this. While not explicitly focused on HD students, Humphries and Clarke (2021) examined online student activities over two years. They identified increased interaction with short-form videos compared to didactic lecture recordings of one-hour duration. Clearly, if IV2 had access to more condensed lecture recordings that he did not have to "go back and forth" in, with quick access to condensed and relevant information, he would have found them to be more academically supportive.







Figure 4.4.2. Percentages of participant stances on how supportive VLE resources and live online lectures were to their academic independence.



Figure 4.4.3. Accumulation of results pertaining to the statement "*they are vital to my studies*" in relation to VLE resources and lecture recordings. *Note.* This statement was not given for online discussion boards or lecture recordings.

4.6.4 Hidden-Disability Compatibility

As outlined in Figure 4.4, there were few issues with disability incompatibility among all online tools. However, all tools provided positive condition-specific support to students.

1) Online lectures resolved on-campus attendance issues for those with physical conditions:

It is quite difficult for me to attend lessons all of the time due to my conditions but my course currently doesn't provide online lectures. Forcing myself to attend college while unwell makes me go into a worse flare up on symptoms that lasts longer. (R21)

2) Online lectures provided more volume control and better view of the lecturer (presumably to lip-read) for Respondent 21, who was hard-of-hearing. She explained that "For my hearing, it's easier in online lectures for me to blast my headphones and see my lecturers move their lips."

3) VLE resources and lecture recordings were study resources that supported the executive dysfunction symptoms of a student with ADHD and autism (Alderson, Kasper, Hudec, & Patros, 2013). Their symptoms presented as difficulties with note-taking, long-term retention of information, or study in advance of assignment due dates, or exams:

Sometimes I can't even do assignments until the day they're due. I just can't make my brain due it until the day...but to have that recording that I could go back to when I panic study before an exam, that was really helpful. (IV1)

Holding information in the long term is something I struggle with, so being able to get all the notes online was really helpful. (IV1)

I can't listen to what the lecturer is saying and take notes. I can't take notes. So having all the notes online was really helpful.' (IV1) IV1's comments about VLE resources and note-taking issues were strikingly similar to the comments of a student with dyslexia in Nightingale et. al. (2019)'s study:

If you are in a lecture room, and think "I don't get this", instead of panicking you can think "Oh well – I'll watch it later"... and you can use the lecture recording to get your head around it. (Participant disclosing dyslexia). (p.22)

4.6.4.1 Hidden-Disability Incompatibility

Among the few condition-specific issues with online tools were:

1) Difficulties with sustained focus and attention in online lectures for respondents with ADHD and dyslexia, which Interviewee One disclosed also. They explained that "Actual lectures that were live online I did not pay attention to. I couldn't." Whereas, Respondent Seven struggled to focus at home in addition to highlighting inconsistencies in their technical quality, "Some lecturers internet/devices are bad quality so you miss out on info and chat functions are usually disabled due to the large amount of people in the class and being at home is too distracting."

2) VLE resource difficulties for Respondent Seven who had dyslexia as their sole condition, which related to either legibility difficulties or navigational disorientation, dependent on ones' interpretation of the disclosure, "It really depends on the notes given. Some are great but other lecturers' notes are hard to read and understand. Although they're easier to use than carrying papers, I think they're harder to follow."

3) IV2 reported navigational issues with lecture recordings. He used the word "confusing" to describe going "back and forth" throughout the videos for the information he needed. No other students reported navigation issues with VLE

88

resources. This could be a positive sign that lecturers and VLE support staff made efforts to disseminate notes in an organised and manageable fashion. Indeed, when the researchers in the 2015 study made efforts to improve the visual layout of online links, the participant no longer reported navigational disorientation. Alternatively, this study's population did not experience symptoms that would result in navigational disorientation.

4.6.5 Well-being

Respondents' opinions differed when asked about the academic compatibility of online tools. Yet, concerning welfare, there was an almost unanimous agreement that all online tools provided peace of mind (Figure 4.5) and flexibility (Figure 4.5.1). The majority of responses in agreement with these statements were above 90%. Less than half thought live online lectures made life easier. As part of a pattern, those most in agreement included those with physical conditions (77.78%), the hard-of-hearing group (66.66%), and in addition, mental health conditions (72.73%) and neurological conditions (100%). However, as discussed, many respondents reported comorbidities of these conditions; thus, an assessment of how online lectures could make life easier for respondents is not possible. In addition, respondents may not necessarily have believed they made life easier concerning conditions. The only identified welfare issues were related to student visibility, where the majority of participants (68.2%) did not like speaking up in online lectures. However, just 20% agreed the same of online discussion boards (Figure 4.5.2). In addition, a small percentage (13.63%) feared that others would record them in online lectures. As found in the interview with IV2 and findings in the literature (Lambert & Dryer, 2017, Laslo-Roth, Baraket-Bojmel, & Margalit, 2020) there was an association between mental health, stress, and isolation entirely online environment.

As discussed, mental health conditions are prevalent among third-level students (Auerbach et al., 2018, Jigsaw & UCD School of Psychology, 2019, USI, 2018); thus, findings that highlight positive or negative impacts on well-being in online environments are essential to address.

89



Figure 4.5. Comparative data by percentage on responses in relation to peace of mind and online study resources.



Figure 4.5.1. Comparative data by percentage on responses in relation to flexibility and online study resources.



Figure 4.5.2. Comparative survey responses in relation to online learning elements and student perceptions of visibility.

4.6.5 Online discussion boards.

Respondents answered different questions about online discussion boards categorised as online engagement and interaction activities as opposed to classroom or study tools. Respondents liked particular aspects, such as the time they were afforded to think about answers (86.7%). Inconsistency between population's perceptions and literature review findings were identified when analysing responses to one particular statement. One hundred per cent of hard-ofhearing participants preferred verbal discussions in either online or on-campus classes, and 73.4% of all respondents. This is inconsistent with findings in Long, Marchetti, and Fasse's (2011) study, which suggested that verbal discussion could cause distress to hard-of-hearing students who relied on multiple visual cues to participate. However, this hard-of-hearing population's preference for them compared to online discussion boards contradicts this. In addition, 40% of respondents did not like online discussion boards. The only skewed data related to this question corresponded to the SpLD group, of whom none agreed that they did not like using them. This is consistent with Shonfeld and Ronen's (2015) case study, which found that students with SpLDs preferred online interactive learning activities more than their peers (Figure 4.5.3).



Figure 4.5.3. Likert scale responses to statements relating to online discussion boards.

4.6.6 HD student success

As discussed in Chapter One, HD student success comprises academic success, hidden-disability compatibility, and well-being. Further exploration into IV1's perceptions of online study tools demonstrated that they were compatible with all three themes in HE, and could support HD student success (Figure 4.5.4). Compared with Figure 2.5, it becomes clear that, again, online learning tools solved many issues identified with RAs (Figure 4.5.5).



Figure 4.5.4. Compatibility of online study tools (VLE resources and lecture recordings) in relation to academia, hidden disability, and welfare with condition-specific issues of Interviewee One.



Figure 4.5.5. Hidden disability specific support of openly available online study tools for IV1 compared to difficulties in RA access process identified in literature.

4.6.7 Student perceptions of online learning tools by conditions.

While the sample size of participants was small and even smaller per group of conditions, an analysis of results was conducted per condition group to identify patterns, similarities, and differences in results. The text addresses significant findings. For future research, tables that consist of respondent perceptions of each online learning tool per condition category and corresponding frequencies are available in the Appendices:

- *Table U1*: Respondent perceptions of live online lectures by condition category.
- *Table U2:* Respondent perceptions of lecture recordings by condition category.
- *Table U3:* Respondent perceptions of online discussion boards by condition category.

• *Table V1:* Respondent comments related to academic compatibility of all teaching and learning tools (inclusive of online).

4.6.8 Limitations

Some responses were possibly based on student experiences with online tools during the pandemic only since many respondents rated them but did not select them as elements of their modules during the academic year the survey was open. In addition, some experiences may have been in an online setting in secondary school rather than third-level education. For example, some first-year students rated live online lectures who did not have experience with them during the survey.

4.7 What are student perceptions of on-campus learning?

Participants rated the level to which they agreed with various statements about oncampus teaching delivery methods: lectures delivered in larger lecture halls and tutorials delivered in smaller tutorial rooms. Some questions were repeated for both teaching delivery methods to analyse similarities and differences in responses. As with online teaching and learning tools, questions related to perceived academic and disability compatibility, and well-being, respectively. Figure 4.6 demonstrates that tutorials were the most popular on-campus teaching method in all areas, with the majority of respondents agreeing with positive statements about them, and the majority agreeing with negative statements about lectures.

Figure 4.6.1 represents responses to questions about lecture halls in percentages. Figure 4.6.2 represents responses to questions about tutorials in smaller tutorial rooms in percentages. Table V2 details a list of all form comments related to oncampus classes.



Figure 4.6. Strengths and weaknesses of on-campus lectures and tutorials.



Figure 4.6.1 Participant responses to Likert scale questions about face-to-face lectures in big lecture halls.



Figure 4.6.2. Survey responses to Likert scale questions about face-to-face tutorials in smaller tutorial rooms.

4.7.1 Unique Strengths: Connection, Interaction, and Engagement.

Lectures in large halls caused many issues for students. However, 70% appreciated that they could be with their friends in them. In addition, and also in concerning connection and interaction, qualitative questionnaire responses demonstrated that students appreciated the additional opportunities for peer and lecturer interaction that tutorials afforded them. This is consistent with findings from Long, Marchetti, and Fasse's (2011) study, which found that students valued interaction opportunities with lecturers and peers. Respondent Seven described tutorials as, "Great for getting input and opinions from peers. Much more engaging. I'm less likely to zone out in them."

IV1 liked on-campus lectures because "something would manage to go in." In addition, they found some lecturers to be captivating and engaging in on-campus lecture settings in a way that did not translate online, according to the student. This student noted that, even if they did other activities on their laptop while in class, they would usually have learned something as a result of their presence alone because "I can't mute the lecturer", they noted.

4.7.2 Unique weaknesses

There were no unique issues with tutorials. However, there were many issues with lectures, both in general and condition-specific. Half of the respondents reported lectures in large lecture halls as distracting (Figure 4.6.3), dispersed across all groups, with 100% of the hard-of-hearing group agreeing, and 75% of those with physical conditions. For one hard-of-hearing respondent, large lectures could result in the onset of several other symptoms, including anxiety and vertigo. For another hard-of-hearing respondent, they could not learn in them unless they could sit near the front. Specific conditions associated with hearing loss are also associated with vertigo (Dodson et al., 2011):

Big lecture halls cause my anxiety to skyrocket. Due to my hearing I have vertigo. I find the steps very frightening and the angle of the lecture halls make my vertigo worse. Also, trying to hear lectures causes me anxiety. (R3)

Not great unless I can get the very front seat. (R22)

This is consistent with findings from the literature review, which reported difficulties with distraction in lectures for hard-of-hearing students, specifically with face-to-face discussions (Long, Marchetti, & Fasse, 2011), and, in addition, from students with ADHD (Jansen et al., 2016) and autism (Cox et al., 2020, Gurbuz, Hanley, & Riby, 2019).

Concerning visibility and welfare, while just 27.20% had issues around visibility and speaking up in tutorials, 65% thought the same of lectures in large lectures halls – potentially due to their size.



Figure 4.6.3. Accumulation of responses to the statement "they are distracting" in relation to tutorials in small tutorial rooms and lectures in big lecture halls, represented in percentages up to 45%.

4.7.3 Campus Environment Issues

Several comments were dispersed throughout the online form, deemed by the researcher to relate to issues with the campus environment. Thus, a lack of consistency in the questionnaire data was identified. HD respondents heavily

favoured tutorials. However, they take place on-campus, which respondents reported issues with.

Table 4.2 provides an overview of the themes identified in these statements, and their corresponding percentages. Most of the feedback was negative statements about attendance (66.67%). Table U4 outlines a full list of comments associated with the campus environment and the related teaching or study method, summarised in Figure 4.6. As found in the literature, students with autism reported sensory issues on-campus (Gurbuz, Hanley, & Riby, 2018), which IV1 also reported in relation to laboratories. This, in turn gave them anxiety, while attempts to listen in lectures gave a hard-of-hearing respondent anxiety.

I find it really difficult to get myself up and organised in time for transport to college. (R5, IV1)

It can be hard for me to attend lectures when I have a flare up of my arthritis, or am having a bad day with my mental illness. (R12)

I find labs to be very over-whelming sensory-wise and anxiety-wise. (R5, IV1)

Table 4.2

Report Type	Positive or Negative	Percentage of qualitative	
	impact	feedback.	
Attendance	Negative	66.67%	
Symptom reaction	Negative	25%	
Engagement in class	Positive	8.33%	

Percentage of report types in qualitative feedback of on-campus classes.

4.7.4 Campus Environment Benefits

Conflicting views of the campus environment and classes that take place on them persisted in the interviews. Both interviewees described on-campus classes as

supportive of their executive dysfunction symptoms through "forced" routines and focus.

Being on campus just kind of forced me into a routine, which is helpful. (IV2)

With on-campus classes I have to be there, so I'm there, but even if I'm not listening, they're still saying stuff. So even if I'm not paying attention, some things will still manage to seep in somehow. (IV1)

Interviewee One demonstrated a determination to learn through their value of the enforced discipline associated with on-campus classes. They appreciated opportunities to retain information in these classes despite the sensory overload they often experienced in them and the stressful morning routines described in order to attend them.

4.8 Online versus On-Campus

This section compares some of the quantitative and qualitative questionnaire results of all teaching and learning tools. An analysis of the strengths and weaknesses of all was conducted to determine the most appropriate tool in relation to the three themes. This was to establish best inclusive practices for HD student success. Figure 4.7 displays the most preferential tools related to online learning, on-campus learning, and disability compatibility in the context of academic success and well-being, followed by a detailed discussion.



Figure 4.7. Most compatible teaching and learning resources per theme.

Note. *VLE resources- virtual learning environment.

*Note.**** Peace of mind' statement only asked of lecture recordings and VLE resources, where both received significantly high marks.

4.8.1 Limitations

As discussed, questions were designed to answer research questions and contribute more data to prior research; thus, they were based on survey questions in other papers or findings from the same. Some questions were not repeated for all teaching and learning tools for these reasons. In order to compare data, questions have been grouped thematically, for example, academic compatibility.

4.8.2 Hidden Disability Compatibility

Figure 4.7.1 represents the accumulation of responses to direct questions asked about the disability compatibility of teaching and learning tools. The control group elected to answer these questions; thus, the percentages are representative of 22 respondents. On-campus lectures were the only tool with considerable reports of incompatibility (30%), yet most did not find them incompatible (50%). Incompatibility issues ranged from attendance to hearing difficulties (Appendix Z).



Figure 4.7.1. Percentage of reports by survey participants of the incompatibility of teaching delivery methods with respective conditions.

4.8.3 Strengths and weaknesses analysis

The strengths and weaknesses of online and on-campus study tools have been outlined in Figure 4.7.2, and Figure 4.7.5 respectively.

4.8.3.1 Strengths

Unique strengths of each method appear to be that on-campus classes provided opportunities for connection, conversation, peer-to-peer learning, and engagement in a way that online classes and study tools did not, and online classes were more suited to groups with specific conditions (physical and hardof-hearing) in a way that on-campus classes were not (Figure 4.7.2). Table 4.3 demonstrates that a side-by-side analysis of Respondent Three's comments about on-campus lectures and online lectures demonstrates how online lectures solve the condition-specific challenges they faced in on-campus lectures. In addition, on-campus classes were more engaging due to lecturer delivery style and enforced discipline e.g. in IV1's words, they couldn't "mute" the lecturer in a face-to-face class. However, online study tools were highly supportive of well-being and peace of mind.

This survey's population consistently demonstrated an appreciation of social connection or interaction. Thus, the interactive affordances of on-campus classes are not to be disregarded (Figure 4.7.4).



Figure 4.7.2. Strengths of Online and On-campus learning tools. *Note*. Factors have been included as strengths if the majority of respondents agreed that they were. In addition, factors have been included as strengths for specific conditions group if the majority did not agree that they were strengths, but the majority of the condition group did, in which case the condition has been named next to the strengths.

Table 4.3Live-online lecture solutions for hard-of-hearing participants

Respondent	On-campus lectures	
R3	Big lecture halls, causes my anxiety to sky rocket, due to my	
	hearing I have vertigo, I find these steps very frightening and the	
	angle of the lecture halls makes my vertigo worse. Trying to	
	hear lectures as wel[1] causes me anxiety.	
	Live-online lectures	
R3	For my hearing it's easier in online lectures for me to blast my	
	headphones and see my lecturers move their lips.	

Interviewee One summarised the academic strengths of online versus oncampus tools. They found on-campus classes more engaging, but lecture recordings provided them with a study resource to revisit (Figure 4.7.3).



Figure 4.7.3. Summary of the strengths of online and on-campus tools for the general survey respondent population, as quoted by Interviewee One.



Figure 4.7.4. The most helpful HE support, according to respondents.

4.8.3.2 Weaknesses

Concerning weaknesses, for the general respondent population, the size of classes appeared to play a more significant role in the perceived disadvantages of a tool than their online or on-campus environment (Figure 4.7.5). Both online and on-campus lectures were the most divisive among respondents. Live online lectures created issues with sustained focus and distractions for the ADHD respondents, and on-campus lectures were found to be distracting by 55% of the HD group, and incompatible with 100% of hard-of-hearing participants. In addition, the majority of respondents did not like speaking up in both classes, which included 100% of the control group (Figure 4.7.6). Thus, many respondents attributed live online lectures to an aspect of positive well-being: ease of living (63.7%), an equal amount attributed them to stressors: peer or lecturer visibility. While a considerable amount attributed on-campus lectures to social well-being by being with their friends (70%), they also had issues with visibility (65%), and a minority (one student) were concerned about being recorded by peers.



Figure 4.7.5. Weaknesses of online and on-campus learning tools.

Note. There were no reported issues with VLE resources, thus lecture recordings are the only online study tool featured.

Note. While fear of speaking up was reported for tutorials, it was by less than half of participants.



Figure 4.7.6. Student responses to visibility in online/on-campus environment.

4.8.4 The Sequential Interrelationship of the Three Themes in HE.

This study has identified a possible sequential interrelationship between the three themes in HE, where hidden-disability incompatibility may harm academic success, i.e. students who learn in an environment not suited to them may miss out on vital information. This, in turn, can create stressors, which reduce levels of well-being, which in turn can reduce academic performance levels (Figure 4.7.7). A reversal of this relationship is also possible, where a learning tool that is hidden-disability compatible could support academic performance and in turn improve well-being, which may also contribute to improved academic performance (Figure 4.7.8).


Figure 4.7.7. Negative relational consequences of the three themes in Higher Education for students with hidden disabilities.



Figure 4.7.8. Consequential success for students with hidden disabilities.

4.9 Why Do Students with Hidden Disabilities Register or Not Register with Disability Support Services?

Section 4.4.6, *Diagnosis and Disclosure* addressed the correlation between diagnostic status and registration status among this study's HD population. All non-registered HD students were also undiagnosed which would suggest that the major reason for non-disclosure was disqualification: respondents did not register because they did not qualify to do so. However, an analysis of the qualitative data reveals additional perspectives from both sides of the spectrum of choice. One participant explained that their undiagnosed status was by choice, and another explained that it was not by choice but result of financial and healthcare-related issues. Respondent 11 was the only unregistered HD student with no plans to obtain a diagnosis. They felt adequately supported by their existing services,

stating "I don't think it would help me that much. I attend college GP, mental health nurse and private therapist."

In contrast, IV1 described life in HE as a '*limbo*' for undiagnosed students stuck in some inertia. They could not afford to get diagnosed, but if they were to get diagnosed, it would have made access to transgender-related healthcare more complicated:

I can't afford to get diagnosed, and if I could get diagnosed they would make accessing trans related healthcare more difficult. (R5)

The services require you to have the diagnosis. And if you don't have €1000 for the diagnosis, you don't have the diagnosis. So you're suffering. You can't even really tell lecturers. Because you're like, oh, I think I have this. I don't have any proof though. But I have it. It's like a limbo to live in, where you're just suffering and you can't really do much about it. (IV1)

The only study in the literature review which identified non-disclosure from students who would like to register was Redpath et al.'s interviews with students in Northern Ireland, who were subject to extended wait periods for diagnosis, similar to respondents in this study. An accurate comparison of Ireland's wait periods for hospital appointments compared to other countries is limited by the former's hospital reporting methods, similar to the limitation on an assessment of Ireland's HD student academic performance. However, Connolly and Brick (2021) developed a new method to assess the former and found Ireland to perform less favourably than other countries. Northern Ireland could not be differentiated in the data. A complete list of qualitative feedback related to non-disclosure reasons is available in Appendix W. These results were analysed to identify themes behind registration rationale (Table 4.4).

Table 4.4

Percentages of reasons for registration and non-registration of students with disability support services identified by the researcher

Reasons for registration.	Registered (14	
	qualitative responses)	
Registered on their own accord for	57.14%	
academic support		
(inclusive of accommodations)		
DARE (Disability Access Route to	14.28%	
Education) Scheme		
Recommended by professional e.g. tutor,	14.28%	
OT.		
HEI awareness of their condition	7.14%	
Reasons for non-registration	Not registered (2	
	qualitative responses)	
Financial issues	50%	
Needs met outside HEI	50%	

4.9.1 What are HD student perceptions of disability support services in HE?

This section will cover the online questionnaire results related to the research question on HD student perceptions of disability support services in HE.

4.9.1.1 Assistive technology

Respondents rated the usefulness of nine individual ATs for their studies on corresponding Likert scales ranging from *extremely useful* to *extremely useless*, including neutrality (Figure 5). Eight out of the 19 respondents (42.11%) who moved forward to this section of the form responded. There were 42 Likert scale responses in total. Figure 5.1 demonstrates that most respondents did not have an opinion on AT products. With neutrality excluded, there were almost three times more positive ratings than negative. Crucially, Respondent Seven, with dyslexia, disclosed that AT enabled them to participate in HE on a par with their peers by stating "Technology provided allows me to keep up with my peers", fulfilling one of Bunbury's (2018) criteria for an inclusive curriculum.



Figure 5. Likert scale response on assistive technology.



Figure 5.1. Accumulation of respondent perceptions of the usefulness of all assistive technology products.

Table 4.5 summarises the most frequently rated AT and Mean usefulness scores. Free application subscriptions received a small number of negative ratings (16.67%), which appeared to be caused by the administrative process involved in the utilisation process:

I was offered the use of apps to take notes in lectures for me and I could not arrange a session to be taught how to use it through the portal I was given so I've never used it! (R8)

Respondent Eight's experience resulted in the non-utilisation of a note-taking app. This is consistent with the literature, which identified numerous accounts of the non-utilisation of RAs and AT due to the bureaucratic or administrative barriers involved in the access process (Table 2.2, Appendix G).

Concerning respondent conditions, the highest scores were free application subscriptions for the hard-of-hearing group and screen readers for the SpLD group. Appendix X relates respondent conditions to their Mean scores of all AT products for future research. However, as stated, many respondents reported multiple conditions. Those who scored AT most highly were also in the SpLD group, possibly due to the additional learning needs associated with these conditions. Respondents could provide information about useful AT discovered themselves (Figure 5.2). Some used applications for welfare purposes, and some to self-manage their difficulties with sustained focus.

Table 4.5

Mean of survey respondent perceptions of AT as rated by Likert scales in order of highest to lowest mean ratings.

Assistive	Number of Respondents	Mean Usefulness
Technology		Response
		(out of 5)

Free subscription to application.	6	4.33
Screen readers	4	4
In-house scanning	4	3.75
Transcription applications	7	3.42
Alternative format	5	3.6
conversion		
Magnifying glass	4	3.25
ССТУ	4	3
Deaf loop system	5	3
Screen magnifier	4	3

Note. Mean calculated based on the following assignments: *extremely useless* = 1, *useless* = 2, *neutral* = 3, useful =4, *extremely useful* = 5.



Figure 5.2. Examples of independent applications reported to be useful by survey respondents.

4.9.1.2 Reasonable Adjustments

Fifteen respondents elected to rate the usefulness of seven different RAs concerning their studies. The Likert scale ratings ranged from *extremely useful* to *extremely useless* including a neutral option (Figure 5.3). Participant answers revealed the RAs they had experienced of and their perception of them. This survey population found accommodations, for the most part, to be extremely useful, and none considered them useless (Figure 5.4). In contrast to AT, there was an identified correlation between frequency of RA use and positive perceptions of them.



Figure 5.3. Survey responses to question 33 on accommodations.



Figure 5.4. Percentage of 53 Likert scale ratings of RAs by usefulness.

4.9.1.3 The most popular accommodations

Table 5.2 represents the number of respondent ratings of each accommodation and its corresponding Mean score. Respondent 12 rated all seven RAs but just additional time in exams as *extremely useful*, and all six others as *neutral*. In the associated comment section, she revealed that it was the only accommodation she was aware of, "I had no idea that these services were even available to me besides extra time in exams. They never really tell you what you're entitled to when you register."

It was unnecessary to differentiate the Mean scores of RAs by condition category since the majority were positive. Instead, Appendix Y outlines the total number of RA ratings by specific conditions for comparative analysis in future research. As stated, respondent results were included multiple times per their condition category; thus did not necessarily reflect any of their conditions' additional support needs. In addition hidden disabilities and their symptoms are "extremely diverse" (WHO, 2021, para. 3). Thus, perceived compatibilities of particular tools, whether online, on-campus, or accommodations, were not necessarily related to any conditions.

Table 5.2

Number of responses per reasonable adjustment and mean Likert scale rating in relation to academic usability

Reasonable Adjustment	Number of	Mean Response
Туре	Respondents	(out of 5)
Additional Time in Exams	13	4.84
Quiet rooms	8	4.75
Lecture notes before class	9	4.44
Extended Assignment Deadlines	8	4.38
Permission to record lectures	6	4.33
Note-taking services	4	4
Occupational Therapy Sessions	6	3.5

4.9.1.4 Additional time in exams

The RA that was rated most often (86.67% of respondents) and reported as the most useful (92.31% of respondents) was extra time in exams. The only registered ADHD participant and only registered participants with SpLDs considered this accommodation extremely useful, similar to Jansen *et. al.*'s (2016) survey of tertiary ADHD students. They also found extra time in exams to be the most utilised RA and the most effective solution for a majority of executive functioning and participation issues addressed in their survey.

Interviewee Two was the registered ADHD participant who disclosed during the interview that he based his perceptions of extra time on his second-level experience. He had not used accommodations in HE. The extra time in exams he was awarded for his scoliosis supported his ADHD symptoms:

I got breaks during exams for my scoliosis where I could just go for a walk to stretch my back or whatever, and that basically ended up with me getting extra time, and it was much easier to do [the exams]. It played into the ADHD. It's just easier to get everything out on paper and get my point across where other people will be able to get their point across quicker. (IV2)

4.9.1.5 Quiet rooms

Findings from the survey and interviews consistently correlate with Jansen et al. (2016)'s survey about effective accommodations. Quiet rooms were the second-most-popular accommodation among this study's population, whereas designated seats in exam settings were second-most popular in the 2016 study. Interviews revealed that respondents considered quiet rooms as exam accommodations. When asked what RAs they would like access to, IV1 selected additional time in exams and a private exam room, where they could read aloud, play music, and talk to themself.

People call me a bit strange. I'm not even really talking to myself I'm just making noises when I'm doing something. So being able to have an exam centre to myself, where I can move around, and I can talk to myself... and I especially like listening to music... it helps me focus. So a quiet room and may extra time in exams. (IV1)

4.9.1.6 Easily accessible RAs

Lecture notes before class were the third-most-popular accommodation - an important finding since it can be easily offered to any student by a lecturer, regardless of their disability registration status. Unlike the other popular RAs, there is no requirement to consult with exams or disability offices to request more time in exam halls or separate rooms for HD students to avail of it.

4.9.2 The Disability Services

The last question on the form asked respondents to select which statements they agreed with about disability services. Some identified themes within these

responses either correlated with or contradicted other findings in this study and the literature (Figure 5.5).



Figure 5.5. Percentage of respondents who agreed with statements about RAs and AT.

4.9.2.1 Positive finding: exposure

Unlike reports in the literature, the majority of respondents had no issues with utilisation of RAs or AT in-class in relation to exposure. Just 7.69% had issues with exposure related to RAs, with no additional feedback provided. As IV2 explained, peer or lecturer awareness of their ADHD and anxiety was beneficial in that it provided an explanation and thus further understandings of their behaviours, similar to the opinions of several interviewees in Blockmans' (2015) study:

I don't care if people know. I honestly prefer when people do know...because sometimes it's an explanation for why I do certain things, or how we (people with ADHD) do certain things. So people aren't like, judging us per se, because they kind of understand me a bit better. (IV2) I think it is quite handy [for all peers to know] as I need to stand up and lie down, and that will stick out and people will have many questions [...] It is handy, from a social perspective, to explain it once (Britt, I, who needs to stand up or lie down to deal with chronic pain). (Blockmans, 2015, p.168)

4.9.2.2 Supportive Services.

This survey population's approval of accommodations and AT has been discussed. As identified in the literature, while some students were averse to the disability services and accommodations, many were happy with them. There was also positive qualitative feedback on the form about the disability services, including Respondent Seven's disclosure that "Supports provided by the disability services reduce the negative impact it [dyslexia] once had on me."

This student provided a direct explanation of how disability support services reduced the negative impact of their dyslexia on several aspects of HE, which, based on prior findings, could be because their condition may be considered an additional educational need. It has been suggested that disability services are particularly supportive to students with these conditions (Kilpatrick et al., 2016). To corroborate this, students with SpLDs are the most likely to be registered with HE disability support services in Ireland compared to other disabilities, suggesting this group values them.

4.9.2.3 Problem-Setting: 'Back Door' Accommodations

Of the small percentage of respondents who did not like registering with the disability services to access support (23.08%) was an unregistered respondent with dyslexia as their sole condition. They received lecture notes before class as their primary accommodation, suggesting they found an alternative route to acquire this accommodation – potentially a direct request with the lecturer. IV1 also described this 'back door' approach. This phrase is not employed to criticise the respondents but rather the unorthodox efforts they had to make to access support instead of official disclosure. IV1 would sometimes disclose their ADHD directly to lecturers to request extended assignment deadlines. However, they perceived that this route was not always a viable option; thus sometimes would

121

not request an accommodation or requested it with an alternative explanation for their lecturer, such as undetailed information about stressors in their life:

It was fine. I told one lecture in-person that I had ADHD and it was fine, but for the ones where I needed extensions it was through email, and I told them I had a lot going on in my personal life. They don't want you to tell them a sob story because then they have to deal with a sob story, so you just keep it vague. (IV1)

4.9.2.4 Problem-Setting: Administration, Communication, Crisis, and Nonutilisation.

Similar to other studies, this study identified issues related to the disability services access process. Issues were both communicative and administrative. In several instances, these issues lead to the non-utilisation of services. Just 46.15% of respondents selected that they found it easy to access support, which suggests that the majority did not. The qualitative data supports the idea that the disability support access process was not easy for respondents. For example:

- R8 had trouble with an online portal and could not arrange an application tutorial. As a result the application went unused.
- R22 could not get in touch with their disability services after six attempts.
- R12 was not aware of the supports available to them apart from additional time in exams until they read about them on this study's form.

Kilpatrick et al.'s (2016) interviews with staff demonstrated that some students disclosed only at a point of crisis to access support; however, for IV2, it appears that disability staff themselves reached out only at a point of crisis during a pivot-online phase. IV2 was asked if he thought an earlier communication from them would have improved his academic circumstances. However, he was unsure and restated the difficulties he had learning solely from home, including that he "let it all pile up too much. It would have taken 10 hours of study a day for weeks to catch up, so I'm going to repeat the year."

4.9.2.5 Problem-Setting: Inconsistent Approaches

Several questionnaire respondents elected to contribute optional open feedback (Appendix Z). Analysis revealed a re-occurrence of issues with administration processes and inconsistencies in lecturer approaches concerning accommodations. This pattern was also identified in inconsistent lecturer approaches to VLE resources in the online learning section of this study, and as was identified in the literature, and with Respondent Seven's comment that, "Some lecturers are great with recognising some students' extra needs, but others are not".

4.9.3 Additional themes

Appendix AA presents additional themes identified in the qualitative data analysis that did not relate to the research questions. In addition, some questions on the form did not specifically relate to the research questions. Concerning the latter, respondents rated if their conditions positively or negatively impacted several aspects of HE life (Appendix BB). This question was developed to support a deeper understanding of their experiences, which could inform the research output and recommendations for a hidden disability-inclusive curriculum (Farrer-Williams, Sullivan, and Woodall, 2015). A sample of these findings is presented in Figure 5.6. Unfortunately, most respondents reported that their conditions negatively impacted all areas of HE. Figure 5.7 includes a sample of the additional themes identified in the qualitative data.



Figure 5.6. Sample findings of reported levels of impact of conditions on HE according to questionnaire respondents.



Figure 5.7. Overview of additional themes identified in interviews, not corresponding to research questions.

5.1 To what extent could online learning replace reasonable adjustments?

A complete analysis of the online questionnaire results and interview transcripts has revealed that there is not necessarily a need to replace reasonable adjustments, as the majority of respondents were extremely happy with them. It is possible, however, to replace certain reasonable adjustments with other online learning tools should a student:

- prefer the online learning option,
- be ineligible for accommodations,
- experience administrative or communicative issues with their disability support services.

Based on insights into this study population's preferences, additional learning needs, condition-specific issues, and welfare, the following online learning tools could compliment, rather than replace accommodations:

1) *HEI-wide Hyflex options* (Columbia Centre for Teaching and Learning, n.d.) could provide at-home lectures for students whose conditions cause attendance difficulties, e.g. physical or mental health conditions or executive dysfunction. In addition, they could provide more volume control for hard-of-hearing students and provide on-campus learning options for students who struggle to focus in online lectures or feel isolated learning from home.

2) *Lecture recordings and VLE resources* were adequate solutions for students with note-taking difficulties, time-management or prioritisation difficulties, and working memory issues.

5.2 Conclusion

In this chapter, the online questionnaire and interview results were reviewed, analysed, and discussed to identify HD students' perceptions of the three elements of HE: online learning, on-campus learning, and disability support services, concerning HD student success: academic compatibility, hidden-disability compatibility, and well0being. The next chapter will present the conclusions, reflections, and recommendations based on this analysis.

Chapter 5: Conclusions

5.3 Introduction

The main aim of this research was to contribute knowledge of best-inclusive curriculum practices for the increasing numbers of tertiary students with hidden disabilities who are reported to achieve less academically than their peers and also experience lower levels of well-being.

In order to achieve this, the research focused on students with hidden disabilities' perceptions of online and on-campus learning and disability support services. An online questionnaire and interviews were selected to gather the relevant data. Finally, respondents' perceptions of online learning and disability support services were compared to assess how much the former could replace the latter. Literature review findings demonstrated that many HD students experienced challenges with accommodations, which online tools appeared to reduce, which inspired the final research question. There were five research questions; thus, several conclusions have been drawn.

5.4 Academic Circumstances

Contrary to the literature, this study's population did not appear to struggle academically with grades in relation to withdrawal and failure. Some students reported difficulties with the academic requirements of HE life, particularly attendance, note-taking, sustained focus, organisation, and time-management, which had negative consequences for some. However, others appeared to get satisfactory grades despite these concerns. Respondent grade information was not requested because official academic student records were unattainable for comparison. Thus, this study's populations' withdrawal and failure rates informed this conclusion.

5.5 Online and On-Campus Classes

For respondents with specific conditions, both online and on-campus classes had unique strengths and weaknesses. For the broader study population, class size often created more issues than class location. In particular, on-campus classes provided opportunities for social connection, peer learning, and engagement

127

(which were highly valued by respondents in this study and the literature) in a manner that online classes did not. For students who struggled with several areas of executive dysfunction, on-campus classes provided much-appreciated routines and enforced discipline, which they associated with more favourable academic outcomes. Online classes provided hidden- disability-specific support in a way that on-campus classes did not, particularly for hard-of-hearing students and those with mental health or physical conditions who struggled with attending on-campus classes or hearing the lecturer respectively. However, a small percentage had fears of being recorded in online lectures.

Concerning class size, larger classes were associated with negative perceptions, e.g. lower levels of engagement and interaction and higher levels of fear regarding visibility when speaking up. Respondents highly regarded small tutorials for their increased discussion and interaction opportunities.

5.6 Online Study Tools

Online study tools were highly associated with well-being and academic compatibility. They acted as an academic safety net for students who struggled with, e.g. attendance, note-taking, or working memory. However, this study identified that lecture recordings risk the same fate as unworkable accommodations if they require lengthy time commitments. In addition, a student with ADHD experienced navigational disorientation when using them, so he chose not. Lecture recordings were also associated with improved grades, which correlates with the literature findings. Thus, they are of high value when efforts are made to condense them.

5.7 Non-disclosure

A finding from this study not identified in the literature was certain reasons for non-disclosure. One of the main reasons for non-disclosure was disqualification. Most students with hidden disabilities who were not registered (80%) with their HEIs disability services were awaiting an official diagnosis and, without one, could not register. Registration and diagnostic status analysis determined this, further enhanced by interview findings. Another new finding not identified in the literature was the financial and health-care restraints associated with an adult diagnosis. One student disclosed that it was €1000 for an autism diagnosis, which

128

they could not afford. However, an official diagnosis would jeopardise their access to transgender-related health care. A small percentage had no plans to receive a diagnosis or register (5% of all students with hidden disabilities and 20% of the unregistered). They were happy with their independent support and free university-based counselling services.

5.8 Perceptions of Disability Support Services

Respondents highly valued accommodations and assistive technology. This study contributes more data to the field of effective reasonable adjustment research. The most popular accommodations in this study were almost identical to those identified in another survey-based study with student respondents who had ADHD. As identified in the literature, the disability services had mixed reviews, with administrative and communicative issues reported. These issues contributed to the non-utilisation of RAs for some students. In addition, the levels of support from lecturers concerning accommodations was inconsistent. However, some nonregistered students managed to secure accommodations directly with lecturers.

5.9 Replacing Accommodations with Class-Wide Online Learning Tools

Online learning tools are viable replacements for specific accommodations; however, they should complement accommodations rather than replace them. This could benefit students who cannot or do not want to access reasonable adjustments for various reasons. To provide all three elements of HE: online learning, on-campus learning, and disability support services *is* conducive to a hidden-disability inclusive curriculum, which could support HD student success (Figure 4.4.5).



Figure 4.4.5. Revisited: HD student success formula: sequential interrelationship

6. Recommendations

This section will outline recommendations for consideration by HEIs -designed to support hidden-disability inclusive curricula practices and, thus, HD student success in HE. This section also addresses research Question Five, focusing on possible digital replacements of reasonable adjustments.

1) A HEI-wide *Hyflex* lecture option, in addition to lecture recordings and VLE resources, could create more hidden-disability inclusive curricula that support all students. An online option could be available alongside on-campus classes for those who struggle with attendance, distraction, or hearing. For those who struggle to focus in online classes, feel isolated online, or prefer peer engagement, on-campus classes would still be available through *Hyflex*. In addition, students who prefer either option could have the other on flexible days. For example, a student who prefers on-campus classes could still learn from home if they suffered from a flare-up of symptoms.

2) Lecturers should consider creating condensed and summarised lecture recordings in the form of PowerPoint presentations and narration instead of hourlong recordings to increase student utilisation of them.

3) A student recommended a centralised online system that informs them of their accommodation allowances. This could be utilised for many forms of communication with HD students and combat the communication issues reported by many service users in this study and others.

4) Mandatory attendance should be reconsidered for all students, not just those registered with the disability offices since many are not in a position to disclose.

5) The Department of Education in Ireland and other countries or individual HEIs could revisit data protection policies that inhibit research into the academic circumstances of their students. Alternatively, the Departments could consider conducting research, for example, every five years, across all HEIs in Ireland to analyse trends in the academic circumstances of students based on hidden disabilities or other unique characteristics.

Finally, two recommendations relate to staff training and appointments, and one relates to policy:

7) HEIs could consider appointing specialised staff to manage online learning systems and ensure those VLEs are hidden-disability compatible. This study found that even the most popular VLE resources presented legibility issues for a respondent with dyslexia. Thus, appropriately trained online learning specialists could ensure that they designed these functions to be accessible to all students.

8) HEIs could consider adopting mandatory training on universal design for learning for academic staff (CAST, 2018).

10) HEIs could consider adopting an e-learning policy such as:

• mandatory follow-on lecture recordings,

- VLE resources,
- Hyflex options.

These tools could support students with a broad range of hidden disabilities to thrive in Higher Education by providing hidden disability-compatible learning options that support academic achievement and well-being.

Finally, while student perceptions are a vital part of an inclusive curriculum design process, more research on a much broader scale should be conducted to examine the longitudinal and measurable impact that online learning tools and specific accommodations have on HD students HE life in the context of academic affairs and welfare. Ideally, HEIs and governments would fund and oversee this research with their valuable access to student records.

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Appendix A

Search terms across library databases.

Search Engine	Google Scholar	Internal	International	Taylor & Johnson	The Online Learning
		Library	Journal of	Online	Journal.
		Database	Inclusive		
			Education		
	Higher Education	Higher	Higher	Higher Education	Higher Education
Primary		Education	Education		
Search Terms:	HEI			HEI	HEI
		HEI	HEI		
+	+			+	+
	Hidden Disability	+	+	ADHD	Case Study
	ADHD / (Attention	Hidden	Autism	Difficulties	Online Learning
Variations of	Deficit Hyperactivity	Disability	Case Study		UDL
search terms	Disorder)	ADHD	Curriculum		
	Autism	Autism	Disability		
	Case Study	Case Study	Experiences		
	Curriculum	Curriculum	HEI		
	Dyslexia	Dyslexia	Inclusion		

Hearing Impairment	Hearing	Reasonable
Inclusive	Impairment	Adjustment
Universal Design for	Inclusive	University
Learning/UDL	UDL	
Visual Impairment	Visual	
	Impairment	

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Appendix B

Countries of origin and total participant numbers per research method.

Authors	Zone	Questionnaire	Focus Group	Interviews	Case
		/Survey			Studies
Alamri & Tyler-Wood (2017)	USA	40			
Barkas, Armstrong, and Bishop	UK			3**	
(2020)					
Bessant (2012)	Australia				3
Beyene, Mekonnen, and	Ethiopia			17	
Giannoumis (2020)					
Blockmans, Inge G. E. (2014)	Belgium	22		13	
Christopher & Richard (2015)	Australia			1	1
Cox et al., (2020)	US			8	
Couzens et al. (2015)	Australia			15	
Fossey et al. (2017)	Australia			32	
Gurbuz, Hanley, and Riby (2019)	UK	184			
Hewett et al. (2018)	UK			32	7
Hopkins (2011)	UK			6	
Jansen et al. (2016)	Belgium	378			
Kendall (2016)	UK			13	

Kilpatrick (2016)	Australia			9	
Lambert and Dryer (2017)	Australia			8	
Laslo-Roth, Bareket-Bojmel, and	Israel	648			
Margalit (2020)					
Long, Marchetti, & Fasse (2011)	USA	1371			
MacLeod, et al. (2017)	UK			16	
Moriña, Cortés, and Melero	Spain		44		16
(2013)					
Mosia and Phasa (2017)	South Africa			26	1
Mullins and Preyde (2013)	Canada			10	
Nightingale et al. (2019)	UK	92	110*		92
Redpath et al. (2013)	N.Ireland			13	
Sachs and Schreur (2011)	Israel	326			
Sarrett (2018)	USA	87	31		
Shonfeld and Ronen (2015)	USA	121		9	121
Smith, Woodhead, and Chin-	USA	155			
Newman (2019)					
Strnadová, Hájková, and	Czech Republic			24	
Květoňová (2015)					
Total participants per study type		3172	185	305	241

Note. Nightingale et al. (2019) gave approximate numbers of participants across 11 focus groups. *110 represents the average.

Note. Barkas, Armstrong & Bishop (2020) ***presented data from three participants as a sample from a 2017 conference paper awaiting publication.

Appendix C

Table C1: Student participant totals per study by disability type.

Authors	А	DX	DC	AU	V/A	MH	PH	0	ND	N
Alamri & Tyler-Wood (2017)	10				11	3	3	9	4	
Barkas, Armstrong, and Bishop (2020)**		1	1	1		1		1		
Bessant (2012)					1		3	1		
Beyene, Mekonnen, and Giannoumis (2020)					17					
Blockmans, Inge G. E. (2014)					3		19			
Christopher & Richard (2015)	1			1						
Cox et al. (2020)				8						
Couzens et al. (2015)							2		5	
Fossey et al. (2017)							15	10		

Gurbuz, Hanley, and Riby (2019)			26		36		8	158
Hewett et al. (2018)				24			8	
Hopkins (2011)		1		4		2	1	
Jansen et al. (2016)		86					42	250
Kendall (2016)		7		1	1	4		
Kilpatrick et al. (2016) N.A								
Lambert and Dryer (2017)		8						
Laslo-Roth, Baraket- Bojmel, and Margalit (2020)	119							529
Long, Marchetti, & Fasse (2011)				88				1195
MacLeod, et al. (2017)			16					
Moriña, Cortés, and Melero (2013)				16	7	22		
Mosia and Phasa (2017)				11				
Mullins and Preyde (2013)	3	4			3			

Nightingale et al. (2019)		42						6		50
Redpath et al. (2013)		2	1	2	2	6	5	1		
Sachs and Schreur (2011)					65	39	61	5		156
Sarrett (2018)	21			65		57		4		1
Shonfeld and Ronen (2015)									25	96
Smith, Woodhead, and Chin-Newman (2019)					13	58	67	13	91	
Strnadová, Hájková, and Květoňová (2015)	2	5		1	11		6			
Total disability type participants per study										
	242	70	2	120	267	211	209	109	125	2435
Total students with disabilities:	1355									

Note. A=ADHD, DX= dyslexia, DC= dyscalculia, AU = Autism/ASD, V/A = visual/auditory impairment, deaf, or blind, MH= mental health condition, PH= physical symptoms or physical medical condition, O = other, ND= non-disclosed specific learning difficulty, N= no disability (control group).

***Barkas, Armstrong, and Bishop, 2020: sample of 3 participants – some with comorbidities of conditions – taken from an unpublished conference paper. Reported conditions may outnumber total number of participants per study due to comorbidities

Authors	Student	Faculty	Disability	Other
			Staff	
Alamri & Tyler-Wood (2017)	40			
Barkas, Armstrong, and Bishop (2020)**	3			
Bessant (2012)	3			
Beyene, Mekonnen, and Giannoumis (2020)	17			
Blockmans, Inge G. E. (2014)	22			
Christopher & Richard (2015)	1			
Cox et al. (2020)	8			
Couzens et al. (2015)	7		8	
Fossey et al. (2017)	25		7	
Gurbuz, Hanley, and Riby (2019)	184			
Hewett et al. (2018)	32			48
Hopkins (2011)	6			
Jansen et al. (2016)	172			42
Kendall (2016)	13			
Kilpatrick (2016)			9	
Lambert and Dryer (2017)	8			

Table C2: Participant totals per study by occupation.

Laslo-Roth, Baraket-Bojmel, and Margalit (2020)	648			
Long, Marchetti, & Fasse (2011)	1283			
MacLeod, et al. (2017)	16			
Moriña, Cortés, and Melero (2013)	44			
Mosia and Phasa (2017)	11	10	2	3
Mullins and Preyde (2013)	10			
Nightingale et al. (2019)	92			
Redpath et al. (2013)	13			
Sachs and Schreur (2011)	326			
Sarrett (2018)	66	1		21
Shonfeld and Ronen (2015)	121			
Smith, Woodhead, and Chin-Newman (2019)	155			
Strnadová, Hájková, and Květoňová (2015)	24			
Total participant type	3350	11	26	114
Total participants across all studies:	3501			

Note: Barkas, Armstrong, and Bishop, 2020: sample of 3 participants – some with comorbidities of conditions – taken from an unpublished conference paper. Reported conditions may outnumber total number of participants per study due to comorbidities.

Appendix D

Table D1: HD Student experience studies and themes.

Authors	Themes (all related to HE and students)
Barkas, Armstrong, and Bishop (2020)	Curriculum inclusion
Bessant (2012)	Assessment
Beyene, Mekonnen, and Giannoumis (2020)	Inclusion, access, accessibility
Blockmans, Inge G. E. (2014)	Disability disclosure
Cox et al. (2020)	Challenges: autism
Couzens et al. (2015)	Support for HD students
Fossey et al. (2017)	Disability supports
Gurbuz, Hanley, and Riby (2019)	Social and academic experiences: autism
Hewett et al. (2018)	Inclusive design, RAs, personal agency
Hopkins (2011)	Discrimination
Jansen et al. (2016)	RAs and ADHD
Kendall (2016)	Disability experiences
Kilpatrick et al. (2016) **	Academic success and withdrawal rates
MacLeod, et al. (2017)	Cost of success: autism
Moriña, Cortés, and Melero (2013)	All disabilities: barriers and support

Mosia and Phasa (2017)	Access to curriculum (blind and low vision)
Mullins and Preyde (2013)	Experiences
Redpath et al. (2013)	Experiences
Sachs and Schreur (2011)	Inclusion
Sarrett (2018)	Experiences: autism
Smith, Woodhead, and Chin-Newman (2019)	RA needs
Strnadová, Hájková, and Květoňová (2015)	Experiences

Note. ** Kilpatrick et al. (2019) did not interview students, but disability services managers about students.

Table D2: E-learning studies, research methods, and totals.

Study	Case Study	Interview	Questionnaire	Focus Groups
Alamri & Tyler-Wood			Х	
(2017)				
Meyers, Christopher, and	Х	Х		
Richard (2015)				
Lambert and Dryer (2017)		Х		

Laslo-Roth, Baraket-			Х	
Bojmel, and Margalit (2020)				
Long, Marchetti, and Fass (2011)	Х		Х	
Nightingale et al. (2019)	Х			Х
Shonfeld and Ronen (2015)	X		Х	
Total	4	2	4	1
As a percentages				
of online studies				
to nearest decimal:	57%	57%	29%	14%

Appendix E

Shared experiences of students with hidden disabilities in higher education across 29 studies.

Shared experience	No. studies	As a percentage of all studies	Authors
			Barkas, Armstrong, and Bishop, 2020.
Environmental struggles	17	58.62%	Bessant, 2012.
			Blockmans, 2014.
			Cox et al., 2020.
			Couzens et al., 2015.
			Gurbuz, Hanley, and Riby, 2019.
			Jansen et al., 2016.
			Hewett, 2018.
			Hopkins, 2011.
			Long, Marchetti, & Fasse, 2011.
			Moriña, Cortés, and Melero, 2013.
			Mosia & Phasa, 2017.
			Mullins and Preyde, 2013.
			Nightingale et al., 2019.
			Repath et al., 2013.
			Sarrett, 2018.
			Strnadová, Hájková, and Květoňová,
			2015.

			Cox et al., 2020.
Academic struggles	12	41.37%	Bessant, 2012.
			Couzans et al., 2020.
			Gurbuz, 2019.
			Kilpatrick et al., 2016.
			Lambert and Dryer, 2017.
			Long, Marchetti, & Fasse, 2011.
			Moriña, Cortés, and Melero, 2013.
			Mullins and Preyde, 2013.
			Redpath et al., 2013.
			Sachs and Shcreur.
			Nightingale et al., 2019.
			Barkas, Armstrong, and Bishop, 2020.
Stress	9	31.03%	Bessant, 2012.
			Christopher and Richard, 2015.
			Fossey et al., 2017.
			Kendall, 2016.
			Lambert and Dryer, 2017.
			MacLeod, et al., 2017.
			Moriña, Cortés, and Melero, 2013.
			Redpath et al., 2013.
			Blockmans, 2014.
			Couzens et al., 2015.

			Hewett et al., 2017.
			Hopkins, 2011.
			Lambert and Dryer, 2017.
			Moriña, Cortés, and Melero, 2013.
More time on study	11	37.93%	Mosia and Phasa, 2017.
			Mullins and Preyde, 2013.
			Sachs and Schreur, 2011.
			Nightingale et al., 2019.
			Redpath et al., 2013.
			Christopher and Richard, 2015.
			Cox et al., 2020.
Executive Dysfunction	10	34.48%	Couzens et al., 2015.
			Cox et al., 2020.
			Gurbuz, Hanley, and Riby, 2019.
			Jansen et al., 2016.
			Laslo-Roth, Baraket-Bojmel, and
			Margalit, 2020.
			Mullins and Preyde, 2013.
			Strnadová, Hájková, and Květoňová,
			2015.
			Nightingale et al., 2019.
			Blockmans, 2014.
			Cox et al., 2015.

6	20.68%	Couzens et al., 2015.
		Gurbuz, Hanley, and Riby, 2019.
		Lambert and Dryer, 2017.
		Smith, Woodhead, and Chin-Newman,
		2019.
	6	6 20.68%

Appendix F

Reports of accommodation types identified in each study, and totals.

Authors	Note -	Assistive	Extra time	Alternativ	Quiet space	Universal	Inter
	Takers	Technology	(exams/	e		Design for	prete
			assignments)	Assessme		Learning	r
				nt			
Barkas, Armstrong, and	1	1		1			
Bishop, 2020.							
Bessant, 2012.		1		1			
Beyene, W., Mekonnen,	1	1					
A. and Giannoumis, G.,							
2020							
Blockmans, Inge G. E.,			1				
2014.							
Cox et al., 2020.							
Couzens et al., 2015.	1	1				1	
Fossey et al., 2017.							
Gurbuz, Hanley, and	1	1	1	1	1		
Riby, 2019.							
Hewett et al., 2018.	1	1		1	1	1	

H 1: 2011		1					
Hopkins, 2011.		1					
Jansen et al., 2016 .		1	1	1	1		
Kendall, 2016.	1	1	1	1	1		
Kilpatrick et al., 2016.							
Long, Marchetti, &							1
Fasse, 2011.							
MacLeod, et al., 2017.		1					
Moriña, Cortés, and		1	1	1	1	1	
Melero, 2013.							
Mosia and Phasa, 2017.	1	1	1				
Nightingale et al., 2019.	1	1					
Mullins and Preyde, 2013.	1	1	1				
Redpath et al., 2013.							
Sachs and Schreur, 2011.							
Sarrett, 2018.	1	1	1		1		
Strnadová, Hájková, and	1						
Květoňová, 2015.							
Smith, Woodhead, and	1	1	1	1			
Chin-Newman, 2019.							
Totals:	12	16	9	8	6	3	1
As a percentage of 22							
Relevant studies to 5%							
Nearest decimal:	55%	72%	41%	36%	27%	c 14%	5%

Alamri and Tyler-Wood (2017), Lambert and Dryer (2017), Meyers and Bagnall (2015), Shonfeld and Ronen (2015), Laslo-Roth, Baraket-Bojmel, and Margalit, 2020 not included. These studies relate to online learning with no opportunity for HD students to discuss RAs in semi-structured interviews or through open-ended questionnaire questions.

Appendix G

Student complaints by category and study in relation to reasonable adjustments, including satisfaction reports.

Authors	Excessive self-	Poor staff	Нарру	Fear of	Non-
	advocacy	compliance	with	stigma	Disclosure
			accommodations		
Barkas, Armstrong, and			1	1	
Bishop, 2020.			-		
Bessant, 2012.		1	1		
Beyene, Mekonnen, and				1	
Giannoumis, 2020.					
Blockmans, Inge G. E.,	1			1	
2014.					
Cox et al., 2020.	1	1	1	1	1
Couzens et al., 2015.		1	1		
Fossey et al., 2017.	1	1		1	1
Gurbuz, Hanley, and		1			
Riby, 2019.					
Hewett et al., 2018.	1	1	1		
Hopkins, 2011.	1	1			
Jansen et al., 2016.					
Kendall et al., 2016.		1	1	1	1
Kilpatrick, 2016.		1		1	1
Long, Marchetti, & Fasse,					
2011.					
MacLeod, et al., 2017.			1	1	

Moriña, Cortés, and		1			
Melero, 2013.					
Mosia and Phasa, 2017.		1			
Mullins and Preyde, 2013.		1	1	1	
Nightingale et al., 2019.			1		
Redpath et al., 2013.				1	1
Sachs and Schreur, 2011.					
Sarrett, 2018.	1	1			1
Smith, Woodhead, and		1	1	1	
Chin-Newman, 2019.					
Strnadová, Hájková, and	1	1			
Květoňová, 2015.					
Total number of studies	7	15	10	11	6
with these complaints:					

Authors	Unworkable	Non-	Negative	Bureaucrac	Identity
	adjustments	utilisation	attitudes	У	
Barkas, Armstrong, and		1			
Bishop, 2020.					
Bessant, 2012.	1			1	
Beyene, Mekonnen, and	1	1		1	
Giannoumis, 2020.					
Blockmans, Inge G. E.,			1	1	1
2014.					
Cox et al., 2020.	1	1	1	1	1
Couzens et al., 2015.	1	1	1		1
Fossey et al., 2017.			1	1	
Gurbuz, Hanley, and		1			
Riby, 2019.					
Hewett et al., 2018.	1			1	
Hopkins, 2011.	1	1		1	
Jansen et al. 2016.					
Kendall et al. 2016.		1	1		1
Kilpatrick, 2016.					
Long, Marchetti, & Fasse,	1				
2011.					
MacLeod, et al. 2017.	1		1		1
Moriña, Cortés, and					
Melero, 2013.					
Mosia and Phasa, 2017.	1		1		
Mullins and Preyde, 2013.		1	1	1	1
Nightingale et al. 2019.					

Redpath et al. 2013.				1	
Sachs and Schreur, 2011.					
Sarrett, 2018.	1		1	1	
Smith, Woodhead, and		1		1	1
Chin-Newman, 2019.					
Strnadová, Hájková, and			1	1	
Květoňová, 2015.					
Total number of studies	10	9	10	12	7
with these complaints:					

Note. Negative Attitudes = negative staff or peer attitudes about disability experienced by the study participant, Identity= identity and issues with the term 'disability.'

Alamri and Tyler-Wood (2017), Lambert and Dryer (2017), Meyers and Bagnall (2015), Shonfeld and Ronen (2015), Laslo-Roth, Baraket-Bojmel, and Margalit, 2020 not included. These studies relate to online learning with no opportunity for HD students to discuss RAs in semi-structured interviews or through open-ended questionnaire questions. 'Fear of stigma' relates to potential stigma. 'Negative staff/peer attitudes about disability' relates to incidences of the same.

Appendix H

Academic outcomes in online learning case studies with various hidden disability participant types and control groups.

Study	E-learning	Comparison	Grade	Participants	Participant	Outcome	Note
	tool	tool	measurement		groupings based		
			system		on:		
Long,	Online	Face-to-face	HEI data of	Deaf and hard-of-	Case study:	Deaf and hard-of-	All student
Marchetti,	synchronou	lectures and	grades of	hearing students	interviews	hearing students	grades
and Fasse,	s lectures,	interactions;	students in 432	enrolled in online		achieved greatest	improved
(2011)	discussion	discussions	real	and face-to-face	Survey: student	improvement in	when lecture
	boards,	with students	synchronous	lectures.	self-identification.	grades when learning	interactions
	lecturer/stu	and lecturers.	online lectures			in online classes with	increased both
	dent		vs face-to-face	No disclosed		highest levels of	online and
	interactions		lectures.	SpLD students		online interaction vs	face-to-face.
				enrolled in online		face-to-face classes	
				and face-to-face		with lower levels of	The biggest
				lectures.		interaction.	improvement
							was for deaf
							and hard-of-
							hearing
							students in

							online lectures
							with high
							interaction
							levels.
Nightingale et al. (2019)	Supplement ary asynchrono	Textbooks	Lecture recording case study test	Dyslexia Control Group	Participant Disclosure	Better grades for all students on lecture recording test.	Equal grades for dyslexic students and
	us lecture			(no disclosed			control group
	recordings.		versus	SpLDs).			despite academic
			Textbook case				barriers faced
			study test				by dyslexic
							students in
							face-to-face
							lectures.
Shonfeld and Ronen	Synchrono us online	Participant self-reports	Formal assessment	SpLDs	Participant self- reported academic	No significant difference in the	In typical face- to-face
(2015).	teaching	of academic	based on	Average Students	achievement in	grades of all three	lectures, the
	module.	achievement	participation		other face-to-face	groups.	SpLD group
		in face-to-	and and		modules.		and average

face	application of	Excellent	group would
modules.	learning.	Students	have
			performed
			worse than the
			excellent
			group.
			SpLDs
			students
			reported
			greater
			satisfaction
			with online
			interaction and
			discussion
			groups.

Appendix I.

Assessment results of survey tools based on accessibility criteria.

Mobile-	Built-in	Screen reader	Free version with	Colour Blind	Font and colour control
friendly	screen	plugin enabled	suitable question	friendly	design control.
	reader		limit.		
×					
	×			×	×
					×
	×		×		
	×		×		
	×		×		
	Mobile- friendly ×	Mobile- Built-in friendly screen reader	Mobile- Built-in Screen reader friendly screen plugin enabled reader × × × × ×	Mobile- friendlyBuilt-in screenScreen reader plugin enabledFree version with suitable question limit.XX	Mobile- friendlyBuilt-in screenScreen reader plugin enabledFree version with suitable question limit.Colour Blind friendly limit.×××××××××××××××××××××××××××××××××××××

	Built in speech-to-	· Speech-to-text	Accessibility checker	Bug detected	Web Content
	text	plugin enabled	(built-in)	during pilot	Accessibility
				phase.	Guidelines
					(WCAG) 2.1
					Compliancy
Google Forms					Level AA
	×			×	
		(Google Chrome			
		only)			
Microsoft Forms					Level AA
	×				Working towards
SmartSurvey		×		×	AA
Survey Monkey					Level AA
	×			×	
Oualtrics					
~~~~~	×			×	(only 20 AA)
					(omy 2.0 / m)

*Note.* X = the survey tool does not fulfil the criteria, = the survey tools does fulfil the criteria.

# Appendix J:

Study	Source	Information	This study's question.
Beyene, Mekonnen, &	Semi-	A: Blind and visually impaired	QS. Q14: 'What do you think about
Giannoumis (2020)	structured in-	students noted that personal	lecture recordings published online after
	depth	lecture recordings took too long	class?"
	interviews.	to listen back over.	• They take too long to re-watch.
Christopher & Richard	Case study and	A: ADHD and ASD participant	QS Q16: "How do you feel about study
(2015)	follow-on	experienced navigational	resources and lecture notes published on
	interview.	disorientation when too many	Brightspace/Moodle/your college's
		links were on each web page.	VLE?"
			• They are easy to locate.
Cox et al., (2021)	Semi-	A: Students with ASD noted an	OS. O20: "What do you think about
	structured	incompatibility with learning in	face-to-face lectures in big lecture
	interviews.	larger lecture halls.	halls?"

# • They are distracting

Cox et al., (2021)	Semi-	A: Students with ASD found	QS. Q20: "What do you think about
	structured	social interaction in tutorials	face-to-face lectures in big lecture
	interviews.	distressing and would stay silent	halls?"
		rather than risk saying something	• I don't like speaking in them.
		deemed inappropriate.	

Gurbuz, Hanley, & Riby,	Questionnaire	Q1 "What kind of additional	QS Q.33 "Please rate how useful to
(2019) p.621		support services and	your studies you find the below
		accommodation did you receive	accommodations (also known as
		at your institution (e.g.	reasonable adjustments) which are
		college/university) due of your	available to some students registered
		diagnosis of an ASD?"	with the disability services."
			• Additional time in exams
			• extended assignment deadlines
			• permission to record lectures

- lecture notes before class
- note-taking services
- quiet rooms
- Occupational Therapy sessions.

Long, Marchetti, and	Case study and	A: Deaf and hard-of-hearing	QS Q18: What do you think of online
Fasse (2011)	follow-on questionnaire.	participants appreciated discussion board interaction as	discussion boards?
		there was no delay with an interpreter as with an on-campus class discussion.	• I like that I have time to think about my answer.
Nightingale et al. (2019)	Case study, questionnaires, focus groups.	A: Students disclosing dyslexia and other SpLDs noted the flexibility online lecture recordings afforded them.	<ul><li>QS. Q14: 'What do you think about lecture recordings published online after class?"</li><li>They give me flexibility.</li></ul>

Union of Students in	Questionnaire	A: Over half of the students with	QS Q27: "Which of the below statements
Ireland, Survey (2018)		disabilities surveyed did not	apply to you?
		disclose their disability to their	• I currently use the disability
		HEIs disability office.	support services in my college.
			• I've never used the disability
			support services in my college.
			• I have used the disability support
			services in my college in my past

*Note.* Information: the source of information that influenced this study's questionnaire design was Q = a survey or interview question, or A = a participant answer. This study's question: QS = questionnaire, I = interview, Q = question number.
### Appendix K

#### Sample of open question on online questionnaire.

 $\mathbf{8}.$  Please list any physical, medical, mental health, or neurological conditions you live with.

Skip to section 2 if you don't live with any.

Examples include: hearing impairment, IBS, Anxiety Disorder, ADHD, Autism Spectrum Disorder, Fibromyalgia, Endometriosis, Epilepsy, Depression.

Enter your answer

#### 9. Have you been officially diagnosed with the above by a medical practitioner?

- I'd rather not say.
- No I self-diagnosed.
- Yes I have been offically diagnosed.
- I have been officially diagnosed for one or more conditions and have self-diagnosed for others.
- I am in the process of being officially diagnosed for one or more conditions.

#### Appendix L

Microsoft Forms technical support forum: troubleshooting issues with questions.



# Appendix M

# HEIs and Disability Organisations in Ireland contacted for expressions of interest in dissemination of the online questionnaire.

Higher Education Institution	Disability Services	Access
	Contacted	Office
		Contacted
Ballyfermot College of Further Education	Х	
Dublin City University	Х	Х
Dundalk Institute of Technology	Х	Х
Galway-Mayo Institute of Technology		Х
Institute of Art, Design, and Technology,	Х	Х
Dun Laoghaire		
Institute of Technology, Carlow.	Х	Х
Institute of Technology, Sligo.	Х	Х
Letterkenny Institute of Technology	Х	
Mary Immaculate College, Limerick.	Х	
Munster Technological University	Х	
National College of Art and Design,	Х	
Dublin.**		
National University of Ireland, Galway.	Х	Х
National University of Ireland, Maynooth.	Х	
Royal College of Surgeons, Ireland.	Х	
Technological University, Dublin.	Х	Х
Trinity College, Dublin.	Х	
University College, Cork.	Х	
University College, Dublin.	Х	
University of Limerick	Х	
Waterford Institute of Technology	Х	
Disability Organisation	General Contact	
ADHD Ireland	Х	
AsIAm (Autism Organisation)	Х	
Epilepsy, Ireland	Х	
Fighting Blindness Ireland	Х	
Irish Deaf Society	Х	

Note. *** = the assistive technology office was contacted in lieu of a disability office email.

#### Appendix N

#### Expressions of interest request email pages 1-4.

Mail: D0023328 Sexaw Yourg: Outook many eligible students do not access their services because they do not identify as having a "disability" and nerform worse academically as a result (Kilantrick et al. 2016).

The Researcher My name is Susan Young. I'm an MSc Education student on the Digital Innovator pathway at TU Dubin. This is my final year of the 2-year part-time MSc with my thesis as the final stage. I vorted as a Sudent Advisor for the TU Dubin Sudent's Union previously and became familiar with the struggles that students with hidden disabilities face at third level.

I also previously worked in Learning and Development where I developed notice training content for telecommissions. I could also the benefit of the floatble appreciation to learning (before I had become as mainstream as it is now) and subsequently applied for this MSc to bring both appecting together- then we were real nucleded into a pandemic, where all students no have experience learning online). My Supervisor is a member of the National Disability Authority.

2. Pilot Copy to View Questions Please see a pilot copy of the survey here: all elements associate with the ethics process will be included with the final version e.g. a landing page with more information, and an opti-n check toos, and the TU Dublin top. be changed. You'll see that the survey is anonymous, purpose clearly defined, and the researcher's email given upon submission to request to withdraw data.

**If you would like to share the survey, but there are small elements that concern you, please address this with the researcher.

coffice.com/Pages/ResponsePage.aspxr 06M7Ng8ii_V2g_BpGpPV5xEp-nMQ-00LotV20uBVVPVzQwSENBN1MyOUoyUC4L



Fill | *****Student Perceptions of Online Learning, On-Campus Learning, and Disability Supports. forms office cor

Desemination Hypos world file to be have this survey: 1) Please reply to this enal to confirm by February 28th. A reminder email will be sent to you on February 27¹⁵¹. 2) The Researcher will inform the Ethics Committee at TU Dublin that your Institution's office will disseminate this survey. 3) The TU Dublin Ethics Committee will respond.

Mail - D2125233 Sour Year, - Onlink
 4) If approved by the Ethics Committee, I will email you the final survey to disseminate
 and any necessary materials (e.g. into email).
 5) The survey will remain open for 3 weeks, the close date will be determined pending
 no delays in this process.

#### Additional Information

- Students while agree to attend interview will be given a second Informed Consent form, and again informad on their right to withdraw at any stage. The researcher is trained in SAFETIAR and SAFEAssist should any student find it distressing to discuss their hidden disability. The Researcher is familiar with referral services and assistance and an experienced Student Advisor in the areas of education and welfare. The researcher is advertising this survey to all students and recent graduates in TU Dublin and on social media via the union and internal communications (pending approval) in order to have a control group. Cox, E.E. Edelstein, J. Rogdon, B., & Roy, A. (2021). Navigating challenges to

- facilitate success for college students with autism, The Journal of Higher Education, 92 (2) 252-278, DOI: 10.1080/00221546.2020.1798203
- · Jansen, D., Petry, K., Ceulemans, E., van der Oord, S., Noens, I. & Bacycns, D. (2016). Functioning and participation problems of students with ADHD in higher education: which
- reasonable accommodations are effective?. European Journal of Special Needs Education, 32(1), 35-53. DOI: 10.1080/08856257.2016.1254965
- Kendall, L. (2016). Higher education and disability: Exploring student experiences. Cogent Education, 3(1), 1256142. https://doi-
- org.tudut blin.idm.oclc.org/10.1080/2331186X.2016.1256142
- Kilpatrick, S., Johns, S., Barnes, R., Fischer, S., McLennan, D. and Magnussen, K. (2016). Exploring the retention and success of students with disability in Australian higher educ International Journal of Inclusive Education, 21(7), 747-762, https://doi
- org.tudublin.idm.oclc.org/10.1080/13603116.2016.1251980
- · Mullins, L. & Preyde, M. (2013). The lived experience of students with an invisible disability at a Canadian university. Disability & Society, 28(2), 147-160. https://doiorg.tudublin.idm.oclc.org/10.1080/09687599.2013.769862

#### Yours sincerely

Susan Young MSc Education Student (Digital Innovator) 2020-2022 TU Dublin

Invitation: Survey Participants with 'Hidden Disabilities' in Higher Education. D20125528 Susan Young <D20125528@mytudublin.ie> Wed 2/16/2022 4:43 PM

Viel 21/8/02/2 4-8 PM To access@dcula caccess@dculacy.access@iatl.ie-access@iatl.ie-a islien.lynch@dkl.ie eileen.lynch@dkl.ie-y accessoft.ie@grintle-access@iatl.ie-a isliing.mchugh@itcanbusig eileanim_mchugh@itcanbusis_initealionergen@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe_arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitioe.arianimesupper@illaitio hnology@s vrt@rcsi.ie <disabilityservice@nuigaiway.ie>; learningsupp
 Dear Disability and Access Services,

I am writing to invite you to share a survey to your service users on their perceptions of online learning, on-campus learning, and disability support services. The survey is anonymous and their HE I information is not requested, therefor will not be differentiated in the results or analysis phase. Participants have the option to provide their email at the end of the survey if they would like to attend a follow-on interview. The online questionnaire is built with the accessible MS Forms.

Below you will find 1) details on the questionnaire with headings 2) a copy of the questionnaire for your information, not for dissemination. 3) steps to share the questionnaire and 4) additional information including a sample of studies that informed this research.

#### 1. Purpose of the Study

The survey aims to identify best inclusive practices for students with 'hidden disabilities' in the context of third level education with a particular focus on academic success and welfar The approach is to address this from the student perspective, akin to modern 'co-created curricula' approaches. Due to the pandemic, an unprecedented number of students now have experience learning online.

This study's main aim is to address student perceptions of online learning, on-campus learning, and disability support services, in order to determine the extent to which universa designed lectures with more online learning content could replace some on-campus learnin or the need for individual disability support services. The study will also look at the reasons why many students do not register with their local isability office to obtain much-needed academic support. The researcher is disseminating the survey to the main student body at D bublin in order to capture data from non-registered users, and as a control group.

Survey Questions The questions in this survey are informed by several studies from Australia, Canada, the US, the UK etc. on subdent experiences in Higher Education, particularly students with ASD, dyslexia, visual impairments, and a number of other 'hidden disabilities.' I have listed some of those studies at the end of this email.

Mail - D20125528 Susan Young - Outlook

0863539816 d20125528@mytudublin.ie suyoung@tcd.ie (personal email from undergraduate degree)

NN2U1YTLIQQQQACK4EFuBYBCqrdhvBrg... 34 https://wdwk.office365.com/mailtabox/d/AAQkADEzZTQINWMILTErY20NGRBMC04Nmq/ILWUMGNN2U1YTLIQQAQACK4EFuBYBCqrdhvBrg... 44

#### **Appendix O**

#### Informed consent document sent to interview participants.



LTTC Participant Information Leaflet

How much could online learning replace reasonable adjustments?

Susan Young, MSc Education (Digital Innovator), Supervisor: Damian Gordon, School of Computer Science.

You are invited to participate in this research project which is being carried out by Susan Young, MSc Education (Digital Innovator).

Your participation is voluntary. Even if you agree to participate now, you can withdraw at any time without any consequences of any kind

The study is designed to investigate your experiences with the current disability supports available in TU Dublin, as well as your experiences with online learning.

The purpose of the study is to determine if online learning is a more suitable tool to support curriculum inclusion and independence in students with hidden disabilities than additional disability supports. Hidden disabilities include visual impairments, additional educational needs, ment health issues, neurodiversity should it impede everyday activities, unseen physical disorders such as epilepsy or nervous system disorders, etc.

If you agree to participate, this will involve you filling out an online questionnaire of no more than five minutes and ten questions. The questionnaire is a mixture of multiplic-choice answers and longer, written statements. You will also be invited to volunteer to participate in an online Microsoft Teams interview of no more than thirty multise which will ask y questions about your experiences in university with disability supports and

online learning in the context of your academic success, wellbeing independence, their suitability, and preferences for either.

Answering questions about your experiences in university in the context of disability may cause you disconfort, particularly because your experiences are unique and personal to you. Should any online questionnaire questions make you uncomfortable, you may skip them and move on to the next, or withdraw from taking the questionnaire by not completing it. There will be a box at the end of the page that how can lick to comprove the that you are withdrawing your.

questionnaire by not completing it. There will be a box at the end of the page that you can tick to communicate that you are withdrawing your questionnaire and do not wish for it to be used in the study.

Should any interview questions make you uncomfortable, you do not have to answer them. You can simply say pass' or "next question" and we will move on. You can stop and leave the interview at any time and request th your answers are not used in the research. You will be prompted three times during the interview and asked if you are happy to confinue.

Your participation in this research could result in great benefit to students in university with hidden disabilities. Insights into your experiences with disability supports and online learning could result access, procedure or choice of the state of the could enhance academia and the higher education experience for all learners.

Any information or data which we obtain from you during this research which can be identified with you will be treated confidentially. We will do this by anonymising your information through an alternative participantnaming system such as interviewee A, B, and C. The Information will be such as were produced and encrypted file within the university's cloud servere:

Written transcriptions may be made for analysis. Extracts of the data from this research project may be published in future. The original recording and available only to the present investigators: Susan Young]

The recordings will be kept in a secure location which will be locked when the researcher is not present. If you have any questions about this research you can ask me. You are also free, however, to contact any of the other people involved in the research to seek further clantication and information: Damian conton, School of Computer Science. Damian x conton/Bubulchin as Claite McAvinia, MSc Education Course Coordinator.

Note. The email to participants with the attached form included an amendment to the form stating that the interview would also include questions about on-campus learning.

#### **Appendix P**

#### Ethnics committee approval email pertaining to this study.



Research Ethics and Integrity Committee, Technological University Dublin - City Campus Grangegorman, Dublin 7.

16/05/2022

Dear Susan,

The Research Ethics and Integrity Committee of the Dublin Institute of Technology has reviewed your application entitledTo what extent can online learning present a viable alternative to reasonable adjustments?, our reference REIC-21-40.

Your application has been approved by the committee. As part of the decision making process the following is noted: None. Note that if there are any changes in the research as described in this submission (REIC-21-40) you must notify the REIC.

The committee would like to wish you the best of luck with your work.

Yours sincerely,

Steve Meaney, PhD Chair - Research Ethics and Integrity Committee, Technological University Dublin - City Campus

#### Appendix Q

Online questionnaire front page with consent agreement and exclusionary method for respondents under the age of 18.

# Student Perceptions of 1)Online Learning 2)On-Campus Learning 3)Disability Services. 8

Thank you for your interest in completing this questionnaire.

TERMS OF THE STUDY:

#### Who can participate in this study?

- · Open to all third level students or recent graduates over the age of 18.
- · Section 1, 2, and 3 : Open to all students.
- Section 4: Open to students with a 'hidden' disability (neurodiversity, chronic health issue, mental health condition, etc).
- Interview Option: Students with hidden disabilities can volunteer their email at the end of section 3 and attend an interview.
- Screen reader built-in.

#### How long will it take?

5 minutes to 15 minutes If you choose to fill in optional comment boxes throughout this survey it will take longer than 5 minutes. Fastest on a desktop/laptop/tablet.

#### What's the research about?

The main aims of this research are to explore:

- 1) Student preferences for different aspects of online lectures and tutorials, and on-campus lectures and tutorials.
- 2) Student perceptions of academic disability support services.

#### Your participation:

- · This survey is anonymous. Your name, email, college, and identifying data will not be collected.
- If you volunteer your email at the end of the survey to be invited to interview, it will be associated with
  your answers. Your answers will no longer be anonymous. You may be asked about your
  answers in the interview.
- If you would like to withdraw your answers at any stage, please note your time stamp of submission. It will
  be the only way to differentiate your data if you have not volunteered your email at the end of the survey.
- Withdraw or ask questions by contacting the researcher by email: d20125528@mytudublin.ie
- Answering questions about a hidden disability may cause distress. If you feel affected by the questions in this survey, you can stop at any time. You can also contact your local student counselling service, disability support service, or
- 1) Aware free national support line on 1800 80 48 48 (open 10am to 10pm 7 days).
- 2) The Samaritans 24 hour helpline: 116 123
- 3) Jigsaw free chat support. Register here by copying the link into your

browser: https://portal.jigsaw.ie/login (open Monday-Wednesday and Friday, 1-4.30pm. Open Thursday 2 - 7.30pm).

#### Section 1

•••

#### Section 1 - About You

8 short questions about your age, academic timeline, and health.

1. I have read the terms of this study and agree that my answers will be used in this research. *

Ves

## Appendix **R**





# Appendix S

# Demography of survey respondents, reports of conditions, and disability service registration status.

Participant	Year	Age range	Gender	Conditions disclosed (as written	Diagnostic status	Disability
	of			by participant)		Registration
	study					Status
R1	2 nd	18-23	Female	Anxiety Disorder	In the process of	Not registered
	year				being officially	
					diagnosed.	
R2	2 nd	24-29	Female	Anxiety, depression, and bipolar	Officially diagnosed.	Registered
	year			disorder.		
R3	$1^{st}$	30-35	Female	Hearing impairment, anxiety	Officially diagnosed	Registered
	year			disorder, depression.	for one or more	
					conditions and have	
					self-diagnosed for	
					others.	

R4	$2^{nd}$	18-23	Female	Social anxiety.	In the process of	Not registered
	year				being officially	
					diagnosed.	
R5	2 nd	18-23	Transgender	ADHD, anxiety disorder, PTSD,	In the process of	Not registered
	year		0	autism, sensory processing	being officially	C
	·			disorder, disordered eating.	diagnosed for one or	
					more condition(s).	
<b>P</b> 6	1 st	18.23	Famala			ΝΛ
KU	l	10-25	remate			<b>NA</b>
	year					
<b>R</b> 7	$1^{st}$	18-23	Female	Dyslexia	Officially diagnosed.	Registered
	year					
R8	1 st	18-23	Female	Rheumatoid arthritis, growth	Officially diagnosed.	Registered
	year			hormone deficiency.		
R9	2 nd	18-23	Female	Polycystic ovary syndrome,	Officially diagnosed.	Registered
	year			irritable bowel syndrome,		
				depression, anxiety, and bipolar		
				disorder.		
R10	3 rd	18-23	Female			NA
	year					

R11	3 rd	18-23	Female	Anxiety disorder	In the process of	Not registered
	year				being officially	
					diagnosed.	
R12	2 nd	18-23	Female	Anxiety, depression, reactive	Officially diagnosed.	Registered
	year			arthritis.		
R13	3 rd	18-23	Female	Dyslexia	Self-diagnosed.	Not registered
	year					
R14	2 nd	18-23	Female	ADHD	Officially diagnosed.	Registered
	year					
R15	1 st	18-23	Female	Dyspraxia	Officially diagnosed.	Registered
	year					
R16	2 nd	18-23	Female	Epidermolysis Bullosa Simple,	Officially diagnosed.	Registered
	year			obsessive-compulsive disorder.		
R17	1 st	18-23	Female	Haemophilia.	Officially diagnosed.	Registered
	year					
R18	1 st	18-23	Male	ADHD, Anxiety Disorder,	Officially diagnosed.	Registered
	year			scoliosis.		
R19	3 rd	18-23	Female	Anxiety, IBS, chronic migraines.	Officially diagnosed.	Registered
	year					

R20	2 nd year	30-35	Female	Hard-of-hearing, asthma, kidney disease.	Officially diagnosed.	Registered
R21	2 nd year	18-23	Female	Fibromyalgia, Myalgic encephalomyelitis, Hypermobile spectrum disorder	Officially diagnosed.	Registered
R22	Master s	30-35	Male	Hearing impairment	Officially diagnosed.	Registered

# Appendix T

Deaf/hear	Physical	Neurologica	Neurodiversit	Mental Health
d of	Conditions	l Condition	У	Condition
hearing				
3	9 participants	2	7 participants	11 participants
participant		participants		1 1
s i				
_				
Hearing	Asthma	Chronic	ADHD (n4)	Anxiety/Disorde
Impairmen		Migraines		r (n9)
t (n3)				
	Epidermolvsis	Sensorv	Autism	Borderline
	Bullosa Simplex	Processing		Personality
		Disorder		Disorder
		Distract		Distruct
	Fibromyalgia		Dyslexia (n2)	Bipolar Disorder
			(SpLD)	
	Growth Hormone		Dyspraxia	Depression (n4)
	Deficiency		(SpLD)	- ·F····· (- ·)
	Deficiency		(SPED)	
	Haemophilia			Disordered
				Eating
	Hypermobile			Obsessive
	Spectrum			Compulsive
	Disorder			Disorder
	Distruct			District.
	Irritable Bowel			Social Anxiety
	Syndrome (n2)			
	Kidney disease			
	Litane, aibeabe			

Table T1: Total reported conditions by category and frequency.

Myalgic
encephalomyeliti
s
Polycistic ovary
syndrome
Reactive arthritis
 Dhammada: 1
Rneumatoid
arthritis
Scoliosis

*Note*. n= number of times the condition was reported. SpLD = specific learning difficulty which was differentiated as a group in further sections of the results chapter.

# Table T2: Reports of condition by patterns of occurrences of comorbidities and single primary conditions among respondents.

Respondent	Hearing	Mental	Neurodiversity	Neurological	Physical
Number	Impairment	Health			
<b>R6</b>		3	2	1	
R9		3			2
R3	1	2			
R2		3			
R12		2			1
R18		1	1		1
R19		1		1	1
R20	1				2
R21					3
<b>R8</b>					2
R16		1			1

R1		1		
<b>R4</b>		1		
<b>R7</b>			1 (SpLD)	
R11		1		
R13			1 (SpLD)	
R14			1	
R15			1(SpLD)	
R17				1
R22	1			

Table T3: Most common reports of comorbidities, single conditions, and overall conditions among respondents.

Most frequent reports of	% HD Respondents (n20)	% Comorbidity
comorbidities by		Respondents (n11)
condition		
Physical condition +	30%	54.55%
mental health condition		
Most frequent report of	% HD Respondents (n20)	% Single condition
one condition		respondents (n9)
Neurodiversity	35%	77.78%
Mental Health Condition	15%	33.33%
Most frequently reported	% HD Respondents (n20)	% Mental health
condition.		condition respondents
		(n11)
Anxiety	50%	90.90%

#### Appendix U Respondent perceptions of online learning tools by category of conditions.

#### **Table U1: Live online lectures**

Acaut	ania: They make learning ea	18101.
	Agree	Disagree
Total:	50%	36.2%
Hearing impairment	33.33%	66.66%
Mental health condition	45.45%	45.45%
No reported conditions	0%	100%
Neurodiverse incl. SpLD	14.28%	71.43%
Neurological condition	0%	0%
Physical condition	55.56%	22.22%
Specific Learning	33.33%	66.66%
Difficulty		

#### Academia: They make learning easier

Hidden Disability Support: They support my independent learning.

Total	40.9%	50%
Hearing impairment	66.66%	33.33%
Mental health condition	27.27%	63.64%
No reported conditions	50%	50%
Neurodiverse incl. SpLD	14.29%	71.43%
Neurological condition	50%	0%
Physical condition	55.56%	33.33%
Specific Learning	33.33%	66.66%
Difficulty		

#### Well-being: They make my life easier.

Total:	46.33%	18.2%
Hard-of-hearing	66.66%	0%
Mental health condition	72.73%	18.18%
No reported conditions	50%	0%
Neurodiverse incl. SpLD	42.86%	42.86%
Neurological condition	100%	0%
Physical condition	77.78%	22.22%
Specific Learning	33.33%	33.33%
Difficulty		

Note. Neutral responses excluded. Combination of results may not amount to 100%.

Note. ADHD, Dyslexia, Dyspraxia included as neurodiversity and additionally as specific learning difficulties.

#### **Table U2 Lecture recordings**

	Agree	Disagree	
Hearing impairment	66.66%	0%	
Mental health condition	45.45%	27.27%	
No reported conditions	50%	0%	
Neurodiverse	57.14%	14.29%	
Neurological condition	50%	0%	
Physical condition	77.78%	22.22%	
Specific Learning	66.66%	0%	
Difficulty			
Academic com	patibility: They take too lon	g to re-watch.	
Academic com Hearing impairment	patibility: They take too lon 33.33%	g to re-watch. 0%	
Academic com Hearing impairment Mental health condition	patibility: They take too lon 33.33% 66.67%	g to re-watch. 0% 33.33%	
Academic com Hearing impairment Mental health condition No reported conditions	patibility: They take too lon 33.33% 66.67% 100%	g to re-watch. 0% 33.33% 0%	
Academic com Hearing impairment Mental health condition No reported conditions Neurodiverse	patibility: They take too lon 33.33% 66.67% 100% 57.14%	g to re-watch. 0% 33.33% 0% 14.29%	
Academic com Hearing impairment Mental health condition No reported conditions Neurodiverse Neurological condition	patibility: They take too lon 33.33% 66.67% 100% 57.14% 50%	g to re-watch. 0% 33.33% 0% 14.29% 50%	
Academic com Hearing impairment Mental health condition No reported conditions Neurodiverse Neurological condition Physical condition	patibility: They take too lon         33.33%       66.67%         100%       57.14%         50%       25%	g to re-watch. 0% 33.33% 0% 14.29% 50% 75%	
Academic com Hearing impairment Mental health condition No reported conditions Neurodiverse Neurological condition Physical condition Specific Learning	patibility: They take too lon         33.33%         66.67%         100%         57.14%         50%         25%         66.66%	g to re-watch. 0% 33.33% 0% 14.29% 50% 75% 0%	

Note. Neutral responses excluded. Combination of results may not amount to 100%.

Note. Percentages calculated against total answers to questions per hidden disability category, and not total respondents per hidden disability category. Therefore, total numbers that percentages are calculated from may differ per question.

#### Table U3: Online discussion boards.

Popularity: I don't like using them.			
	Agree	Disagree	
Hearing impairment	0%	0%	
Mental health condition	66.67%	22.22%	
No reported conditions	NA	NA	
Neurodiverse	25%	50%	
Neurological condition	50%	0%	
Physical condition	28.57%	28.57%	
Specific Learning	0%	50%	
Difficulty			
Well-being: I don't like others viewing my answers.			
Hearing impairment	0%	50%	
Mental health condition	33.33%	22.22%	
No reported conditions	NA	NA	
Neurodiverse	25%	25%	
Neurological condition	50%	50%	
Physical condition	0%	42.86%	
Specific Learning	0%	50%	
Difficulty			

*Note*. Neutral responses excluded. Combination of results may not amount to 100%.

*Note.* Percentages calculated against total answers to questions per hidden disability category, and not total respondents per hidden disability category. Therefore, the total numbers that rates are calculated from may differ per question.

### Appendix V

# List of all respondent comments related to campus environment and academic compatibility of all tools, respectively.

 Table V1: Qualitative survey reports of academic in/compatibility factors

 with teaching delivery methods.

Participant	Lecture Halls
P7	Good in small amounts for info that just needs to be learned or
	generally understood but smaller groups are much better for any maths
	or physics subject where you can discuss solutions easily and ask more
	questions.
R14	I like them if I can access the study notes online afterwards.
<b>R</b> 7	Not great unless I can get a seat at the very front.
	Smaller Tutorials
<b>R</b> 7	Great for getting input and opinions from peers and are much more
	engaging, I'm less likely to zone out in them.
	Live Online Lectures
<b>R</b> 7	Some lecturer's internet/device are bad quality, so you miss out on info
	and chat functions are usually disabled due to the large amount of
	people in the class and being at home is too distracting.
	Lecture recordings
Р3	Cannot express how helpful video recordings are to my studies. I just
	wish all lecturers recorded videos.
Р5	I often don't watch them back unless they have a speed modulator so I
	can speed up or down to suit my needs.
P7	There a good study tool and there great if you miss a lecture due to an
	appointment that can't be avoided but there not a great substitute to
	attending lectures whether there in person or online
	Online Discussion Boards
P5	I find it really difficult to express myself through writing.
P7	Good for any questions you may be stuck on but I find that many
	people just use WhatsApp or another form of communication instead.
	Lecture notes posted on a VLE

P3	I like to be able to mark them physically, but they are a godsend when
	you may have missed a lecture and can catch up.
P7	It really depends on the notes given, some are great but other lecturers
	notes are hard to read and understand and although it's easier to use
	than carrying papers, I think they're harder to follow.

## Table V2: Student Reports of issues with on-campus classes.

### **General Campus Environment**

R16	My physical condition sometimes inhibits me from going to class or from
	socialising, as it makes it very painful for me to walk.
R12	It can be hard for me to attend lectures when I have a flare up of my
	arthritis or am having a bad day with my mental illness.

R5	I struggle to get myself into college on time.	
R21	I struggle to attend all my in-person lectures because of my condition but	
	am in college as much as possible.	
R21	It is quite difficult for me to attend lessons all of the time due to my	
	conditions, but my course currently doesn't give the opportunity for	
	online lectures and forcing myself to attend college while unwell	
	makes me go into a worse flare up on symptoms that lasts longer.	
	Lecture Halls	
R3	Big lecture halls, causes my anxiety to skyrocket, due to my hearing I	
	have vertigo, I find these steps very frightening, and the angle of the	
	lecture halls makes my vertigo worse. Trying to hear lectures aswell,	
	causes me anxiety.	
R12	Because of my physical illness, it can be a challenge for me to make it to	
	an in-person class when I'm having a flare up.	
R22	Not great unless I can get the very front seat.	
R5	I find it difficult to get myself up and organised in time for transport to	
	college.	
	Smaller Tutorials	

R12	Because of my physical illness, it can be a challenge for me to make it to	
	an in-person class when I'm having a flare up. ***	
R7	Great for getting input and opinions from peers and are much more engaging, I'm less likely to zone out in them.	
	Labs	
R5	I find labs to be very over-whelming sensory-wise and anxiety-wise.	

*Note.* *** participant wrote that the their comment about lecture halls should be considered for online tutorials.

## Appendix W

List of qualitative comments related to reasons for disability disclosure and registration status provided by survey respondents.

	Non-disclosure
R5	I can't afford to get diagnosed, and if I could get diagnosed, they would
	make accessing trans related healthcare more difficult.
R11	I don't think it would help me that much. I attend college GP, mental health
	nurse and private therapist.
	Disclosure and registration with disability services
R2	My tutor recommend I apply for extra support with anxiety about exams
	and assignments.
R3	Struggling with the time I was given in exams and CAs so I registered with
	the service so I could obtain extra time and supports.
R7	Provided supports that I needed at no extra cost which makes learning so
	much easier.
R8	I entered college through the DARE scheme even though I got enough
	CAO points for my course.
	I had exam accommodations for my leaving cert.
R9	I registered as I have exam supports
R12	It was recommended to me by an occupational therapist i had when
	attending an in-patient rehab program for my arthritis
R14	To access occupational therapy and exam supports/accommodations if
	necessary
R16	I registered with my college's disability services because I wanted to have
	the security that if I needed help with something related to my condition
	and college, I could get that help.
R17	For awareness of condition

R18	I thought it would help.
R19	DARE (the Disability Access Route to Education)
R20	I need supports and without them would find college unattainable
R21	Needed accommodations to comfortably attend college and lectures and sit exams
R22	Necessity, serious illness which required flexibility

# Appendix X

Mean scores of AT products a	and services by condition category.
------------------------------	-------------------------------------

Assistive	Hearing	Mental	Neurodive	Neurologi	Physical	Specific
Technology	Impair	Health	rse	cal	Conditio	Learnin
	ment	Conditi		Condition	ns	g
		on				Difficult
						ies
Free	5	4.5	4.5	NA	4.2	4.5
subscription						
to						
application.						
Screen	5	3	5	NA	3.66	5
readers						
In-house	2	4	4	NA	3	4
scanning						
Transcriptio	3.5	4	4	NA	3.6	4
n						
applications						
Alternative	3	3	4	NA	3.33	4
format						
conversion						
Magnifying	3	4	3	NA	3.33	3
glass						
CCTV	3	3		NA	3	3
Deaf loop	3	3	3	NA	3	3
system						
Screen	3	3	3	NA	3	3
magnifier						
Total	30.5	31.5	30.5	NA		33.5
					25.29	

*Note*. Mean calculated based on the following assignments: *extremely useless* = 1, *useless* = 2, *neutral* =3, *useful* =4, *extremely useful* =5. Mean scores have been

calculated, with neutral scores included. Many respondents had comorbidities across multiple condition categories, therefor their answers have been included multiple times across conditions.

# Appendix Y

Survey respondent Likert scale ratings of the effectiveness of individual RAs by response frequency and mean.

Reasonable	ADHD	Anxiety	Dyspraxia	Dyslexia	Depression	Hard-of-hearing	Physical
Adjustment							Condition
Туре							
Additional Time	1	5	1	1	4	3	7
in Exams							
Quiet rooms	0	4	0	1	3	1	5
Lecture notes	1	5	0	1	3	2	5
before class							
Extended	1	4	1	0	3	1	6
Assignment							
Deadlines							
Permission to	1	3	0	1	2	1	5
record lectures							
Note-taking	0	2	0	0	2	1	4
services							
Occupational	1	3	0	0	2	1	5
<b>Therapy Sessions</b>							

*Note.* Conditions not listed did not answer the question.

# Appendix Z

# Voluntary non-structured feedback from survey respondents with hidden disabilities.

Respondent	Qualitative Feedback
Number	
R7	Some lecturers are great with recognising some students' extra needs
	but others are not.
R20	It would be good to have a more central system online where a
	student has access to know their supports and helps etc such as used
	in other universities and assessed at start of semester for things like
	printing allowance, assertive devices, and in-person appointments.
R22	Tried to contact disability services 6 times. Got through once then
	gave up.
R14	Space out assignment deadlines at the end of the semester more
	because when they are all at once I really struggle to focus and get
	them done because of the stress, exhaustion from working, and
	negative side-effects of using medication.

#### Appendix AA

#### **Additional themes**

Additional themes were identified among the survey respondents, particularly through discussions with the interviewees. Many themes were identified that correlated with students in the literature review studies. They are included here, as they did not relate to the research questions.

#### **Executive Dysfunction**

As with findings from the literature, and what is widely accepted as common trait of neurodiversity, both interviewees reported issues with executive dysfunction and its negative impact on academic life. As already addressed, Respondent Seven disclosed on the form that they preferred tutorials because they were less likely to "zone out"– akin to issues with sustained focus. Both interviewees were averse to online lectures because they found it too easy to zone out also- a phrase used by both. Both interviewees addressed issues with time-management, organisation, prioritisation, and focus. This affected how IV1 managed assignment deadlines, which they usually left until the last minute, and how they managed morning commutes: they regularly missed their train.

For one of my classes they didn't set a proper deadline for some assignments so I just didn't do them. Then he actually gave me a deadline so I said 'I can work to that.' My brain can't do them until the day they are due. I need that deadline to be right there in order for me to actually do anything. I know I can do them. I did them all my first semester, and I was getting really good grades. And these are things I started at 9am that were due at 5pm. I can do it when I've got that deadline. (IV1)

I usually get a lift with my mam into college but she can't on Thursdays so I have to get the train but I time it badly (and miss it). So I say I'll get the next one, then the next one, then I've basically missed the first two lectures. That happens consistently, and I'm missing half a module, and there's nothing I can really do to change it because half the time my brain just works like that. I can't just switch that part of me off. (IV1)

210

For IV2, it manifested in issues with organisation, time-management, and clarity on assignments and deadlines, which resulted in his work *'piling up'* on him past the point of an achievable catch-up plan:

I'm not good at organising. I'm not good at laying everything out... I left everything pile up on myself to the point where catch up would have meant spending 10 hours a day for weeks straight on the work. (IV2)

#### Note-taking issues

The questionnaire respondents and IV1 cited difficulties taking notes in-class, as addressed by Nightingale *et al.* (2019). Thankfully, IV1 explained that their laptop was helpful as they were more adept at typing than writing, However when it was not possible to use the laptop, they simply did not take notes:

If I'm in a lab I can't listen to what the lecturer is saying and take notes. I can't take notes... so I don't do that. Whereas, on my laptop, I can type much faster than I can write. AutoCorrect is my absolute saviour because I can just go back and track things later. (IV1)

When asked to describe what they found difficult about note-taking, they explained:

So when I physically write something, if I make a mistake, I have to rub it out and it becomes messy, and I don't want to hand it in. So then I have to write it all out again. Then I make more mistakes or notice more things that I need to change. So I prefer typing. (IV1)

#### Extra-time

As identified in the literature review, HD students spend more time on their academic work than peers, which is not often reflected in their grades. This was

validated by the interviewees, where IV2 discussed their preference for additional time in exams, because it "takes [them] longer than others."

#### **Reading Comprehension Disorientation**

While navigational disorientation was identified in one instance in the literature, and coined by the researchers in relation to online navigation (Christopher & Richard, 2015, p.216), a type of reading comprehension disorientation was identified across the with both interviewees. It manifested itself in interviewee aversions to overly-detailed assignment briefs, and preference for verbaldiscussions with peers and lecturers about academic assignments. Interviewee Two used the term "Shakespearian language" to describe complicated and detailed assignment briefs, which they had difficulty understanding. In addition to a lack of clear instruction, a lack of any instruction also created issues with assignment implementation:

I hate when they just say to write something. Like I don't know what you want me to write – an essay? If you tell me to write an essay, like Shakespeare, I'm not going to write it. I would love work samples. I could just change them to what is needed from me (IV1).

In addition, IV2 experienced navigational disorientation and confusion about their modules and assignments without the availability of a clear written schedule and corresponding assignment information. With all of their course details and assignment information scattered across their online learning platform, via lecturer emails, and disclosed in online lectures, they got lost, and at one point, was unaware that they had particular assignments. They noted this disorientation with online lectures also, and described "getting lost going back and forth over the recording, looking for information." When asked what an ideal HE experience would include, IV2 referenced a clear written schedule provided for him, with all of the necessary module, subject, and assignment details in one place.

#### **Poor Academic Performance**

While the online form did not reveal the academic circumstances of HD students in relation to grades, the interviews did. Both respondents referenced academic

212

struggles. IV2 had already failed the year due to assignment 'pile-ups', and IV1 referenced academic struggles, which they attributed to memory-based work in third-level education:

"I basically can't study. I can't learn anything off so things started going downhill from there." (IV1)

#### **Transition Support**

While access to HE, rather than access to the curriculum is not within the scope of this research, it was identified as a common theme among interviewees. Both found secondary school much easier, describing these ease with terms like "less complicated", "simple" and "repetitive" which they found easier to manage. IV1 described high academic achievement in secondary school. However, this success was a hindrance, according to them, due to the fact that it projected an image of capacity on their part. This meant that when they did struggle, the adults around them did not allow them any leeway, and assumed they were acting out on purpose:

Once I heard it once I understood it. I was top of the class. Every day you'd come in and they'd teach the same stuff every day, the same maths, so I could get it really quickly which hindered me quite a lot, because all the other problems I had. People thought what I was doing, it's like, it's not because there's something wrong with you, it's just because you're being bad. Like I had severe emotional dysregulation as a child. (IV1)

Both interviewees, who had ADHD (both), and autism, among other students (IV1) demonstrated their capacity to achieve in a more favourable secondary school environment. However, more complicated assignments, briefs, and the requirement of more personal responsibility for organisation and dissecting assignment requirements lead to their academic struggles. Perhaps more transitional support is needed for students with their conditions.

#### **Appendix BB**

#### Living with a hidden disability in Higher Education.

Participants rated the impact their condition had on certain aspects of HE life with positive, negative, and neutral options. While these findings supported the ethnographic research strategy and created a rich picture of HD student life from their perspective, they did not relate to any research questions, thus, have been included in Appendix BB. The findings were interesting, and, unfortunately, disheartening. The vast majority of the 19 respondents who answered the questions perceived that their conditions had a negative impact on all listed areas of HE life (Table V1). The percentages of response types out of the total 133 responses are differentiated in V1.

The associated qualitative feedback is displayed in Table V2. An analysis of the comments is visible in Table V3. Respondent seven described how their condition impacted their social life and attendance:

My physical condition sometimes inhibits me from going into class, or from socialising, as it makes it very painful for me to walk. (R16)

One participant who was hard of hearing and had kidney disease found their condition to have a positive impact on their attendance but did not disclose why. Another participant with several physical conditions reported them to have a positive impact on their organisation and time-management skills. The participant disclosed that:

I struggle to attend all of my in-person lectures with my condition but am in college as much as possible. It does increase my time management as I do assignments when they are given and over time so I achieve as much as possible on good days. (R21)

#### Table V1

*Percentage of responses that relate to perceived impact of conditions on aspects of HE.* 

214

	Negative Impact	<b>Positive Impact</b>	Neutral
Total out of 133	57.15%	2.25%	40.60%
Totals per aspect	Negative Impact	<b>Positive Impact</b>	Neutral
Wellbeing	84.21%		52.8%
Attendance	57.89%	5.3%	36.8%
Organisation	57.89%	5.3%	36.8%
Social	57.89%		42.1%
Financial	36.84%		63.2%
Grades	57.9%		42.1%
Time	47.4%	5.3%	47.4%
Management			

### Table V2

Participant survey qualitative responses that relate to perceived impact of conditions on grades, wellbeing, social, organisation, time-management, financial, and attendance aspects of HE.

Participant Qualitative Responses number

R5	I struggle really hard to start assignments in advance of the day they're
	due, I struggle to get myself into college on time, I often don't have
	money to eat during the week as I struggle with impulse buying (I get
	paid Friday) – I also cannot even try to save for assessments because of
	this, I can't focus in any classes, I am so incredibly stressed about
	college all the time. I find the labs to be incredibly overwhelming
	sensory-wise and anxiety-wise.
R7	Supports provided by the disability service reduce the negative impact it
	once had on me
R8	While they (conditions) don't always negatively impact my grades and
	wellbeing they definitely have at times in the past!
R12	It can be hard for me to attend lectures when I have had a flare up of my
	arthritis or am having a bad day with my mental illness.

R16 My physical condition sometimes inhibits me from going into class, or from socialising, as it makes it very painful for me to walk.
R21 I struggle to attend all of my in-person lectures with my condition but am in college as much as possible. It does increase my time management as I do assignments when they are given and over time so I achieve as much as possible on good days.

#### Table V3

Percentage breakdown of qualitative reports on impact of living with a condition in higher education.

	Negative Impact	<b>Positive Impact</b>
Total	83.33%	16.67%
Attendance issues caused	50%	
by physical symptoms		
<b>Executive Dysfunction</b>	16.67%	16.67%