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Enablers to Equality, Diversity, and Inclusion in IS
Education**

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Learning Without Limits: Identifying the Barriers and Enablers to Equality, Diversity, and Inclusion in IS Education

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ABSTRACT

Inclusion in Information Systems (IS) has received significant attention in recent years, but inclusion in IS curriculum design and delivery is comparatively underdeveloped. Understanding and working with diversity in IS student groups has implications for how we prepare students for a diverse workplace and the design and development of IS systems. Although progress has been made towards inclusive higher education, institutions have not transformed into multicultural diverse organizations. This paper showcases an initiative to apply principles of Universal Design in the particular context of an IS postgraduate programme in a leading Irish business school. This initiative is set within the context of two connected research projects seeking to identify barriers to inclusion experienced by students generally, and particularly by certain student groups, in the same school. The findings demonstrate the persistence of inclusion issues in higher education, including in IS, that Universal Design principles are effective in developing more inclusive teaching and learning practices, and that small actions can have a big impact in this regard. A set of key recommendations is provided; while not exhaustive, these contribute to the wider discourse on inclusion and offer practical suggestions to educators on the design and delivery of inclusive programmes at both undergraduate and postgraduate level.

Keywords: Equality, Diversity, Inclusion, Information systems (IS), Curriculum design & development

1. INTRODUCTION

The main focus of inclusive education is the need to provide a high-quality learning environment for all students by increasing the use of practices that lead to full participation (Messiou et al. 2016). “Inclusion” is, however, contested within and across educational systems and its implementation has always been problematic (Armstrong et al., 2011). Within the philosophy of inclusion, “diversity” is understood in a wider sense, including different capacities, gender differences, and differences in social and cultural foundation (Moriña, 2017). While there is no consensus regarding the best definition of “diversity,” many agree that race, ethnicity, socioeconomic status, sexual orientation, and geography are essential elements of diversity (Dhaliwal et al., 2013). Many of these different characteristics are fixed, making each person unique. Inclusion involves bringing together and harnessing these diverse characteristics in a way that is beneficial. Inclusion translates the concept and practice of diversity into action by creating an environment of connection (Jordan, 2011). These variations in individual characteristics are seen more as advantages than issues. The idea is that all learners, without exclusion, benefit from learning and experience full involvement in their educational system (Dhaliwal et al., 2013; Moriña, 2017). However, each higher education institution is expected to develop its own functioning definition of diversity while contemplating its nature, history and traditions, mission and the geographical location (Dhaliwal et al., 2013). For this article, we define “inclusive education” as the entitlement and the opportunity of all learners to be included in a regular classroom environment regardless of their uniqueness, while receiving the supports necessary to facilitate access to both the learning environment and information (Shyman, 2015, p. 351).

While the concept of diversity in Higher Education Institutions (HEIs) is not new, until recently, it was not included in strategic or organizational change efforts. Often the response of HEIs to diversity concerns has been to increase the number of students from diverse backgrounds (e.g., international students, mature students, students with disabilities, minority groups) in their intake, an approach known as structural diversity (Elliott et al, 2013; Hurtado et al., 1999). However, while structural diversity at HEIs has increased in the last 20 years, institutions have not

transformed into truly multicultural diverse organizations (Manning & Muñoz, 2011). Structural disadvantage referred to in this article is the lack of appropriate physical, cultural and human infrastructure within a HEI that would facilitate an inclusive learning environment. Most HEIs struggle to guarantee access to quality education, but without addressing historical, global, and structural disadvantages experienced by their diverse student body, this makes inclusive education just an illusion (Armstrong et al., 2011). It is a challenge to build inclusive access to existing structures without addressing issues around inequality and exclusion on which one’s learning environment is built (Slee, 2011, p. 84).

Learning environments are often inflexible, creating organizational and personal challenges in terms of “creating an inclusive environment for all,” and with only minor modifications for individual students (Collins et al., 2019). Consequently, structural disadvantage remains unaddressed, and disadvantaged groups may be excluded or denied full educational or social participation (Acedo, 2008).

This study addresses inclusion issues within an Information Systems (IS) postgraduate programme at a leading Irish business school. In doing so, it also evaluates the benefits of applying principles of Universal Design for Instruction (UDI) and Universal Design for Learning (UDL), as a tool for promoting inclusive learning. Although inclusion in IS generally has received significant attention in recent years, research on inclusion within IS curriculum design and delivery has not received sufficient attention (Coleman et al., 2017; Trauth, 2017). This is important because understanding the “diversity” of IS students has ramifications for how we prepare students for a career in a diverse workforce, and how IS are designed and developed (Trauth et al., 2017). Inclusive learning goes hand-in-hand with UDI, as the underlying premise of UDI is a value system that embraces heterogeneity in learners (McGuire & Scott, 2002). This is combined with a belief that educators who anticipate diversity can intentionally build inclusive instructional approaches into their teaching (McGuire & Scott, 2006). In this study, we showcase how the principles of UDI are a key enabler to creating an inclusive environment for postgraduate IS students. These issues highlight the need for research to not just create awareness of exclusion but to provide actionable insights as to how IS curriculum, as well as

non-IS curriculum, can be redesigned to ensure all students can experience learning without limits.

The paper is structured as follows. First, a review of literature on inclusive teaching and frameworks that facilitate inclusiveness is presented. Then the methodology for data collection and analysis is provided. Next, a summary of key findings is presented. Discussion and recommendations follow. The paper ends with a conclusion, limitations, and future actions.

2. THEORETICAL FRAMEWORK

2.1 Inclusive Teaching and Learning

Inclusive education is a framework that lays out an educational arrangement in which all students can learn, participate, and are welcome as valuable members of the institution (Ainscow, 1998; Sapon-Shevin, 2003). The Index for Inclusion (e1) (Booth & Ainscow, 2002; Kamenopoulou et al., 2016) states that “Inclusive learning and teaching recognizes all students’ entitlement to a learning experience that respects diversity, enables participation, removes barriers and anticipates and considers a variety of learning needs and preferences.” Inclusive teaching is thus underpinned by principles of social justice and rights, and the values of equity and fairness. In practice, this means “taking account of and valuing students’ differences within mainstream curriculum, pedagogy and assessment” (Hockings et al., 2012).

An inclusive pedagogy seeks to identify and address barriers commonly experienced by diverse student groups. For instance, class discussion is still one of the most frequently used “active learning” strategies in business schools (Dallimore et al., 2013). However, classroom interactions between students and lecturers are situated in a societal context where men’s voices frequently command greater power and influence than women’s voices (Ashcraft & Mumby, 2004; Brescoll, 2011). These gendered norms impact class dynamics and hinder lecturers’ efforts to build inclusive classroom cultures. It is, therefore, important to understand the extent to which these gender dynamics affect a lecturer’s ability to nurture inclusive classroom environments (Opie et al., 2019).

Further barriers may derive from exclusionary language and microaggressions, often related to characteristics such as race, gender, sexual orientation, religion, age or disability, which may discourage attendance or participation by targeted groups (Harrison & Tanner, 2018). For instance, an emerging body of literature highlights the need for lecturers to develop skills in facilitating dialogues about race and racism in undergraduate and graduate classrooms. Research indicates white students and students of color desire lecturers to intervene in racially hostile situations, yet many fail to do so (Boysen, 2012; Linder et al., 2015). The failure to intervene is often due to lack of training and experience but may also derive from a reluctance to engage in “difficult” conversations (Sue et al., 2009). Although progress has been made in transforming HEIs into LGBT-inclusive learning environments, still a great deal of work remains to be carried out toward reaching this objective (Hughes & Hurtado, 2018).

Although many barriers to inclusion affect multiple student groups, some are more specific. For example, students with disabilities may face barriers related to accessibility, physical or otherwise (for instance, inaccessible websites or

materials). They may also experience difficulties in relation to obtaining necessary accommodations or alternative assessment formats (Fuller et al., 2009). Some students may also experience particularly high degrees of exclusion due to cumulative forms of disadvantage derived from intersecting characteristics (such as ethnic minority students from disadvantaged socio-economic backgrounds).

Inclusive teaching begins with inclusive course design, so that course readings, assessments and activities “reflect a diverse array of identities and perspectives” (Gannon, 2018). Inclusive models of curriculum design are outlined by Hockings et al. (2012), who also outlines a wide range of inclusive pedagogies and principles for assessment. Sathy and Hogan (2019) advocate the development of an inclusive mindset, which constantly asks “Who is being left out as a result of this approach?” as a key focus of the educator. An awareness of personal bias (followed by appropriate counteraction and interventions), use of teaching strategies that promote a sense of belonging (i.e., active learning), and a strong focus on structure, are critical to creating inclusive learning environments (Gannon, 2018; Sathy & Hogan, 2019). A highly structured course design with a strong focus on problem-solving and higher-order cognitive skills has been found to improve the performance of all students in a particular cohort and to reduce the attainment gap between disadvantaged and non-disadvantaged students (Haak et al., 2011). Likewise, Eddy and Hogan (2014) found that a “moderate-structure” intervention significantly enhanced engagement and improved course performance for all students, but disproportionately increased the performance of Black students (halving the Black-White achievement gap) and first-generation students (closing the achievement gap with continuing-generation students).

2.2 Universal Design for Instruction and Learning

Research shows that “how” people learn is as unique as their fingerprint (CAST, 2018). Universal Design can provide a starting point for developing a framework to design and deliver programmes and modules that ensure lectures, discussions, visual aids, videos, printed materials, labs, and fieldwork are inclusive to all students (Burgstahler, 2009). The primary focus of Universal Design is to reduce barriers for students and to encourage and support inclusive learning. As Katz (2012) states, “diversity is neurological, diversity is societal and diversity is human.” It is therefore important to note here that Universal Design does not benefit only learners with exceptional needs; rather, it focuses on the composition of a learning environment that can be accessed, understood, and used to the greatest extent by learners, irrespective of their ability or disability. The fundamental quality of Universal Design is that it should meet the needs of all learners who wish to use it and should be designed with due consideration of the diverse needs and abilities of all learners (O’Neill & Maguire, 2019).

Universal Design encompasses both Universal Design for Learning (UDL) and Universal Design for Instruction (UDI). UDL and UDI are complementary educational frameworks for applying universal design principles to learning environments, with a goal of considering and addressing the widest possible variety of learning needs and preferences (Black et al., 2014; McGuire & Scott, 2006; Rose & Meyer, 2002). Black et al., (2014) emphasis that UDL focuses on the learner, whereas

UDI focuses on instruction. Both UDL and UDI were used in the highlighted case study.

UDI represents the systematic application of universal design for creating instructional goals, methods, materials, and assessments that work for everyone – not a single, one-size-fits-all solution, but rather flexible approaches that can be customized and adjusted for individual need (McGuire & Scott, 2006; Rose & Meyer, 2002). UDL is a complementary framework for inclusive teaching and learning (AHEAD, 2020) that provides multiple means of (i) Engagement (The “Why” of Learning), (ii) Representation (The “WHAT” of learning), and Action & Expression (The “HOW” of learning). UDL is defined as “a framework for designing curricula that enable all individuals to gain knowledge, skills, and enthusiasm for learning. UDL provides rich supports for learning and reduces barriers to the curriculum while maintaining high achievement standards for all” (CAST, 2018).

3. RESEARCH CONTEXT

The context of this research is presented below.

3.1 The School of Business & Economics

The research took place in the J.E. Cairnes School of Business and Economics (SBE) at NUI Galway, Ireland. SBE is one of the three constituent schools of the College of Business, Public Policy and Law (CBPPL). Over recent years, CBPPL has increased levels of interculturalism among the student body. A substantial proportion of students are registered with the Disability Support Service, and there has been a measurable rise in the registration of transgender students. The School has almost 3,000 undergraduate students and over 700 postgraduate students, spread across areas such as Accountancy and Finance, Economics and Public Policy, Management, Marketing, and Business Information Systems.

The School’s mission is to deliver a high-impact, globally centric, scholarly environment in which students become well-rounded and employable business graduates, and its faculty contribute to society, industry and academia through quality engagement and research.

The School offers a wide range of programmes, from undergraduate degrees to executive education, tailored to deliver the specific professional skills required to succeed in a globalized and competitive environment. Led by over 100 highly-experienced faculty, the SBE pursues an innovative teaching approach which incorporates face-to-face delivery, blended learning, professional mentoring, student placements and group-based project work.

3.2 MSc. Business Analytics Programme

The MSc. in Business Analytics provides students with the skills and knowledge to manage and develop business analytics within organizations. The programme is designed as a specialist course, which assists students in blending their existing talents with the technological skills and business knowledge needed to use and manage big data and business analytics in modern knowledge-based organizations. This one-year postgraduate programme commenced in 2015-16. Since then, the number of enrolled students has increased significantly (Table 1).

Year	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Enrolment	16	36	57	99	102

Table 1. Student Enrolment

This programme has a diverse cohort of students that are broadly characterized as follows:

- *Non-EU students* (70%): India, USA, Pakistan, Nigeria, China, Brazil, UK, and Malaysia.
- *EU students* (30%): Ireland, Germany, France.
- *Mature students* (20%): Industry experience ranging from 1 to 8 years (both EU and non-EU).
- *Students with disabilities* (10%): Dyslexia, social anxiety, and medical conditions.
- *Primary degree*: Engineering, Mathematics, Statistics, Arts, Information Systems, and Commerce.

4. METHODOLOGY

The primary research draws on action research methodology, which focuses on the use of systematic enquiry to improve personal practices and enhance the learning environment for students. Action Research is a methodical process of inquiry performed by those taking the action, and the primary reason for employing action research is to support the “actor” in developing and/or improving their actions (Burns, 2009; Fischer, 2001; Rochsantiningsih, 2005). The purpose of action research in this case was to bring about change in specific contexts (Parkin, 2009), specifically, the development of a more inclusive learning environment in a particular educational setting.

This research draws on three key data sources: a CBPPL undergraduate inclusive learning project (2018 to date) (“the UG project”); a separately funded but overlapping University postgraduate inclusive learning project (2020 only) (“the PG project”), and programme data from MSc (Business Analytics). The findings referred to in this paper are interim findings, and data collection is ongoing for both the UG project and the PG project.

Both the UG and PG projects sought to identify the barriers to inclusion experienced by students generally, and particularly by certain student groups (students with disabilities, international and intercultural students, LGBT+ students (with a particular focus on transgender students), students of different genders, mature students, students with caring responsibilities, and students from socio-economically disadvantaged backgrounds). The primary objective was to capture the experience of groups that were identified as particularly likely be disadvantaged or excluded in the learning setting as an important focus of inclusion while embracing that this may not necessarily be diversity in its full UDL sense. Both projects used primarily qualitative methods to gather in-depth data on the lived student experience of inclusion and exclusion from students across all schools in CBPPL (and in the case of the PG project, from two Schools in the College of Science and Engineering; also the Schools of Mathematics, Applied Mathematics and Statistics, and the School of Physics). As qualitative research, it should be noted that generalizability is not an expected attribute. Rather, the article is meant to study a specific phenomenon (learning experiences) in a certain population (UG and PG students in

SBE) of a focused locality (NUI Galway) in a particular context. The focus is on finding answers and meanings that students have constructed and offered and on hearing experiences of silenced voices, particularly of marginalized and vulnerable cohorts of students in the examined context.

In line with ethical approval, data was gathered through online student surveys, student focus groups and individual student interviews. The data gathering had multiple purposes: to identify barriers experienced by different student groups; to contribute to appropriate policy changes and interventions at College, School and programme level; to enable targeted staff training and assist in awareness-raising, and to provide a baseline and permit the tracking of progress over time.

The staff training seminars contextualized the issues raised by students through the use of student panels, where students highlighted their personal experiences of inclusion and exclusion. The objective of the staff training was both to raise awareness of student experiences of exclusion and to encourage staff to address exclusion through inclusive practice, also directly informed by students. In line with the action research methodology, therefore, student responses contributed to staff change, which could in turn improve the student experience. Thus, research in this article was cast as an iterative process. Foundational research identified issues of equity and inclusion in the learning environment and unearthed different levels of participation through the survey responses, the discussions emerging from group dynamics within focus groups, and in-depth experiences from individual interviews. In response to preliminary data, a variety of staff training workshops and seminars on inclusive learning and UDL were held, as part of both the UG and the PG projects. Subsequent research enabled further refinement of the training offered, with later research also alert to potential impacts of the training.

A final element of the UG and PG projects was the initiation of the Dean’s Awards for Inclusive Teaching, which sought to encourage inclusive teaching practice. Students were offered the opportunity to nominate individual staff and teaching teams, programmes or units for an Individual or a Team Award. Both awards were substantial, with a €1,000 teaching grant available for each category, along with a digital badge for use in marketing. Therefore, the key objectives of the projects were to identify barriers to inclusion and to encourage, facilitate, and measure change through action research.

The surveys for the UG and PG projects were conducted online and were anonymous. The UG surveys focused on second and final year students across all programmes in CBPPL. These groups were selected because they have sufficient lived experience to be able to comment on inclusivity within the College and were over age 18. Surveying both second and final year students also permitted some measurement of yearly progress. The PG survey focused on both taught and research PG students.

At the time of writing, four UG project surveys had been conducted between October 2018 and March 2020. All were therefore administered prior to governmental COVID-19 restrictions in mid-March 2020. Also, at the time of writing, the PG project had conducted one online survey in February 2020, again before the introduction of restrictions in March. The surveys were all substantially similar, with some minor modifications as additional questions were added in the

second year of the UG project. This paper draws only on survey data pertaining to the SBE, purposed across the different student groups, as well as comparing across the PG and the UG findings. The two student levels have the same staff and university-wide facilities. However, there are differences between undergraduate (UG) and postgraduate (PG) levels in terms of student composition and programme delivery and design. SBE survey response rates are outlined in Table 2.

Project Year	Survey	Total responses (SBE students)
UG Year 1 (2018/2019)	UG Survey 1 – 2nd Year	35
	UG Survey 2 – Final Year	180
UG Year 2 (2019/2020)	UG Survey 3 – 2nd Year	67
	UG Survey 4 – Final Year	147
PG Year 1 (2019/2020)	PG Survey 1 – PGR and PGT	30

Table 2. Composition of Inclusive Learning Project

The SBE UG and PG survey data provides a good indication of the operating context for our case study, the MSc. in Business Analytics. Students from the MSc. in Business Analytics were surveyed as part of the PG project. In addition, the Director of the MSc. Business Analytics separately undertook research among both alumni and students of the programme to evaluate their experience. The primary methodology used for this was based on direct engagement with graduates of the programme, complemented by ongoing feedback from students, including (i) end of year programme reviews, (ii) independent module feedback, and (iii) feedback from class representatives. This data collection was completed over four consecutive years (2015-16; 2016-17, 2017-18; 2018-19).

5. KEY FINDINGS AND ANALYSIS

5.1 SBE - UG and PG Project Findings

UG and PG project findings are outlined in Table 3. Although a majority of students who expressed an opinion (approximately 70% or more) agreed with that their learning environment was inclusive, a minority (between 6-10%) disagreed, while many students were undecided.

	Agree	Disagree	Undecided
2018 UG Survey 1 – 2 nd Years	86%	9%	5%
2019 UG Survey 2 – Final Years	74%	8%	18%
2019 UG Survey 3 – 2 nd Years	78%	9%	13%
2020 UG Survey 4 – Final Years	72%	6%	22%
2020 PG Survey 1 - PGRs & PGTs	70%	10%	20%

Table 3. SBE Student Perception of Inclusiveness

Table 4 shows the percentage of responses from international students and students with disabilities across all surveys. SBE generally has more international students at PG level, and this was reflected in the response rates for each group.

Qualitative data was gathered consistently via open-ended questions in all five surveys. Students were requested to provide examples of situations where they felt excluded or included in their learning environments. UG survey responses identified a certain degree of inclusiveness in the learning environment, with some students also expressing neutral views (Table 3). However, a number of common issues were also identified (e2) as follows: difficulties faced by international students; exclusionary practices by some lecturing staff; lack of facilities for students with disabilities; barriers related to course delivery; large class sizes; exclusion at social events and in relation to clubs and societies; and loneliness. Similarly, key themes emerged from the PG survey pointing towards barriers to inclusion, as follows: gender discrimination and sexism; racism; barriers faced by students with disabilities; barriers arising from course structure and delivery; issues affecting part-time or full-time students; social exclusion; heavy workload; and exclusionary attitudes or practices by teaching staff. While some exclusionary barriers were specific to UG or PG students, similar issues were faced by international students and students with disabilities in both groups, particularly loneliness, discrimination, and accessibility. UG students also highlighted a number of barriers both at structural as well as individual level which militated against inclusion. Structural issues included large class sizes making it harder to meet people, leading to social isolation, loneliness, and consequently accumulating a negative student experience.

	International students	Students with disabilities
2018 UG Survey 1 – 2 nd Years	6%	11%
2019 UG Survey 2 – Final Years	2%	6%
2019 UG Survey 3 – 2 nd Years	6%	6%
2020 UG Survey 4 – Final Years	2%	10%
2020 PG Survey 1 – PGRs & PGTs	53%	10%

Table 4. Proportion of International Students and Students with Disabilities from the Total Number of SBE Survey Respondents (e3)

There were also many positive examples of inclusive practice highlighted by UG students (see Table 5). These included peer support mechanisms, and lecturers responding to feedback to create a more gender-inclusive learning environment or taking steps to be inclusive of students who were parents. Some students with disabilities (both UG and PG) also expressed very positive views, though sometimes this was simply because lecturers had complied with legal obligations in terms of providing necessary accommodations.

Examples of exclusion were also provided. Students commonly identified general social barriers as impacting on

their ability to learn (see Table 6). Many students reported feeling socially isolated or excluded from social outlets such as clubs and societies. Students who were not local found it difficult to make friends, which impacted on their wellbeing and ability to participate. These difficulties were compounded for international and intercultural students, many of whom were left alone in student accommodation at weekends and during national holidays, when Irish students went home. This group also highlighted racial exclusion as an issue in both peer relations and pedagogical practice. Some international and intercultural students reported racist assumptions by teaching staff, or in other cases a failure to intervene to address racial hostility such as microaggressions. The lack of role models for ethnic minority students was also raised by a number of students, as was representation for female students.

Category
Gender “When forming groups for an assignment, the lecturer took on board feedback from the previous semester’s survey from girls who felt uncomfortable in all male groups - and requested that every group formed have at least two girls (if they wished)” (Female, White, Irish, Heterosexual, 2nd year Business Information Systems student)
Disability “Most lectures read and adhere to Learning and Educational Needs Summary (LENS) reports” (e4) (Female, White, Irish, Heterosexual, Final Year Bachelor of Commerce student with a disability)
Caring Responsibilities “Lecturers allowing children into class when parents are students” (Female, White, Irish, Heterosexual, Final Year Bachelor of Commerce student)

Table 5. Examples of Positive Student Experiences (e5)

Category
Racial exclusion and stereotyping “There is still a strong feeling of underlying difference between International and Irish students (especially in master’s level). Again, there is a feeling of separation between Irish and International students” (Female, International, PhD student) “Comments made by staff and students regarding the intellectual capacity of International students” (Female, International, PhD student)
Race and gender representation “I haven’t seen any black lecturers in the college” (Female, Black-African, Heterosexual, Final Year Bachelor of Commerce student) “There is a lot of gender discrimination I believe in course material. Women are not visible in some modules with regard to reading lists, invited speakers and other events” (Female, Mature, Irish, MBA student with a disability)
Structural barriers “Assuming we know the Irish Educational System” (Female, International, PhD student)

Table 6. Examples of Exclusion and Discrimination

5.2 MSc. Business Analytics – Barriers to Inclusion

While the UG and PG project preliminary findings offer evidence of barriers to inclusion in SBE generally, the Director of the MSc. in Business Analytics also undertook programme-specific research (e.g., end-of-year reviews, module reviews, and interviews) in 2017 and 2018 to assess the experience of students completing the programme. Analysis of student feedback identified a range of issues, broadly categorised as relating to “social exclusion,” “lack of cultural awareness,” “disconnect between programme and module learning outcomes,” and “not understanding the Irish educational system.” As such, the programme feedback broadly aligned with a number of barriers identified in the UG and PG projects, particularly in relation to international and intercultural students.

Against this background, the MSc. Business Analytics Programme drew on UDI/UDL to promote and create a more inclusive learning experience for the 2018-19 academic year. As previously noted, UDL and UDI are complementary frameworks aiming to meet the needs of a wide variety of learners. This was identified as critical to supporting students to create their version of a “positive student experience.” Three principles of UDI were used as a mechanism to tap into the knowledge and creativity of all students on the programme:

- “Simple and intuitive” refers to the materials and activities.
- “Tolerance for error” refers to the delivery environment.
- “Community of learners” refers to the learning environment.

5.3 Application of UDI and UDL Principles MSc. (Business Analytics)

A description of these three principles and how they are applied to the MSc. in Business Analytics programme are listed in Table 7.

Principle and description by AHEAD (e6)	Examples
Simple and intuitive: Clearly describing course expectations for grading, in different formats, for example narrative and rubrics.	A number of actions were taken to provide transparency of course expectations. <ol style="list-style-type: none"> 1. Programme and module learning outcomes are made available on the college website. 2. During the programme induction, the link between programme and module learning outcomes are discussed, as well as the rationale for varied assessment techniques. 3. During Week 1, ‘coffee mornings’ are organised with staff and students. Students are divided into small groups to facilitate conversations between students and between staff and students.
Tolerance for error: Providing ongoing and continual feedback on coursework rather than at specified interim periods, such as mid-term or final exams.	A number of actions were taken to provide support for students. <ol style="list-style-type: none"> 1. The practice of ‘feedforward’ is incorporated into a number of modules that were considered problematic (based on student feedback). 2. A workshop on how to reference and avoid plagiarism is provided to students in term 1. 3. Real-time polling tools (e.g., Kahoot, Poll Everywhere) are used across most modules in order to provide real-time feedback and facilitate engagement. 4. A number of lecturers dedicate the last 30 minutes of their lecture to providing ‘formative’ feedback on a weekly basis.
Community of learners: Creating a variety of learning settings, for example, use of e-mail groups, social networking sites, or chat rooms.	A number of actions were taken to create a community of learners. <ol style="list-style-type: none"> 1. The business analytics society was established in the 2018-19 academic year – this student-led initiative helped to create an identity and social club for students to engage with each other. 2. Students undertake a field trip to national heritage sites, with the aim of self-reflection on how our ancestors would view of use of technology (positive & negative) followed by writing a reflective journal. 3. A business analytics alumni group was established on LinkedIn. This enables current students to engage with alumni who share their experiences and insights on how to get value from the programme and the college experience.

Table 7. Applying UDI Principles to the Master’s Programme

In addition, principles of UDL were applied at module level. A key exemplar relates to the module: IS Strategy & Innovation (Topic: Design Thinking (DT)). The following design issues were identified as problematic, based on student feedback, analysis of student performance, and observations:

- **Relevance:** Students did not make a connection with this topic and their future career.
- **Lack of self-belief:** Students believed they could not be a ‘designer’ as they did not study ‘design’ in their undergraduate degree.
- **Misconception:** Students assumed this topic was ‘flaky’ when compared to technical modules and that it would not be applicable in non-Western countries.
- **Lecturer is the oracle:** Many students had experienced a teaching environment where the lecturer is the domain expert and their wisdom should never be challenged.

From a practice perspective, changes to the ‘delivery’ and ‘content’ of the module included, (i) discussing the ‘Inclusive Teaching and Learning Statement’ during the introduction lecture (ii) changing the welcome note to students at the start of a lecture, by replacing phrases such as ‘Hi guys’ to ‘Hi folks’, (iii) no longer dividing students into groups based on the traditional two male, two female ratio, (iv) providing non-Western case studies and literature on the use of design thinking, and (v) providing examples of non-Western role models when explaining how companies ‘sell experiences’ associated with their product or service.

5.4 Reported Benefits of UDL/ UDI Approach

Evidences of the benefits of adopting a UDL/UDI approach are presented under three broad categories: (i) Dean’s Award for Inclusive Teaching, (ii) student feedback, and (iii) student sentiment survey. We acknowledge that these benefits are a starting point rather than an end point to promoting an inclusive learning environment.

5.4.1 Dean’s Award for Inclusive Teaching (2019). The MSc. (Business Analytics) programme was awarded the inaugural *Dean’s Award for Inclusive Teaching – Team Award*, in 2019, following student nominations. This innovative CBPPL award recognizes a range of supports offered by teaching and administrative staff of the programme to advance inclusion.

5.4.2 Student Feedback. Post implementation of the UDI and UDL principles, students from the 2019-20 cohort were invited to provide feedback of about their personal experience of the programme (see Table 9).

This feedback is not exhaustive as each year an end of year programme review is conducted; however, this feedback was selected as the students gave consent to use these quotes in this specific study. Each quote was reviewed and approved by the student concerned.

Principle and description (by CAST)	Exemplars
Engagement: For purposeful, motivated learners, stimulate interest and motivation for learning.	<ol style="list-style-type: none"> 1. As students’ level of motivation and focus varies, the ‘Inclusive Teaching and Learning Statement’ (see Appendix 1), a measure advocated by students at UG and PG project training, is discussed at the start of the module. Positive affirmations are used to optimise motivation. 2. To demonstrate the universal use of DT, contemporary and diverse use cases of DT reported in international news articles and academic articles are discussed during lectures.
Representation: For resourceful, knowledgeable learners, present information/content in different ways.	<ol style="list-style-type: none"> 1. Tailored podcasts from local and international companies are incorporated as part of the flipped classroom learning. 2. Relevant YouTube videos are integrated into the lectures.
Action and Expression: For strategic, goal-directed learners, differentiate the ways that students can express what they know.	<ol style="list-style-type: none"> 1. Students are encouraged to self-assess their progress and identify milestones to help benchmark their progress. In-class support enabled students to plan and structure information for assessment and examination. 2. To facilitate ‘expression & communication’ the classic sequence of communicating with students (e.g. the lecturer asks a question, a student responds, and the lecturer assesses that response) was replaced with peer-review of responses and use of real-time polling in-class.

Table 8. Applying UDL Principles to the Master’s Programme

Participant Profile	Testimonial
Female, White, Irish, Catholic, Heterosexual	<i>While I never felt excluded from the programme, I would not like to be part of any programme where my peers and friends felt excluded. The 'Inclusive Teaching Statement' conveyed a powerful message and commitment to students and staff that no student should feel excluded from the college experience, and if they did, to contact the Programme Director. Having the sincere support and empathy of the Programme Director makes a difference to the student experience.</i>
Male, Brown, South Asian, Hindu, Homosexual	<i>Personally I haven't experienced any exclusion in the class of the programme or the society and I do have a general observation to support my perspective. The class representative election during the introductory class was a step towards inclusion to make sure we had two girl class representatives irrespective of the benefit of having the democracy to choose anyone.</i>
Male, Irish, Catholic, Heterosexual, Disability	<i>While completing my masters there was an emphasis on group work as it gets you involved with your classmates and you feel part of the group. This was very daunting as meeting and working with people for the first time can be very stressful, especially because I suffer from severe social anxiety. I found a big difference compared to my undergraduate experience as my classmates were there to help me at any point when I was struggling and lecturers provided alternative forms of assessment which helped my feel that I listened to and included of the college experience.</i>
Male, Indian, Hindu, Homosexual	<i>While completing the masters I have felt accepted, regardless of my gender, race, ethnicity, and nationality. As an elected class representative, I have always been respected and supported by my peers and lecturers in carrying out my duties. I have experienced 'inclusiveness' as a core value of the student experience at NUI Galway and especially in my master's programme.</i>
Male, Guinean, Muslim, Heterosexual	<i>On the first day of the semester, the Programme Director communicated clearly about what to expect from the programme and the importance of respectful and inclusive interactions with my peers and with staff. The class trips really helped me to get to know my peers and integrate into the college experience. This was very important to me as I was able to make new friends and also learn about other cultures. Lecturers also made sure that students did not feel left alone and were forthcoming to offer assistance both inside and outside lecture times.</i>
Female, Chinese, No Religion, Heterosexual	<i>As an international student, the learning environment in Ireland is different from my homeland and I was not sure how I would fit into this environment, especially with group activities. Various supports were provided to help students feel respected, safe and included. The programme induction workshop highlighted the diverse cultural and academic backgrounds of students and the value that diversity brings to solving business problems.</i>
Female, Indian, Christian, Heterosexual	<i>My experience while completing the programme can be characterised as being exceptional, inclusive, and fun. From day one I was encouraged and supported to participate in lectures and social events that were organized by the Programme Director. I have not missed my home country's festival celebrations as these were also organized on campus for us to celebrate. These supports helped me to socialize, make new friendships, and learn about other cultures.</i>

Table 9. Student Feedback on Exclusion and Discrimination

5.4.3 Student Sentiment. Student sentiment about the programme and modules has been captured at the end of each year since 2016-17. The first phase involved data extraction and integration using Python scripts whereby student responses were converted into .CSV file format. Text was then converted into Pandas DataFrame format for compatibility purposes with the sentiment analysis algorithm. The second phase involved the development of a rating scale as the response rate for each end of year programme review varied, 72% (2016-17), 96% (2017-18), and 70% (2018-19). An overall rating scale of 0 to 5 was established, zero being the lowest overall score the programme could receive and five being the highest rating.

Figure 1 presents the sentiment trend over three academic years and the impact of implementing principles of UDI and UDL, which has positively improved student sentiment (see purple circles in Figure 3). During this period, the programme grew from 56 to 103 enrolled students. The value of sentiment

analysis is that it provides a high level of analysis that can support or challenge qualitative student feedback.



Figure 1. Sentiment of Business Analytics Students Over 3-Years

6. DISCUSSION AND RECOMMENDATIONS

The key theme running through the concept of inclusive learning literature is the right of all groups of learners to social justice (Hockings et al., 2012). It is a challenge to implement the principles of inclusive education within higher education institutions. Though inclusive education was originally developed for younger students, an increase in the number of students with disabilities, arising from their successful completion of secondary education, required the move towards inclusive practices within higher education institutions (Moriña, 2017).

These findings illustrate how UDL/UDI frameworks provide three important elements that are critical in “changing” how we think about inclusive teaching and learning. First, it raises “awareness and understanding” about limiting the learning experience of a student by unintentionally excluding them from the student experience. Second, it provides a “roadmap of practical actions” that can be easily adapted to suit the diverse teaching contexts. Third, it transforms the teaching experience for both students and staff as it facilitates greater engagement between students and between students and staff.

The following inter-related recommendations are intended to support educators to realize the value of a UDL/UDI framework in the context of curriculum design, as well as to provide a more positive student learning experience.

Build an inclusive learning environment: UDI highlights the importance of creating opportunities to foster inclusivity and de-center power within the classroom. As in the MSc. case study, fostering a community of learners will create a comfortable, supportive environment where students can take more control of their learning, and learning will be understood as an ongoing dialogue between student and academic (transforming teaching by facilitating engagement). Social events (e.g., class trips or coffee mornings, as in the MSc. Business Analytics) can offer valuable ways of building learning communities and fostering social inclusion (roadmap of practical actions). However, it is important to ensure that “play” events are accessible to all.

Embrace diversity: UDL highlights that educators need to design curricula that will promote engagement and motivation. As academics we need to critically reflect on the types of authors, examples and literature we recommend (a point addressed to great effect in the MSc. Business Analytics through the use of non-Western case studies). Do we ensure diversity in what we utilize to teach? Is the teaching curriculum representative and reflective of society, or does it reflect social bias and exclusion? Consider building in opportunities for students to suggest more up-to-date and inclusive resources (awareness and understanding; transforming teaching by facilitating engagement).

Inclusive learning analytics: UDL highlights the importance of stimulating engagement and building motivation. Educators need to design curricula that will facilitate the learning of a more diverse group of learners (Katz, 2012). This implies we need to value what individual students bring to the curriculum design process (Bovill et al., 2011). We need to be open to change and partnership. Building in opportunities for students to co-design surveys, assessment and teaching approaches can broaden the inclusivity of a course (transforming teaching by facilitating

engagement; roadmap of practical actions). This is important in relation to IS curriculum design and delivery, where inclusion has, to date, not received sufficient attention.

Continuous improvement: One of the big misconceptions about UDL is that it is a checklist to follow – that at some point the educator will be “done” with their UDL implementation, with every item ticked and a magically transformed learning environment. Nothing could be further from reality (Edgren & Rogers, 2019). Educators need to continue to learn how to provide an inclusive learning environment – by engaging with students, engaging in reflection, and deriving actionable insights from the use of learning analytics. We must continue to challenge our own biases and assumptions; this often requires us to acknowledge that we may have actively excluded some groups in our learning environments before (awareness and understanding).

Small actions can have a big impact: When we think about inclusivity, it can seem like an onerous task. In reality, small changes go a long way. As noted in the MSc. Business Analytics case study, making an inclusion statement, using more inclusive language, or using more diverse teaching examples can help students to feel they are valued, respected and visible (roadmap of practical actions). A UDL/UDI framework actively encourages many of these changes under the principle of multiple means of engagement.

While the above recommendations are not exhaustive, they contribute to the wider discourse on inclusion and offer practical suggestions to educators on the design and delivery of inclusive programmes at both the undergraduate and postgraduate level.

7. CONCLUSIONS, LIMITATIONS, AND FUTURE ACTIONS

As a qualitative exploration of the lived experience of students in a particular learning context in a single location, this study does not purport to be generalizable. However, it provides in-depth background to the case studied and rich contextual data to help readers relate the findings to other educational contexts.

The findings of the UG and PG projects demonstrate that significant issues with regard to inclusion (e.g., in relation to intercultural students, students with disabilities, gender discrimination, and class sizes) may persist in third-level education and require further intervention.

The subsequent investigation into a stand-alone PG taught course provides a case study to explore the potential effectiveness of selected inclusive teaching and learning practices. Although limited to a single case, this study offers some initial evidence of the effectiveness of UDL/UDI frameworks in helping to promote inclusion and address barriers. In this way it offers practical suggestions for effective and inclusive teaching practice and may guide the development of future interventions to the benefit of students.

8. ENDNOTES

(e1) The Index for Inclusion is a set of materials to guide schools through a process of inclusive school development. It is about building supportive communities and fostering high achievement for all staff and students

<http://www.csie.org.uk/resources/inclusion-index-explained.shtml#intro>

(e2) At the time of writing, interviews and focus groups were ongoing and as such most of them were not transcribed or analysed. We therefore identified themes mainly from the online surveys and some of the interviews and focus groups with SBE students that had matched the demographics of learners from the selected case study (MSc in Data Analytics). Themes were identified on the basis that issues had been raised by multiple students.

(e3) Data on the overall composition of the student body were not available for this study as this is not monitored by the University.

(e4) Learning and Educational Needs Summary (LENS) report - The process of recommending reasonable accommodations is initiated by the Disability Support Service of the university following a meeting between a Disability Officer and the student. The Disability Officer prepares a needs assessment report known as a LENS report which is a list of the required supports for that student. The School and Exams staff are responsible for ensuring that the reasonable accommodations stipulated in the LENS report are implemented.

(e5) The positive comments in Table 5 are quotations from the optional open-ended remarks in the two surveys. The survey posited: “I find my learning environment at NUI Galway very inclusive”, with options to express disagreement, uncertainty or agreement, followed by an optional comment box. A subsequent question addressed the statement “Teaching staff are inclusive in class and other learning contexts” in similar terms. The quotations in Table 5 are representative of comments made by multiple students, as are the identified themes.

(e6) AHEAD is an independent non-profit organisation in Ireland working to create inclusive environments in education and employment for people with disabilities. Its main focus is further education and training, higher education and graduate employment.

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Denis Dennehy is a lecturer in business information systems and former director of the Masters in Business Analytics at NUI Galway, Ireland. His teaching and research primarily focus on the mediating role of digital technologies and analytics, in the context of information systems, and its implications for people, organizations, and society. His research has been published in leading journals including *European Journal of Operational Research*, *Information Systems Frontiers*, *Information & Management*, *IT & People*, and *Journal of Systems & Software*. He is a senior editor of *Information Technology & People* and served as conference chair of IFIP I3E2021.



Shivaun Quinlivan is the Vice-Dean for Equality, Diversity and Inclusion in the College of Business, Public Policy and Law at NUI Galway, and a Senior Lecturer in Law. Her research focuses primarily on the right to equality with a particular focus on the right to education for people with disabilities. Dr. Quinlivan, with Dr. Lucy-Ann Buckley, co-leads two inclusive learning projects at NUI Galway



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Cameron Keighron (They/Them) is a PhD student in Electrophysiology studying Parkinson's Disease, having previously completed an MSc in Regenerative Medicine and served as the Vice President for Education in NUI Galway Students' Union. Cameron is a passionate advocate for student rights, noting that students can often be unheard or left out of key third level sector discussions and decisions. Over the past two years, Cameron has been involved in an Inclusive Learning and Teaching Project looking at barriers that minority communities face within postgraduate degrees and developing innovative ways to address those barriers.



Sharon Flynn is Project Manager for Enhancing Digital Capacity in Teaching and Learning with the Irish Universities Association, on secondment from her role as Assistant Director of the Centre for Excellence in Learning and Teaching at NUI Galway. She is a successful hybrid academic with more than 25 years of experience working in higher education in Ireland.



APPENDIX 1

Inclusive Teaching and Learning Practice Statement



MSc. Business Analytics Programme
Inclusive Teaching and Learning Practice

Dear student,

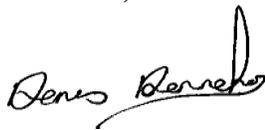
Your success and student experience is important to me. Every student, regardless of personal history or identity categories, is a valued member of the MSc. Business Analytics programme. Your experiences are valuable and important, and you should feel free to share them as they become relevant during lectures and extra curricular activities. No student is ever expected or believed to speak for all members of a group.

You have the right to determine your own identity. You have the right to be called by whatever name you wish, and for that name to be pronounced correctly. You have the right to be referred to by whatever pronouns you wish. You have the right to adjust those things at any point in your education.

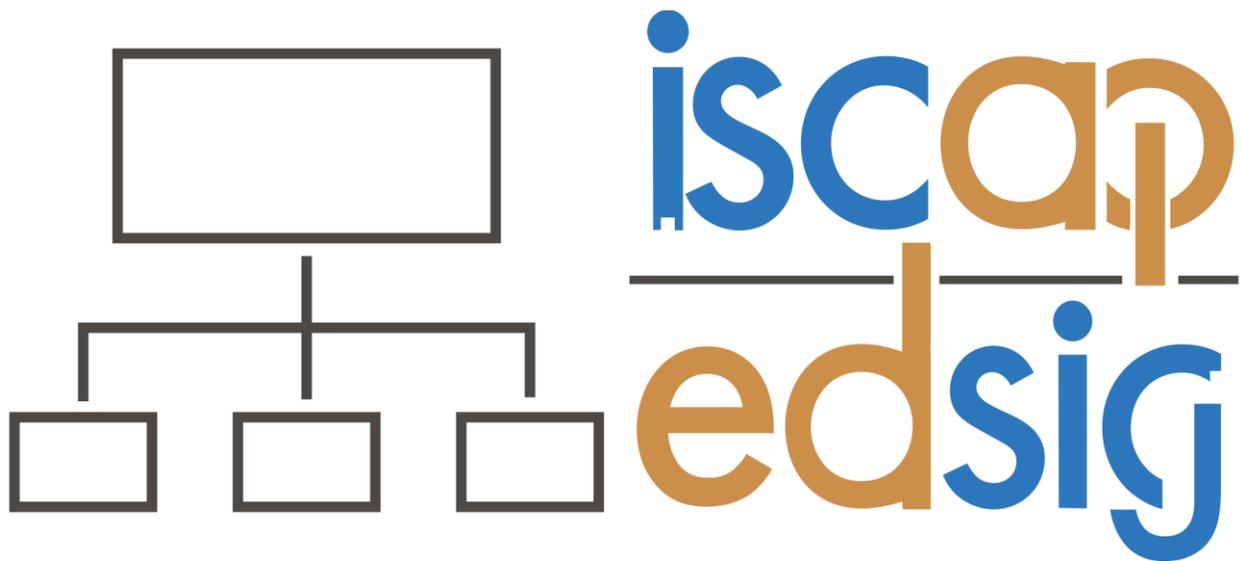
We all learn differently. If there are elements of this programme that exclude you or don't work for you, let me know as soon as possible. I encourage you to seek the support of a wide range of student services at NUI Galway to determine how you could improve your learning as well. We can develop strategies to meet both your needs and the requirements of the programme.

If you find that there are aspects of course instruction, subject matter, classroom environment, or extra curricular activities that result in barriers to your inclusion, please contact me privately.

Best Wishes,



Dr. Denis Dennehy
Programme Director MSc. Business Analytics
NUI Galway



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