

Fostering Equity Students' Experience and Success Through a Lens of Universal Design for Learning

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Abstract

This study investigates how Universal Design for Learning (UDL) enhances the experiences and outcomes of equity students in higher education, focusing on those from low socioeconomic status (SES), regional and remote (RR), and non-English speaking background (NESB) cohorts. Unlike traditional applications of UDL, which primarily focus on students with disabilities, this research customises the UDL framework to address the unique challenges faced by these equity groups, emphasizing their distinct learning barriers and support needs. Drawing on qualitative data from 27 semi-structured interviews conducted at a large public university in Australia, this study explores the adaptation of UDL principles in curriculum design, course delivery, and assessment. The research highlights the critical role of the “3 E’s”: Empowerment, achieved by equipping students with tools and autonomy in learning; Engagement, fostered through adaptable and inclusive teaching approaches; and Effectiveness, ensuring students acquire meaningful skills suited to their diverse educational needs. Practical strategies derived from this research include flexible assessment models, the use of AI and digital tools for accessibility, and structured mentoring programs to support student success. These findings offer actionable guidance for educators seeking to create more inclusive learning environments and reinforce UDL’s transformative potential in advancing equity, diversity, and inclusion in higher education.

Keywords: equity students, universal design for learning, student experience, inclusive education, empowerment, engagement, effectiveness

1. Introduction

The importance of an inclusive education system is widely acknowledged globally (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2016). Education systems that embrace inclusivity are pivotal in fostering societies that value diversity and equality. Increasingly, education policies emphasize the need for national systems to provide equitable access to high-quality education for every student. This recognition stems from a deeper understanding that education is not only a fundamental human right but also a cornerstone for reducing societal inequalities and enhancing national economic productivity and competitiveness. By equipping individuals with the skills, knowledge, and confidence to participate fully in society, inclusive education systems contribute to broader social cohesion and economic resilience. These priorities align closely with the United Nations Sustainable Development Goals (SDGs), particularly SDG 4, which seeks to ensure inclusive and equitable quality education for all and promote lifelong learning opportunities. Consequently, the primary objective of educational institutions must be to remove barriers that hinder access, participation, and success in education for all learners, regardless of their backgrounds. Equity/equality, diversity, and inclusion (EDI) are becoming increasingly integral to universities worldwide, with many institutions implementing strategic EDI plans (Wolbring & Lillywhite, 2021). Equitable and fair delivery of study programs is a key mechanism for achieving this goal, particularly for marginalized groups. By investing in strategies and frameworks that address these disparities, educational institutions can help bridge the gaps that perpetuate social inequities, creating a more just and prosperous future for all.

Recent literature aligns with ongoing discussions in the Higher Education Accord, where students have voiced significant concerns about the state of equity in Australian higher education. These conversations, reflected in the Australian Universities Accord Final Report (2024), emphasize the importance of systemic reforms to create a more inclusive and equitable academic environment. By implementing inclusive pedagogical practices, institutions can

help level the playing field for marginalized and disadvantaged student cohorts, empowering them to overcome barriers, achieve their full potential, and thrive in both their academic and professional pursuits.

Despite the broader commitment to inclusivity, equity students continue to experience systemic barriers that hinder their educational success. For example, low socioeconomic status (SES) students often struggle with financial constraints, limiting their access to educational resources, technology, and extracurricular engagement (Tan, 2024). Regional and remote (RR) students face digital connectivity issues and geographical isolation, impacting their ability to access academic and social support (Burke, Bennett, Burgess, Gray, & Southgate, 2016). Similarly, non-English speaking background (NESB) students encounter language barriers, cultural adaptation challenges, and limited access to linguistic support services, all of which contribute to lower retention and academic achievement rates (Bennett et al., 2004).

Addressing these challenges requires an inclusive pedagogical approach that accommodates the diverse needs of equity students. Universal Design for Learning (UDL) provides a flexible framework that enables educators to implement differentiated teaching strategies, ensuring students can engage with curriculum content in meaningful ways. However, existing UDL initiatives in higher education have predominantly focused on students with disabilities, often overlooking the broader equity cohorts. This narrow focus creates an unintended gap in inclusive education efforts, as the challenges faced by other equity groups differ substantially from those encountered by students with disabilities.

This study identifies and addresses this gap by exploring how UDL can be customized to support low SES, RR, and NESB students. Unlike traditional approaches that assume a one-size-fits-all model of inclusive education, this research underscores the necessity of a customised UDL framework—one that integrates flexible teaching strategies, diversified assessment methods, and targeted support mechanisms to accommodate the unique challenges faced by these cohorts. Specifically, this study investigates how tailored UDL strategies can enhance equity students' empowerment, engagement, and academic effectiveness, ultimately improving their retention and success in higher education. By broadening the scope of UDL beyond disability support, this research contributes to the ongoing discourse on equitable education and presents actionable strategies for institutions seeking to implement UDL as a truly universal—not selective—framework for inclusion.

1.1 Universal Design for Learning (UDL): A Framework for Inclusivity

Universal Design for Learning (UDL) is a comprehensive framework designed to guide the creation of adaptable and supportive educational experiences that meet the needs of all learners (Meyer, Rose, & Gordon, 2014; Bray, Banks, Devitt, & Ní Chorca, 2021; Bray et al., 2024). Developed by the Centre for Applied Special Technologies (CAST) in the 1990s, UDL was first formalized in 2008. Over time, the framework has undergone significant updates, including efforts to address systemic biases and oppression, culminating in the release of Guidelines 3.0 in 2024. Central to UDL is the rejection of the notion of a “typical” learner, instead recognizing that each individual learns differently due to diverse and variable experiences. By embedding flexibility into teaching and learning practices, UDL seeks to engage and support all learners, enabling them to succeed.

The Higher Education Opportunity Act of 2008 provides a succinct and authoritative definition of UDL:

“A scientifically valid framework for guiding educational practice that: (a) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (b) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient.”

This inclusive pedagogical approach addresses both individual variability—stemming from unique learning needs, abilities, and backgrounds—and systemic barriers that may hinder equitable access to education. UDL's emphasis on flexibility and adaptability positions it as a powerful tool for fostering equitable and effective learning environments.

Within the UDL framework there are three broad principles: (a) multiple means of representation, (b) multiple means of engagement, and (c) multiple means of action and expression. Each UDL principle is supported by specific guidelines and checkpoints that provide a structured approach for practical and effective implementation. These elements serve as a clear roadmap for educators, helping them enhance accessibility and student engagement. First, representation involves presenting information in various formats to facilitate learners in processing and comprehending the content effectively. This broadens avenues for learners to engage with the material, fostering resourcefulness and knowledge acquisition (the “*what*” of learning). Next, engagement entails providing numerous ways to engage with the learning to stimulate interest and sustain enthusiasm. This ensures that learning remains

meaningful and relevant, fostering purposefulness and motivation among learners (the “*why*” of learning). Finally, action and expression provide learners with diverse opportunities to develop and demonstrate their knowledge, understanding, and abilities. This enables learners to leverage their strengths and capabilities, fostering strategic and goal-directed learning approaches (the “*how*” of learning). In essence, UDL advocates for providing students with a range of choices in how they engage with course materials, how those materials are presented (whether through video, audio, or written formats), and how they demonstrate their learning (via presentations, essays, or exams) (Meyer et al., 2014; Behling & Tobin, 2018). This flexibility not only accommodates the diverse needs of students but also fosters inclusivity by recognizing and respecting individual learning needs, cultural backgrounds, and abilities. By encouraging learner autonomy, UDL helps students take ownership of their educational journey, enhancing their motivation and engagement.

The literature extensively highlights the numerous benefits of the UDL framework. For instance, Al-Azawei, Serenelli, and Lundqvist (2016) conducted a comprehensive content analysis of 12 studies examining the adoption of UDL principles between 2012 and 2015. Their findings revealed that educational materials designed in alignment with UDL effectively addressed the needs of a diverse range of learners, accommodating varying levels of prior knowledge, abilities, and educational backgrounds across different cultural contexts. Similarly, Capp (2017), in a meta-analysis of 18 studies conducted between 2013 and 2016, reported comparable benefits, particularly for students with differing abilities. Research also demonstrates that UDL enhances overall course satisfaction, improves clarity of course content, and fosters greater student engagement (Cumming & Rose, 2022). Additionally, UDL plays a pivotal role in creating more equitable learning environments, especially for marginalized student populations in higher education (Hanesworth, Bracken, & Elkington, 2019). By addressing the diverse needs of learners, UDL reduces barriers and promotes inclusivity, enabling underrepresented groups to achieve academic success on par with their peers. The advantages of UDL extend beyond students to educators as well. Katz (2012) identified a notable reduction in stress levels among educators implementing UDL principles, while Kumar and Wideman (2014) observed that the framework improved teaching preparation and efficiency, resulting in decreased workloads. Rao (2021) and Rao, Garant-Jones, & Dean (2024) illustrate how faculty members collaborating with industry and community partners can apply UDL to reduce barriers and design customized work-integrated learning (WIL) experiences that honor students’ diverse abilities and needs. Collectively, these findings underscore the transformative potential of UDL in fostering accessible, equitable, and effective educational experiences for both learners and educators.

An emerging body of literature highlights the importance of applying UDL in assessment design across diverse student populations (Black, Weinberg, & Brodwin, 2015; Dickinson, 2018; Griful-Freixenet, Struyven, Verstichele, & Andries, 2017; Stampoltzis, Tsitsou, Plesti, & Kalouri, 2015). Nieminen (2024) proposed the Assessment for Inclusion (AfI) framework, which outlines five key principles: rethinking accommodations, anti-ableist work, celebrating human diversity, fostering student partnerships, and promoting interdependence. Another body of literature highlights the role of digital technology in supporting key aspects of the learning process emphasized in UDL, such as self-regulated learning (Zhu, Au, & Yates, 2016; Willems, Gonzalez-DeHass, Powers, & Musgrove, 2021). Technology offers significant potential to enhance education by providing diverse options for presenting content, expressing learning, and engaging with material (Bray et al., 2024). The university’s Learning Management Systems (LMS) serve as an antecedent to UDL by establishing a foundational infrastructure that supports the implementation of UDL principles. LMS platforms enable the design of accessible and versatile learning environments by offering tools to deliver multimodal instruction. These systems allow educators to present information through various media, such as videos, audio recordings, interactive simulations, and text, catering to different learning styles and preferences. Furthermore, LMS features such as adjustable settings (e.g., font size, playback speed, and captions), interactive elements like quizzes or discussion boards, and personalized learning paths empower students to navigate their learning experiences in ways that suit their individual needs (Bongey, 2012). However, the adoption of UDL remains limited, likely due to insufficient theorization and operationalization of inclusive assessment (Tai, Ajjaw, & Umarova, 2024).

1.2 Student Equity in Higher Education

Widening participation in higher education aims to enhance the success and retention of students from diverse backgrounds. In Australia, equity student groups that often face significant marginalization and disadvantage throughout their university studies include Aboriginal and Torres Strait Islander peoples, individuals from low socioeconomic backgrounds, people with disabilities, those from remote, rural, or isolated areas, first-generation university students, individuals from non-English speaking backgrounds, and women in non-traditional fields (Willems, 2010; Tai et al., 2024). These students encounter systemic, sociocultural, and institutional barriers that

hinder their access to and success in higher education (Rao et al., 2024). While initiatives promoting equity and social justice have led to increased participation of these groups in tertiary education, evidence indicates that equity students continue to experience disparities compared to their “privileged” counterparts, particularly in academic achievement, engagement, retention, and graduate employment outcomes (Department of Education, Skills, and Employment, 2020a, 2020b). Recent research highlights the significant influence of students’ social, cultural, and economic environments on their educational outcomes (Hosein, Balloo, Byrom, & Essau, 2023; Rao et al., 2024). Accordingly, this study focuses on three equity cohorts: students from low socioeconomic backgrounds, students from regional and remote areas, and students from non-English speaking backgrounds.

For instance, students from low socioeconomic backgrounds and regional and remote areas often struggle with a sense of belonging and engagement throughout their academic journey (Burke et al., 2016). This can stem from a lack of social and cultural capital, financial pressures, or limited access to academic resources. Such challenges contribute to higher attrition rates and lower academic performance compared to their more privileged peers (Harvey, Andrewartha, Edwards, Clarke, & Reyes, 2017). Additionally, many of these students hesitate to seek academic support due to feelings of inadequacy or a lack of confidence and self-esteem (Devlin, Kift, Nelson, Smith, & McKay, 2012), further perpetuating the cycle of disadvantage.

Similarly, students from non-English speaking backgrounds face unique obstacles that impact their academic success and overall participation. Language barriers often inhibit active participation in classroom discussions, the ability to ask questions, and collaboration with peers. NESB students are also less likely to engage in activities such as group projects, peer learning, and informal discussions of academic concepts, which are vital for deep learning (Grebennikov & Skaines, 2009). Research has shown that these students experience higher rates of university withdrawal compared to their English-speaking background (ESB) peers, highlighting lower levels of engagement and integration within academic communities (Krause, Hartley, James, & McInnis, 2005; Jackling & Natoli, 2011).

The COVID-19 pandemic has further exacerbated these challenges, potentially widening existing opportunity gaps in higher education (O’Shea, Koshy, & Drane, 2021). Equity students faced unique hardships during this period, such as the digital divide impacting regional and remote students, increased caregiving burdens for those with family responsibilities, and heightened economic stress among students from low socioeconomic backgrounds. The full extent of the pandemic’s impact remains unclear, necessitating a thorough evaluation of current curricula, teaching strategies, assessments, and academic support to better understand and address the diverse needs of equity students in a post-pandemic context.

1.3 The Present Study

Investigating how different teaching pedagogies affect various types of students is a complex and nuanced challenge (Rivera, 2017; Orlov et al., 2021). Universal Design for Learning (UDL) is a widely recognized and adopted pedagogical framework for curriculum design and development. It supports educators in planning and implementing differentiated teaching strategies while offering students the flexibility to tailor and personalize their learning experiences. In the current study, the three UDL principles underscore flexibility and adaptability, making UDL an ideal framework for addressing potential inequalities experienced by equity students, who often encounter structural barriers in traditional educational system. Unlike conventional pedagogies that rely on a one-size-fits-all approach and often overlook the intersectional disadvantages faced by marginalized students, UDL’s adaptability uniquely positions it to dismantle these barriers.

Although universal design is increasingly promoted as a promising approach (Dallas, Sprong, & Kluesner, 2016; Fleet & Kondrashov, 2019), there is limited evidence of its impact on the student experience (Al-Azawei et al., 2016; Edwards, Poed, Al-Nawab, & Penna, 2022) and minimal practical guidance on its implementation (Kimball, Wells, Ostiguy, Manly, & Lauterbach, 2016). Equity group students’ voice offers a new opportunity for us to assess the value of the UDL strategies and provide recommendations for future pedagogical approaches for these cohorts. A number of recent papers have examined the role of UDL in learning for students with disability (e.g., Kent, 2016; Black et al., 2015; Griful-Freixenet et al., 2017; Edwards et al., 2022). This project is distinguished from those studies by exploring the impact of UDL on low SES, RR, and NESB equity cohorts. This is important as students from low SES, RR, and NESB backgrounds may have unique personal circumstances affecting their learning as compared to those with disability (see Section 1.2).

To address these issues, this project employs in-depth interviews with students from these key equity cohorts, inviting them to share their perspectives on the implementation of UDL in curriculum design, course delivery, and assessment at a large public university in Western Australia. The primary aim is to investigate how these aspects influence students’ overall experience, engagement, retention, and perceived employment outcomes. The project

specifically examines the awareness and perceptions of UDL among low SES, RR, and NESB students to better understand their unique academic needs. Through this investigation, the project seeks to uncover the connections between UDL practices and their impact on equity students, aiming to identify key barriers and enablers for inclusive pedagogy. Importantly, the research clarifies that the study context did not involve a formal UDL intervention but rather an exploration of students' experiences in environments where UDL-aligned strategies were either implicitly present or could be beneficially applied. The findings will inform the development of targeted guidance notes to address these challenges and enhance the implementation of UDL principles in higher education.

The study is guided by the following research question (RQ):

RQ: To what extent, and in what ways, does Universal Design for Learning (UDL) enhance equity students' experiences and promote their engagement, retention, achievement, and perceived employment outcomes?

2. Method

2.1 Research Design

This study adopts an exploratory qualitative research design (Maxwell, 2013), utilizing a single case study method (Yin, 2014) and the coding technique as developed by Glaser and Strauss (1965) to address the research question. This approach was selected as the most suitable for several compelling reasons. First, an exploratory qualitative design allows for an in-depth understanding of the phenomenon under investigation, particularly when the research focuses on complex, context-specific dynamics. This suits the conditions of our target groups (low SES, RR, and NESB equity cohorts) due to their unique situations. Second, the single case study method provides a detailed examination of a specific instance, enabling rich insights that might not be captured through broader methodologies. By focusing on a single case, the study can delve deeply into the nuances and unique characteristics of the subject, offering a comprehensive perspective that aligns with the exploratory nature of this research. This enabled deeper understanding of the mentioned student groups that were studied in this research.

An email invitation was sent to the low-SES, RR, and NESB equity cohorts identified in the university's Diversity and Equity List, using a self-selection sampling approach. The email included a Qualtrics link and a QR code, enabling students to express their interest in participating in the study. It outlined the purpose of the research, assured participants of confidentiality, and provided clear instructions for signing up. Students who were interested could click the link or scan the QR code to select their preferred interview time and location. Once responses were received, each student was contacted individually to confirm the arrangements, address any questions, and ensure they were fully informed about the interview process. This approach aimed at streamlining the recruitment process while prioritizing participants' convenience and comfort.

The primary data was collected through 27 semi-structured interviews with students from low SES, RR, and NESB equity cohorts within the Faculty of Business and Law. In this study, CAST's (2024) UDL guidelines serve as the theoretical framework shaping the development of interview questions. The interview questions were centered around the proposed broad topics, facilitating the development of thick descriptions and enabling the identification and reconceptualization of congruences and inconsistencies in participants' responses. Prior to participating, all interviewees completed a consent form specifically designed for this research. The interviews were conducted either face-to-face or online via MS Teams, depending on participant preference.

Additionally, a systematic framework, constant comparative method, and iterative coding processes enabled the identification of patterns, relationships, and underlying themes rooted in participants' lived experiences. This methodology allowed the study to develop a robust, data-driven understanding of the research problem, ensuring that the findings are both contextually relevant and reflective of the unique challenges faced by low SES, RR, and NESB equity students.

2.2 Ethics Approval

Before data collection commenced, a research ethics application was submitted to the Human Research Ethics Office at the University to ensure ethical compliance. Approval for the research was granted by the University Human Ethics Committee (HRE2023-0593). Participants were provided with a detailed participant information and consent form, which they reviewed and signed to indicate their informed consent to participate in the study.

2.3 Data Collection and Analysis

Equity data for this study was provided by the Learning Innovation and Teaching Excellence Centre (LITEC) at the University. A purposive sampling strategy was employed to recruit equity students identified in the Diversity and Equity spreadsheet. Participants were selected based on the following inclusion criteria: (i) enrollment in the Faculty

of Business and Law between 2021 and 2023, (ii) classification within the low SES, RR, and NESB equity cohorts, and (iii) a study location at either the main physical campus or in a fully online mode. Recruitment was conducted by a research assistant who had no involvement in teaching or grading within the units or courses in question, to mitigate potential power imbalances between academics and students.

The data underwent thematic analysis using the six-stage framework proposed by Braun and Clarke (2006): familiarization with the data, generation of initial codes, identification of themes, review of themes, definition and naming of themes, and the production of the final report. Following the interviews, the data was transcribed and coded using qualitative coding techniques outlined by Strauss and Corbin (1998). Initial codes were refined and summarized into key themes (Glaser, 1978), which were subsequently mapped against the coding technique as suggested by Glaser and Strauss (1965) and relevant UDL principles to facilitate a deeper understanding and a more comprehensive analysis of the findings. To ensure consistency and reliability, a joint discussion was conducted to resolve any discrepancies. Once the data analysis was finalized, the findings were converged and triangulated to identify the major outcomes of this study.

3. Results

Using the coding technique as detailed by Strauss and Corbin (1998) and UDL principles, this research created a tailored version of UDL specifically designed to address the unique needs of students from low SES, RR, and NESB equity cohorts. *Customised UDL*, at its core, focuses on creating a more flexible and supportive learning environment that directly responds to the distinct challenges these students face. Key components include enhancing access to resources, offering multiple pathways for completing assignments, and providing strong support systems through lecturers and mentors. The overarching goal is to ensure these students feel included, remain engaged, achieve academic success, and are well-prepared for future employment opportunities. To remain effective and relevant, this customised approach must be continually updated based on ongoing feedback to adapt to the evolving needs of the students.

Our findings reveal that *customising UDL* is essential in creating a comprehensive support system tailored to the unique needs of three equity cohorts. This involves adapting support mechanisms and teaching methods to address their specific challenges. Key strategies include implementing mentoring programs, leveraging AI tools, and promoting the use of multimedia to engage students and provide diverse ways for them to learn and express themselves. Challenges such as skill acquisition pressure, assessment difficulties, and issues with feedback emphasize the importance of responsive and adaptable teaching practices. Positive interventions, including practical exposure, effective feedback, and flexible assessments, align closely with UDL principles and contribute to improved outcomes. Overall, a *customised UDL* approach significantly enhances the educational experiences of low SES, RR, and NESB equity students by fostering engagement, academic success, and readiness for future employment. Table 1 presents the list of codes, the categories that emerged from the analysis, and their mapping to UDL principles.

Table 1. List of codes and emerged categories

Codes	Key Themes	Categories	UDL Mapping
1. Accessibility to resources	Educational and Professional Challenges	(1) Antecedent conditions	Engagement
2. New technologies			
3. Personal circumstances			
4. Discipline knowledge	Resource and Support Accessibility	(1) Antecedent conditions	Actions and Expression
5. Tutor's lack of preparation and delivery concerns			
6. Mentor-mentee relationship concerns	Personal and Interpersonal Dynamics	(1) Antecedent conditions	Actions and Expression
7. Flexibility in submitting different forms of Assessment			
8. Group work challenges	Personal and Interpersonal Dynamics	(1) Antecedent conditions	Actions and Expression
9. Future employment concerns			
10. Mental health support costs	Personal and Interpersonal Dynamics	(1) Antecedent conditions	Actions and Expression

Codes	Key Themes	Categories	UDL Mapping
11. Support Networking			
12. One-on-one mentorship	Enhanced Mentorship and Guidance		Engagement
13. Mentoring programs by senior students			
14. Teachers don't monitor student progress	Monitoring and Empathy in Teaching		Actions and Expressions
15. Tutors don't help with goals setting		(2) Phenomena	
16. Providing a sense of empathy and understanding in class	Encouragement and Innovative Learning Tools	<i>Customised UDL: Comprehensive Support System</i>	Representation
17. AI tools should be encouraged to use			
18. Encouragement of multimedia use and innovation			
19. Encouragement of using learning support tools			
20. More resource for international students on English language			
21. Further support on developing presentation skills	Skill Development and Assessment		Actions and Expression
22. Student performance may increase if marking is not just based on writing			
23. Uni to Assist Equity students with employment upon graduation	Post-Graduation Support and Employment	(3) Actions and Strategies	Engagement
24. Post-graduation support			
25. Personal growth and development			
26. Some students don't feel comfortable discussing personal things or speak out	Personal and Social Development		Engagement
27. Cultural events			
28. Feeling isolated and disconnected	Social Integration and Well-being	(4) Context Conditions	Actions and Expressions
29. Adapting to university life			
30. Pressure on navigating through expected skills (e.g. essay writing, referencing, etc.)	Academic and Assessment Challenges	(5) Intervening Conditions	Actions and Expressions
31. Unfamiliarity with the format	Communication and Support Issues		
32. Unit Outline issues			Engagement
33. Assessment difficulties (hard to comprehend, no exemplar etc.)	Resource and Accessibility Constraints		
34. Feedback quality and Timing			
35. Computer software only available on campus which is demotivating.			
36. Teaching style affects motivation			
37. Intensive units are stressful			
38. Tutors don't provide opportunity for all to speak out			
39. Curtin Connect communication (late or no response)			

Codes	Key Themes	Categories	UDL Mapping
40. Student accommodation			
41. Inequality in class			
42. Challenges around online learning engagement			
43. Responding time of tutors to student questions			
44. Lack of communication to students			
45. Learning support tools presented but not encouraged			
46. Reactive approach of teaching team			
47. Good practical exposure	Empowerment		
48. Good feedback received from tutors			Representation
49. Approachability of teachers/tutors	Engagement through		
50. Experienced professors have more engagement activities	Positive Educational Interactions		Engagement
51. Good flexibility for Assessments		(6) Outcome Conditions	
52. Group work opportunities	Effective and Flexible Learning Environment		Actions and Expressions
53. Online classes effectiveness			
54. Face to face class is very practical and helpful			
55. Tutors' feedback is helpful			

As shown in Table 1, the 55 codes identified through the analysis are organized into key themes and categories, and mapped to the three core UDL principles, illustrating how a customised UDL approach can be systematically applied to enhance equity, inclusion, and student success across diverse cohorts.

4. Discussion

Drawing on the insights from this research, this section discusses the impact of our findings on the application of UDL in creating inclusive and equitable learning environments. By prioritizing diversity, equity, and inclusion, educators can play a significant role in empowering every learner to succeed and thrive. Grounded in the lived experiences of equity students, this research identifies key factors that contribute to the successful implementation of UDL. The following sections delve into the major aspects of these students' lived experiences, shedding light on the strategies and practices that promote meaningful learning outcomes.

4.1 Antecedents

The student experience of UDL is shaped by a complex interplay of institutional policies, faculty attitudes and competencies, technological infrastructure, and the characteristics of the student population. Each of these factors serves as an antecedent that collectively determines the quality and inclusiveness of the learning environment.

Drawing from student perspectives, content availability, timeliness of feedback, instructors' capabilities, assessment design, and participation in group work were identified as important factors influencing their ongoing academic progress. Institutional policies play a critical role in establishing the framework for UDL implementation and success. These policies encompass guidelines for accessibility, funding for assistive technologies, and professional development programs designed to support students from varied backgrounds. When institutions prioritize inclusive education, they are more likely to adopt comprehensive UDL practices. For instance, timely access to digital content and adaptable learning resources can significantly enhance the experiences of students with diverse needs. Policies related to mental health, financial aid, and accommodation are equally pivotal, particularly for NESB equity cohorts.

In UDL design, the educator is positioned as both a resource person and the primary facilitator of learning. Faculty attitudes towards teaching, student engagement, and innovation are therefore critical factors in shaping learning

outcomes. This is supported in the literature, with faculty members who adopt a student-centred approach and demonstrate cultural competence shown to contribute positively to the learning environment (Merriam & Bierema, 2013). While a diverse student body enriches the learning experience, it also necessitates tailored approaches to address varying needs. Students from migrant and refugee backgrounds may encounter language barriers, cultural adjustment challenges, and the lingering effects of prior trauma, all of which can hinder their full participation in and benefit from higher education. Similarly, economic disadvantage among low SES students can limit access to educational resources, extracurricular opportunities, and support services, affecting both academic achievement and the overall university experience.

4.2 Phenomena

This part characterises a comprehensive support system necessary for the success of UDL. The increasing demand for inclusivity in higher education necessitates the presence of adequate support programs and activities to make students feel empowered.

Such support also helps students adapt to Australian culture, foster a sense of connection and belonging, and develop a sense of self-worth. An approachable educator, a friendly and open environment, and an assurance of care enable a culture of support and sharing among students. Overall, a support system should ideally incorporate multiple guidelines and policies to accommodate the diverse needs, learning styles, and preferences of all students. The role of the educator is crucial in customising content delivery and providing meaningful feedback on student progress. Building connections with fellow students beyond the classroom further enhances learning by providing valuable peer support. Mentoring programs also offer guidance and assistance for students who need it. Additionally, innovative learning tools play a significant role in supporting UDL principles and enhancing student success. Tools such as AI-driven learning platforms, interactive multimedia, and collaborative digital tools help bridge gaps in understanding and promote active engagement.

4.3 Contexts

Context conditions refer primarily to the personal factors that shape the differences in understanding, aptitude, and skills students bring to their learning experience. These personal factors include students' level of aspirations, learning needs, cognitive abilities, background knowledge, prior experience, motivation and engagement, and physical and sensory abilities. An increased level of engagement and academic support can positively influence motivation and career aspirations.

A key to managing students' personal and circumstantial factors that are closely related to their study success is to provide academic advising that considers individual needs and offers personalised support. Additionally, tutoring services, peer mentoring, and study groups can assist students who may need extra support in navigating UDL-based curricula. Furthermore, ensuring students' mental health and emotional well-being are prioritised, accessible counselling services, stress management workshops, and wellness initiatives are vital to supporting students throughout their academic journey.

A well-designed UDL framework that facilitates access to resources tailored to diverse backgrounds, learning abilities, and skill sets can effectively address these differences. By incorporating differentiated learning designs, UDL can support personalized learning experiences that cater to the unique needs of each student, fostering a more inclusive and equitable educational environment (Burke et al., 2016).

4.4 Strategies and Actions

The foundation of any successful UDL implementation begins with strong institutional commitment. Universities must demonstrate a clear, top-down commitment to inclusive education through the creation of policies that promote UDL principles across all aspects of teaching and learning. These policies should be aligned with national and international standards on inclusivity and diversity, including legal mandates such as Australian Government's Inclusion and Diversity Strategy and the TEQSA guidelines on diversity and equity.

Moreover, university leaders must allocate resources and prioritize UDL as a strategic initiative. This commitment involves developing long-term goals, establishing a monitoring framework to assess progress, and ensuring that UDL principles are integrated into institutional mission statements. Collaboration with external organizations, such as UDL research networks, can further strengthen the university's efforts and ensure best practices are being followed.

At the learning design level, key aspects include unit design, administration, educational technology, mentorship, and flexible support. Universities increasingly rely on LMS to enable flexible engagement, representation, and expression. For students from diverse backgrounds, educators can use LMS tools to foster active learning through

multimodal environments with diverse representations, processing methods, and motivational elements.

Students highlighted the importance of skill development and inclusive assessment practices for academic and professional success. Regular feedback through formative assessments was highlighted as key to building confidence and addressing areas for improvement. Flexibility in assessment formats was equally crucial, enabling equitable practices that accommodate diverse abilities and learning styles.

Post-graduation support also emerged as a priority, with students valuing career counselling, mentorship, and opportunities to connect with industry professionals through internships, networking, and institutional partnerships. These strategies were seen as vital for enhancing employability and easing the transition to the workforce.

4.5 Intervening Factors

For students from diverse backgrounds, accessibility and digital equity are critical to enabling success in learning. The widespread availability of connected devices has introduced greater flexibility in how, when, and where people learn, prompting institutions to update their information technology (IT) infrastructure. However, simply owning a device that connects to the internet is not sufficient. To truly support equitable learning, all aspects of the learning environment must be fully accessible and usable for all students. A key starting point is facilitating opportunities to build digital literacy, which is foundational for academic success. This is consistent with the findings of Wang, Shannon, and Ross (2013), who reported that students with higher levels of technology self-efficacy achieve better learning outcomes.

Beyond digital access, the level of difficulty experienced by equity students and their familiarity with the unit's background knowledge are also significant contributors to learning success, further underscoring the need for proactive and tailored support within UDL-designed learning environments.

4.6 Outcomes

Key outcomes for students engaging with a UDL-designed learning environment include a sense of empowerment, effective learning, and sustained engagement. As students adapt to the university environment, UDL provides the scaffolding necessary to support skill development, foster connectivity, and deepen engagement with both peers and the learning process. Developing discipline-specific skills provides students with diverse opportunities to communicate and demonstrate their learning in various ways, accommodating different learning styles and abilities. Connectivity with peers and educators is essential for maintaining engagement, as it cultivates a sense of belonging, collaboration, and mutual support. Overall, the application of a customised UDL approach, as proposed in this study, is expected to yield significant positive outcomes, with students reporting increased feelings of empowerment, enhanced learning effectiveness, and greater academic engagement. Figure 1 illustrates the customised UDL framework developed through this study.

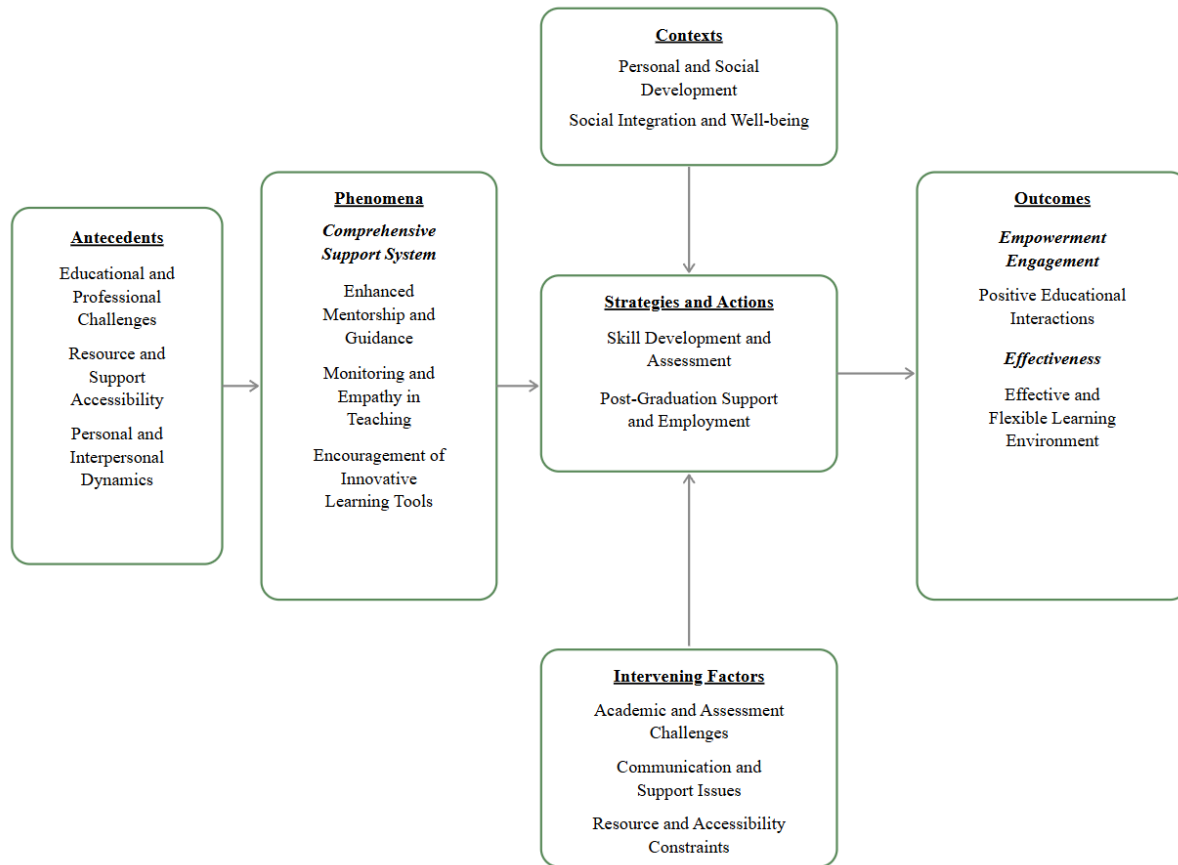


Figure 1. Proposed customised UDL framework based on low SES, RR, and NESB equity cohorts

4.7 Implications

Research on Universal Design for Learning (UDL) has significant implications for education policy and practice. By demonstrating the effectiveness of UDL in supporting equity students, stakeholders can advocate for increased funding for UDL-aligned technologies and training, addressing systemic inequities that hinder these students' success. This study contributes to a deeper understanding of students' experiences with UDL implementation in universities. It identifies a set of antecedent factors, experiential factors, and anticipated outcomes for students.

Equity students' lived experiences reveal a set of antecedents that can be grouped into factors impacting their learning experiences. These factors include learning design, accessibility, resources, and personal circumstances. These antecedents serve as prerequisite conditions for equity students to fully benefit from UDL. While antecedents create enabling environments, additional factors support adaptation within the process and environment. Developing skills and competencies, ensuring extended support, and fostering connections facilitate timely and effective adaptation for these students. This study highlights a set of affective outcomes that learners identified as crucial for truly impactful learning: empowerment, engagement, and a sense of effective learning. These outcomes help students feel empowered, remain engaged, and ultimately achieve meaningful learning results. Together, empowerment, engagement, and effectiveness form the three "E"s of students' perceived outcomes. Figure 2 illustrates these implications through a model of students' lived experiences with UDL application in the university context.

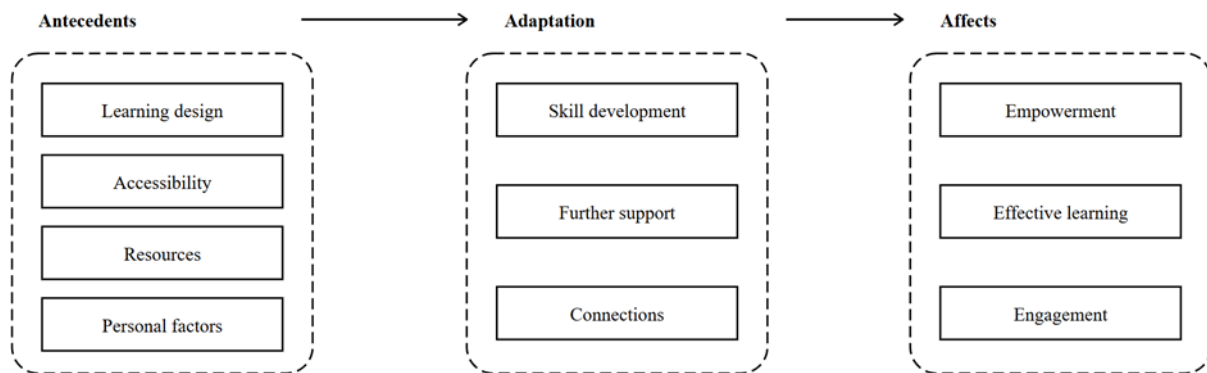


Figure 2. Pathway to inclusive learning: antecedents, adaptation, and affects

4.8 Future Research Direction

Future research should explore several critical areas to expand the understanding and application of UDL in fostering equity in higher education. First, longitudinal studies are necessary to examine the long-term impact of UDL on equity students' academic performance, retention, and career outcomes, providing insights into how these strategies influence their educational journeys and transitions into the workforce. Second, future studies should examine how the customised UDL principles proposed in this research impact various equity cohorts beyond those explored in this study, such as students with caring responsibilities, Indigenous students, or first-generation university students, to ensure the inclusivity and adaptability of the framework. Third, it is important to acknowledge that this study was conducted within a single higher education institution, focusing exclusively on business courses. Future research should extend to multiple institutions and disciplines to provide a more comprehensive understanding of UDL's broader applicability and impact. Fourth, future research should explore the compounded challenges faced by equity students who also belong to other marginalised groups, to better understand how UDL addresses overlapping barriers. By pursuing these research directions, the transformative potential of UDL in creating inclusive and equitable educational experiences can be further realised.

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Authors' contributions

Associate Professor Chen Zheng was responsible for study design, data collection, and revising the manuscript. Dr Saadia Shabnam and Dr Hossein Mohammadi were responsible for data collection, data analysis, and revising the manuscript. Associate Professor Chen Zheng, Dr Saadia Shabnam, and Dr Hossein Mohammadi drafted the manuscript and contributed equally to this work. All authors read and approved the final manuscript.

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