Empowering Students with Autism in Higher Education: A Comprehensive Review of Transition Support and Universal Design for Learning

(Memperkasa Pelajar Autisme di Institusi Pengajian Tinggi: Satu Tinjauan Komprehensif Mengenai Sokongan Transisi dan Reka Bentuk Pembelajaran Sejagat)

Shameilla Kamarull Bahsha, Hasnah Toran, Mohd Syazwan Zainal

ABSTRACT

Students with autism is on crucial phase during the transition from high school to higher education. The unique challenges in meeting the academic demands, developing self-determination, and social integration are some of the factors that they are facing. In order to reach their full potential in education, students with autism need additional support and learning approaches that are appropriate for them. Autism is a complex neurodevelopmental disorder which is characterized by difficulties with social interactions, communication, and repetitive behaviours. On the other hand, autism affects behaviour, communication and social interaction. One of the supportive learning for students with autism is Universal Design Learning (UDL). With the integration of UDL principles in higher education, it enhances the transition of learning experience by creating the flexible, inclusive, and supportive learning environment thus paving way for their success. Therefore, this paper will explore how UDL principles can be implemented to support the transition of students with autism from secondary education to higher education in a global context. Eventually, this paper will be evaluating transition programmes that incorporate with UDL principles in higher education. Appropriate learning support fosters the society towards inclusive, equitable, and innovative environment worldwide.

Key Words: Autism; Universal Design Learning; Higher Education; Transition Support; Inclusive Education

ABSTRAK

Pelajar dengan autisme berada pada fasa penting semasa peralihan dari sekolah menengah ke peringkat pendidikan tinggi. Terdapat juga beberapa faktor dan cabaran unik yang dihadapi dalam memenuhi tuntutan akademik, membina kecekalan, dan integrasi sosial. Untuk mencapai potensi penuh mereka dalam pendidikan, pelajar autisme memerlukan sokongan tambahan dan pendekatan pembelajaran yang sesuai untuk mereka. Autisme adalah gangguan perkembangan saraf yang kompleks yang dicirikan oleh kesukaran dengan interaksi sosial, komunikasi, dan tingkah laku yang berulang. Secara tidak langsung autisme mempengaruhi tingkah laku, komunikasi dan interaksi sosial. Salah satu sokongan dalam pembelajaran untuk pelajar autisme ialah reka bentuk pembelajaran sejagat. Dengan integrasi prinsip reka bentuk pembelajaran sejagat dalam pendidikan tinggi, ia meningkatkan transisi pengalaman pembelajaran dengan mewujudkan persekitaran pembelajaran yang fleksibel, inklusif dan menyokong sekali gus membuka jalan untuk kejayaan mereka. Oleh itu, kertas kerja ini akan meneroka bagaimana prinsip reka bentuk pembelajaran sejagat boleh dilaksanakan untuk menyokong transisi pelajar autisme daripada pendidikan menengah ke pendidikan tinggi dalam konteks global. Penghujungnya, kertas kerja ini akan menilai program transisi yang digabungkan dengan prinsip reka bentuk pembelajaran sejagat dalam pendidikan tinggi. Sokongan pembelajaran yang sesuai mampu memupuk masyarakat ke arah persekitaran yang inklusif, saksama dan inovatif di seluruh dunia.

Key Words: Autisme; Reka Bentuk Pembelajaran Sejagat; Pendidikan Tinggi; Sokongan Transisi; Pendidikan Inklusif

INTRODUCTION

Addressing unique challenges in the transition of students with autism is crucial from secondary education to higher education, which is also known as Autism Spectrum Disorder (ASD). In the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published by the American Psychiatric Association (APA), autism is classified under a category known as "Autism Spectrum Disorder" or Autism Spectrum Disorder (ASD). DSM-5 lists three levels of difficulty in ASD based on support needs according to American Psychiatric Association (2013). The symptoms and difficulties of the spectrum are different and they also affect each individual differently. Compared to the previous version, DSM-IV, DSM-5 introduced several major changes in the diagnosis of autism. Although references to autism as a "devastating condition" still appear from time to time according to EU Healthcare and Social Care News (2020), it is evident that very many individuals are able to live fulfilled and productive lives. In the decades following since the publication of DSM-III there has been growing recognition that autism is a lifelong condition, extending throughout adolescence and adulthood into old age as stated by Happé and Frith (2020). Nevertheless, even today, compared with the volume of research on autistic children, the relative number of adult studies remains very low.

According to Davis et al. (2021) increased research on autism and in higher education reflects recognition among researchers of the need to support this growing population. As specified by Briggs et al. (2012) and Clark (2005) the transition to university is both a testing and exciting time for any students, whether they are autistic or not. It involves a significant increase in independence, from daily living responsibilities to navigating a timetable with classes potentially spread across multiple sites, and potentially changing from week to week, and each aspect of this poses its own psychological challenge. Most of these communities are frequently underserved, and in the educational system, their unique requirements are frequently disregarded. Nevertheless, the overall findings by Chan et al. (2022) showed that inclusive education for students with disabilities are still far from the achievement target. Therefore, all parties, especially the government and universities have an important role in intervening and supporting inclusion in students with disabilities education. With the principle of "Education for all", "Leave no-one behind" and respecting the diverse abilities and varied needs of the children with disabilities, the educational approaches and services have to be adapted and modified to provide best possible support to the learners in agreement with Aguilar and Heusser (2022). Accardo et al. (2019) explained that transition

support has been shown to be critical in the success of autistic students and the enjoyment of being at a higher education institution (HEI), even it is important to them and their families.

Although good transition support has been shown to have positive effects at the university level, good attitudes towards learning, better peer relationships and inclusion are also something that is generally not covered in HEI policies. Across Western countries, autistic students are entering HEI in increasing numbers according to Bakker et al. (2019) and Van Hees et al. (2015) although still at lower rates than their non-autistic peers specified by Roux et al (2015). With the global massification of higher education, the number of students with disabilities is increasing year on year as claimed by McNicholl et al (2021). Additionally, through the United Nations (UN) Sustainable Development Goals (SDG) were introduced and adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the earth, and ensure that by 2030 everyone enjoy peace and prosperity. There are 17 goals that have been made and for this study, focus more on the 4th goal which is quality education and the 10th goal which is to reduce inequality. According to the United Nations General Assembly Economic and Social Council May 2024 SDG4 is the main enabler of most of the other SDGs.

Universal Design Learning (UDL) is an educational framework aimed at making learning accessible for all students, offers promising strategies in supporting these individuals. By addressing their unique challenges and leveraging their strengths, higher education institutions can create inclusive and supportive environments that promote the academic and social development of all students. Further research and investment in these areas are essential to bridge the gap and ensure equitable access to higher education for students with autism. The need for effective transition support and inclusive educational practices is important to their success in higher education. With UDL being used globally, educational objectives can be met by all students regardless of their neurodiversity, in accordance with the values of equity and inclusivity. In light of the global demands for greater inclusivity in higher education, UDL provides a complete framework that benefits students with autism despite improving the educational experience for all students. HEI can develop more accommodating and supportive learning environments by embracing UDL, which will ultimately promote a diverse and inclusive culture. Obstacles occur in higher education level for students with autism including issues with communication, social interaction, and sensory sensitivity. In order to meet the needs of students with diverse learning styles and preferences, UDL provides a range of teaching techniques and assessment options. One way to guarantee that students can select the format that best meets their needs is to offer

lecture materials in numerous formats, such as text, audio, and video. Furthermore, providing alternate modes of completion for assignments such as oral presentations or visual projects which allows students with autism to emphasize their areas of strength.

AUTISM IN HIGHER EDUCATION INSTITUTIONS

According to Vincent (2019) the transition phase in adulthood is difficult for students with disabilities and it is supported by Wehman (2013). Studies showed that the transition from higher education for students with disabilities is challenging on a practical and psychological level. Great students if placed in the wrong situation can cause harm to them and others including the institution of higher education. Through this study, navigating good academic and social challenges can provide a good transition while educators can also contribute to how to overcome the academic and social challenges faced by students with autism in higher education. It also touches on the difficulties faced by autistic students in the transition phase at the higher education level. Research by Jackson et al. (2018) showed that more than 50% of students with autism considered themselves to not be academically successful, and were unhappy with their workload. When it comes to the transition to university, there is significantly less literature exploring students with autism's experiences or what factors can help them to make the transition as successful as possible. Significantly, suitable transition planning has been shown to be one of the strongest predictors of attending university for autistic young people, including taking part in events such as campus visits and meeting university staff members as stated by (Chiang et al., 2012; Retherford & Schreiber, 2015; Shmulsky et al., 2015).

Autistic students may have skills particularly suited to higher education institutions (HEI), such as proficient memory skills, a focus on detail, and creative thoughts, as well as passionate interests, and a strong desire to acquire accurate knowledge as explained by Drake (2014). Indeed autism presents heterogeneously there are also vast differences in coping mechanisms and skills in autistic students according to Gobbo et al. (2014). However, even when exhibiting some of these skills, autistic students have been reported to have a heightened risk for academic and personal challenges, and thus might not reach their full potential at university according to Pinder-Amaker (2019). Research suggests that autistic students are likely to be disadvantaged at university, with only 27% reporting that their social needs were met and 40% reporting that their academic needs were met as specified by Cai et al. (2016).

The inclusion of students with disabilities in higher education has been increasing according to Brett (2016); Swart and Greyling (2011). Internationally, the evolving education and disability legislation is making an important move towards promoting greater opportunities for individuals with disabilities, to enrol in, and complete higher education as claimed by Brett, (2016). Higher education policy across the globe has changed considerably following the amplified focus on inclusive practice in recent times as mentioned by Brett et al. (2016); Bergbäck and Blomberg (2016). Hence, there is an increasing number of individuals with disabilities, including those with ASD who enrol in higher education based on Barnhill (2016) and Bell et al. (2017). As students enrol in higher education, they must adjust to new surroundings, become familiar with new physical and social environments as well as the academic demands of the institutions. Studies indicate that compared to typically developing ones, students with autism are more likely to experience difficulties coping with postsecondary experiences. Consequently, evidence has identified transition as difficult for students with autism as explained by Anderson et al. (2018). Furthermore, it has been shown that individuals with autism experience significant transition challenges across the lifespan according to (Bolourian et al. 2019; Mandy et al. 2016 & Friedman et al. 2013). Transition difficulties in the autism population limit their academic progress, functional participation, and independent functioning as explained by Marsh et al. (2017).

More than 50% of autistic students considered themselves to not be academically successful, and were unhappy with their workload in accordance with Jansen et al. (2018). Focus groups have highlighted that students with autism often feel that peers or lecturers do not accept them or have insight into the difficulties they might face based on Dose et al. (2002). Similarly, Moriña Díez et al (2015) found that disabled students perceived lecturing staff as creating 'more barriers than bridges' in relation to inclusivity. A lack of training for these staff was identified as a persistent issue. Autism awareness and knowledge within HEI teaching staff is essential for providing students with an autism friendly university environment, where they can use their strengths to thrive. This supports Starr-Glass (2020)'s theory and emphasises the importance of making teaching staff aware of the challenges that autistic and otherwise neurodivergent students can face in their lectures. Complicating the issue further is the possibility that those with little knowledge about autism may be unaware of their own deficit in this area. Based on McMahon et al. (2020) explained that within the general population there was no relationship between scores on perceived autism knowledge and those on actual autism knowledge, and that those who were less knowledgeable overestimated their knowledge significantly. This misjudgement could lead to the educators

making assumptions about autism without consulting further information, resulting in lack of implementation of inclusive teaching practices. Often, the first hurdle for students with autism in receiving support within universities involves informing the university of their condition.

Autistic people often experience significant barriers to formal diagnosis in childhood, adolescence, or young adulthood, particularly for girls and women as explained by Bargiela et al. (2016) or those without additional intellectual impairments added by Mayes et al. (2014). Indeed, due to misdiagnosis, co-occurrence diagnoses, and stereotyped perception of autism there is increasing recognition of a 'lost generation' according to Lai and Baron-Cohen (2015); Stagg and Belcher (2019) of undiagnosed adults with autism that may represent up to 50–60% of the true autistic population as indicated by Baron-Cohen et al. (2009). Some of these people may never receive a diagnosis, or only receive it as adults. Even for those able to receive a diagnosis before arriving at university, many students are hesitant to share their autism diagnosis to the relevant service, fearing discrimination, bullying, stigmatisation, and a lack of understanding as claimed by Cai and Richdale (2016); Cox et al. (2017); Sarrett (2018) and Vincent et al. (2017). Lack of awareness and understanding HEI can result in a lack of appropriate teaching strategies and support mechanisms tailored to their unique needs. This gap underscores the importance of the development of comprehensive awareness programs within higher education institutions. By fostering an environment of understanding and inclusion, institutions can ensure that all students, including those with undiagnosed autism, have the opportunity to thrive academically and socially. Recognizing and addressing these needs is crucial for promoting equity, reducing barriers, and enhancing the overall educational experience for every student.

UNIVERSAL DESIGN LEARNING (UDL) CONCEPTS FOR AUTISM STUDENTS IN HIGHER EDUCATION INSTITUTIONS

Universal Design Learning (UDL) was developed by researchers Rose et al. (2002) at the Center for Applied Special Technology (CAST) and is based on a decade of neuroscience research that leads to variable assumptions in life and learning. UDL principles were developed following reauthorization in 1997 by the Individuals with Disabilities Education Act (IDEA). When developing an approach to teaching students with autism in higher education, it is important that the individuals being served are consulted. In surveying individuals on the autism spectrum who have gone through higher education, research 14 has found a need for more education on autism in higher education for both instructors and fellow students stated by Sarrett (2017).

Students will need different things and learn better when a variety of teaching methods are utilized added Sarrett (2017). Engagement, representation, and expression are the principles of UDL and it is accommodating the diverse needs of students with autism. One of the approaches in learning is UDL. This approach not only enhances academic performance and engagement for students with ASD but also fosters a more inclusive and supportive educational experience, promoting equity and accessibility for all students. When exploring the best strategies for inclusive education, viewing autistic learners through a strengths-based lens is important to ensure that their potential is recognised by Cosden et al. (2006).

Autistic learners often exhibit strengths such as visual processing, logical thinking, attention to detail, adherence to rules and routines, and strong motivation to engage with high-interest areas (Mitchell, 2010). Inclusive education, as defined by Alesech and Nayar (2020), is an approach that fully integrates children with special needs into age-appropriate classes in their local schools, ensuring they receive necessary adaptations and support services. Research by Waisman et al. (2022) supports the idea that teaching methods like Universal Design for Learning (UDL), which address the needs of diverse populations, can create a successful learning environment for students on the spectrum. Carrington et al. (2020) emphasize that educators who understand and implement UDL can effectively address the needs of autistic students by removing learning barriers and offering flexibility in teaching and planning. UDL is a proactive approach that aims to make learning and teaching more inclusive for all students, rather than merely accommodating those with sufficient support (Burgstahler, 2010). This approach is particularly important for conditions like autism, which may not be immediately visible to others (Zeedyk et al., 2019).

Students on the spectrum often face challenges with information processing and time management, especially in classroom settings and when completing homework, as they may struggle to stay focused on tasks (Van Hees et al., 2014). Interviews conducted by Cai and Richdale (2015) indicate that many individuals on the spectrum experience difficulties with executive function, leading to challenges in completing complex academic tasks. The need for autism-friendly lesson plans is evident from the first day of class, where expectations and information are shared. Autistic students often struggle to understand the expectations for instructor-student relationships and appropriate behavior in higher education settings (McMahon-Coleman & Draisma, 2016). Clear discussion of what is expected from students in the classroom is a great way to start off the semester with clarity that allows students on the spectrum to know the rules of conduct within the classroom. It is

recommended that instructors use visual aids and resources to help students structure and better conceptualize what is being learned according to Berkell Zager (2013).

Students with autism struggle with a lack of structure, creating that within the classroom allows them to better understand the material being presented by using multiple ways of teaching also extends to communication skills used in class. Group work is a part of higher education that teaches teamwork skills and communication and is greatly needed for students on the spectrum to learn what a group work environment looks like. Many students on the spectrum struggle with social interactions and knowing what roles to take in a small group, so an instructor may need to go over the roles of a team member in group and allow students to complete multiple roles over the course of their education. Berkell Zager (2013) also notes four important roles in group work, facilitator, timekeeper, recorder, and researcher. Students may take multiple roles at once and certain meetings may require some roles over others. Students may do more than one function at once, and certain meetings might call for more roles than others. Encouraging them to recognise and assume these roles during in-class and after-class group activities can significantly support and reinforce the acquisition of these competencies.

Furthermore, encouraging students to use a variety of communication channels, such as phone calls, email, discussion boards, and in-person interactions, helps them come up with more comfortable ways to stay in touch with their classmates and instructors. For students on the spectrum, bridging the communication gap can be achieved through encouraging and incorporating each student into class discussions. When teaching students using universal design, it is important that it reaches the students and is an important use of time and resources. In using a UDL course for first year college students Kumar and Wideman (2014) reviewed how this lesson plan helped the learning of students. By implementing UDL, educators can create more inclusive and adaptable learning environments that reduce barriers to learning, enhance student participation, and improve academic outcomes. This approach not only benefits students with autism but also enriches the educational experience for all students, fostering a culture of inclusivity and acceptance. As higher education institutions continue to strive for greater diversity and inclusion, embracing UDL principles is a crucial step in providing all students with the tools and support they need to succeed.

UDL PRINCIPLES TO SUPPORT LEARNING PROCESS OF AUTISM STUDENTS

Through UDL, students with autism in higher education can get the benefits because it provides a flexible and inclusive framework that can meet their various learning needs. CAST is a non-profit educational research and education centre that created the UDL guidelines according to Universal Design Learning Guidelines (2023). The three pillars of UDL are multiple means of engagement, representation, and action and expression, and a variety of practical strategies to implement these pillars are recommended by the Center for Applied Special Technology Center for Applied Special Technology (2020). Additionally, the UDL framework values diversity and considers a curriculum that eliminates or reduces barriers as the main tool to achieve it. Thus, each area of the curriculum should furnish multiple, varied, and flexible options for representation, expression, and engagement. UDL is used in special education settings and for students with disabilities as mentioned by Tobin et al. (2018). This modality was inspired by the 1950s architectural movement, "Universal Design" which focused on making architecture accessible and useful for the most diverse population of citizens possible. In teaching, UDL asks the educators to consider the diverse needs of their students and the students that will likely pass through their classroom. UDL will differ with your teaching style and classroom, but ultimately take the time to consider the needs of the students wherever they are in terms of their learning.

Burgstahler et al. (2015) highlight a range of UDL actions that could make post-secondary education more inclusive for autistic students. These actions include proactively communicating how students can discuss learning concerns and being approachable; regularly and clearly outlining expectations, such as the importance of treating other learners with respect and engaging in learning activities; assigning roles for each student within a group and scaffolding group work activities; allowing alternative means of participation, such as using post-it notes rather than speaking; recording lectures or making them available outside of live sessions; providing regular breaks; and dividing large tasks into smaller, manageable parts. Recent studies and systematic reviews have also emphasized the success of responsive, individualized teaching for autistic students (Austin et al., 2017) and the effectiveness of UDL for students with additional support needs across various outcomes (AlRawi et al., 2021). Ultimately, it is essential for teaching staff to understand that there are multiple ways for students to develop and demonstrate learning outcomes, and that doing so in an unexpected way does not diminish the quality of student learning.

The first principle is providing a number of representations means by presenting materials and information in the form of visual, audio, or audio-visual multimedia. The second principle provides different actions and expressions, facilitating students to explain their knowledge using digital software, such as a virtual keyboard that allows students to type without pushing the keyboard
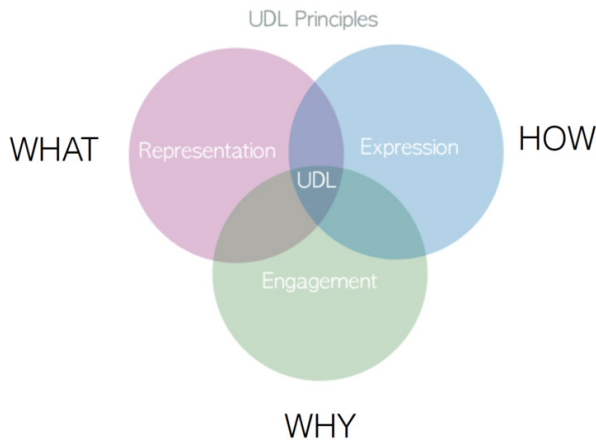
FIGURE 1 UDL Principles through "Venn Diagram" by University of Denver is licensed under CC BY 4.0/ Design modified from original.

buttons. The third principle proposes various means that facilitate students' involvement through the freedom to establish a comfortable learning environment using e-learning, enabling students to learn from anywhere according to Windy et al. (2020). When creating resources for learning and to make it autism friendly, it can seem overwhelming to try and create so many additional resources that a few students may use while others choose to ignore them or simply use the in-class material. Rather than creating hand-outs, videos and references all in one semester, it can be more adaptive to utilize the Plus 1 method of approaching UDL learning as explained by Tobin et al. (2018). The principle of multiple means of action and expression had the least participants providing the opportunities that autistic learners need to interact with accessible materials and tools, work toward goals, and make the most out of their learning. The low percentage of teachers providing options for adapted equipment, physical accessibility and ways to respond differently to the same learning task is concerning. This does not align with literature that states equity, diversity and inclusivity are vital to autistic learners as explained by Bolstad & Gilbert (2012) and Whaikaha – Ministry of Disabled People and Ministry of Education, New Zealand (2022).

The UDL framework has three guiding principles that guide educators to support all learners by providing multiple ways of engaging students, representing knowledge, and demonstrating understanding. These guiding principles are underpinned by nine guidelines, which are broken into 31 checkpoints that support students to access, build, and internalise skills. These highlight ways in which educators can design learning environments and programs that are accessible for all students and may guide them to set learning goals and plan curriculum, assessment, teaching

strategies, and resources to meet individual learning needs. The following section will provide an overview of the UDL principles, guidelines, and associated checkpoints by CAST (2018) which are detailed fully in Figure 2.

Principles	Guidelines	Checkpoints
Provide multiple means of engagement	Provide options for recruiting interest (7)[a]	Optimise individual choice and autonomy (7.1)
		Optimise relevance, value, and authenticity (7.2)
		Minimise threats and distractions (7.3)
	Provide options for sustaining effort and persistence (8)	Heighten salience of goals and objectives (8.1)
		Vary demands and resources to optimise challenge (8.2)
		Foster collaboration and community (8.3)
		Increase mastery-oriented feedback (8.4)
	Provide options for self-regulation (9)	Promote expectations and beliefs that optimise motivation (9.1)
		Facilitate personal coping skills and strategies (9.2)
		Develop self-assessment and reflection (9.3)
Provide multiple means of representation	Provide options for perception (1)	Offer ways of customising the display of information (1.1)
		Offer alternatives for auditory information (1.2)
		Offer alternatives for visual information (1.3)
	Provide options for language and symbols (2)	Clarify vocabulary and symbols (2.1)
		Clarify syntax and structure (2.2)
		Support decoding of text, mathematical notation, and symbols (2.3)
		Promote understanding across languages (2.4)
		Illustrate through multiple media (2.5)
	Provide options for comprehension (3)	Activate or supply background knowledge (3.1)
		Highlight patterns, critical features, big ideas, and relationships (3.2)

Principles	Guidelines	Checkpoints
		Guide information processing and visualisation (3.3)
		Maximise transfer and generalisation (3.4)
Provide multiple means of action and expression	Provide options for physical action (4)	Vary the methods for response and navigation (4.1)
		Optimise access to tools and assistive technologies (4.2)
	Provide options for expression and communication (5)	Use multiple media for communication (5.1)
		Use multiple tools for construction and composition (5.2)
		Build fluencies with graduated levels of support for practice and performance (5.3)
	Provide options for executive functions (6)	Guide appropriate goal-setting (6.1)
		Support planning and strategy development (6.2)
		Facilitate managing information and resources (6.3)
		Enhance capacity for monitoring progress (6.4)

*Bracketed numbers are specific for each guideline and checkpoint as per the UDL graphic organiser Version 2.2 from CAST (2018)

FIGURE Universal Design for Learning: Principles, guidelines, and checkpoints by CAST (2018).

The principles in UDL is essential in supporting the learning process of students with autism, ensuring they can access, engage with, and excel in higher education. As institutions strive to meet the needs of a diverse student body, integrating UDL principles is a vital step towards creating an environment where every student, including those with autism, can thrive and achieve their full potential.

UDL STRATEGIES INCORPORATE WITH TRANSITION PROGRAMMES IN HIGHER EDUCATION INSTITUTIONS

Cox et al. (2021) explained that one of the issues students on the spectrum have raised is that there is not enough awareness on campus both in and outside of the classroom. Therefore, allowing multiple ways for students to show their learning throughout the class can enhance the learning and strengthen those gateways and their interest in learning for students with autism and students without autism. Using a flexible learning method means of presenting information that considers technology, interactive learning, and learning objectives to reach participants has been found to be appropriate and useful for participants of diverse backgrounds. Before class even begins, it is important to consider how language and learning objectives come across to the student. When creating the syllabus, it is important to use clear language for all assignments as indicated by McMahon-Coleman and Draisma (2016) and Van Hees et al. (2014). Examples or references may be helpful for more complex assignments. Clear language is helpful for students on the spectrum who may not grasp vague directions. Anything that is not clear should also be discussed in class to offer clarification. Students on and off the spectrum may require direction before they are able to show their knowledge sufficiently. Throughout the semester offer multiple methods of testing and opportunities to show learning. No single assignment should ruin a student's chances to do well in the class. When planning assignments, it is helpful to test and assess knowledge often and with multiple methods in order to keep track of who is struggling and may need more assistance or help reaching out to tutoring and other resources as stated by Berkell Zager (2013). Giving small assignments often can allow you to see who is not understanding the lessons and where it may be helpful to offer greater flexibility. It is recommended that instructors give students multiple ways to show their learning through different forms of testing explained by Tobin et al. (2018). Being clear and concise and allowing students more opportunities to show their learning can make classes more successful for both neurotypical and neurodiverse students alike.

Learner variability is acknowledged within the UDL framework by recognising that each learner links the three networks of the brain such as affective, recognition and strategic in different ways, which influences the context in which learning occurs, emotional states of each learner, and the experiences, knowledge, interest and abilities that each child brings to the learning context as indicated by CAST (2018c) and Gordon et al. (2014). It is this combination that makes every experience unique for the learner, and which makes their learning variable according to Rose et al. (2002). UDL strategies, when incorporated with transition programs in higher education institutions, ensure a supportive and inclusive learning environment that caters to the diverse needs of all students, particularly students with autism, facilitating their successful adaptation and academic achievement. Having a variety of learning approaches and methods help the students with autism to grasp the content more effectively. One of the most popular learning tools for students in a higher education context is a complex, weighty textbook and students with autism often struggle in processing the information, which makes it difficult for them to learn content for classes. In addition to classroom changes to lesson planning, methods of engaging the student in growth have also been considered. A recognize, reframe, resolve (3R) model has been researched and considered for teaching students on the spectrum as explained by Cox et al. (2021).

A recent meta-analysis of literature by Capp (2017) examined studies which were published in peer reviewed journals between 2013 and 2016 (n=18) and utilised pre- and post-testing to evaluate 7 the effectiveness of UDL. Participants' use of strategies to plan curriculum and assessment, and utilise teaching strategies and resources, could be defined as fundamental elements of UDL according to CAST (2018). In addition, educators in this study discussed the importance of getting to know students on the autism spectrum so that they could identify "triggers", challenges, and strategies to help students either avoid or manage these challenges.

These strategies not only align to the principles of UDL but are examples of practices which have been classified as having a strong evidence base for students on the autism spectrum as explained by Odom et al. (2010). Somehow, this is relevant as educators support students on the autism spectrum in diverse classroom environments by planning multiple and flexible ways of presenting content and supporting engagement. Capp concluded that UDL is an effective teaching methodology for improving the learning process for all students, but noted that the impact on educational outcomes was not clearly demonstrated. By adopting UDL principles such as providing multiple means of engagement, representation, and expression the educators can create a flexible and inclusive learning environment that accommodates diverse learning styles and needs especially students with autism in higher education. Whilst, the transition programs which support students in adjusting to the academic and social demands in higher education, are enhanced when paired with UDL strategies. Additionally, the inclusive nature of UDL fosters a sense of belonging and community among all students, ultimately contributing to a more equitable and supportive educational landscape. As higher education institutions continue to evolve, the

integration of UDL with transition programs stands out as a best practice for promoting diversity, inclusion, and student success.

DISCUSSION

Transition support plays a critical role in addressing the social skills, self-advocacy, and self-determination challenges faced by students with autism as they navigate the shift from secondary education to higher education. This transition period can be particularly daunting, as it often involves adapting to new environments, expectations, and social dynamics. To effectively support these students, it is essential to provide direction and resources tailored to their unique needs. One framework that enhances transition support is UDL which creates an inclusive and adaptable learning environment that caters to a diverse range of students globally. By combining transition support with UDL principles, institutions can ensure that individuals with autism are not only academically prepared but also possess the skills and confidence necessary for success in higher education.

The transition to higher education presents numerous challenges for students with autism, impacting their academic performance and overall well-being. Academic success for these students hinges on the availability of inclusive practices, awareness campaigns, and efficient support systems. Higher education institutions that acknowledge and address the specific needs of students with autism can foster a more equitable and supportive environment. This commitment to inclusion not only benefits autistic students but also enhances the educational experience for all students, creating a more vibrant academic community. Incorporating the perspectives of students who have successfully navigated higher education is essential in the implementation of UDL. As noted by Hart et al. (2010) and Taylor and Colvin (2013), understanding the diverse experiences of individuals on the autism spectrum, as well as the broader student population, can inform the application of UDL principles in higher education. By creating adaptable learning environments through UDL, educators can support students with varying needs and foster a sense of belonging. This inclusive approach is critical in addressing the barriers faced by students with autism and ensuring they feel valued within the academic community.

Students with autism exhibit diverse learning needs and preferences, which necessitate a variety of teaching approaches. The UDL framework effectively meets these needs by focusing on three core principles: expression, representation, and participation. These principles emphasize the importance of providing multiple means of engagement, presenting information in various formats, and allowing students to demonstrate their understanding in different ways. This flexibility is particularly beneficial for students with "invisible" conditions, such as autism, where specific needs may not be immediately apparent. By proactively addressing these unique challenges, educators can cultivate a supportive environment that promotes both academic and social success for all students, including those on the autism spectrum. UDL acknowledges learner variability, recognizing that each student's unique experiences, emotional states, and abilities significantly influence their learning processes. This recognition is essential for developing effective teaching strategies that resonate with diverse learners.

Furthermore, incorporating UDL strategies within transition programs can facilitate a supportive environment tailored to the diverse needs of students, particularly those with autism. For instance, transition programs that integrate UDL principles can provide opportunities for students to engage in peer mentoring, access resources designed to enhance self-advocacy skills, and participate in social skills training. These elements are crucial for helping students with autism navigate the complexities of higher education and develop the necessary competencies for success. In addition to supporting academic growth, transition programs grounded in UDL can foster essential life skills, such as self-determination and self-advocacy. Empowering students with autism to articulate their needs and seek support when necessary is vital for their long-term success. By fostering an environment that encourages open communication and active participation, educators can help students build confidence in their abilities and navigate the challenges of higher education.

Ultimately, the integration of transition support and UDL in higher education represents a significant step toward creating a more inclusive academic landscape. By implementing comprehensive support mechanisms that address the unique needs of students with autism, institutions can cultivate a culture of acceptance and understanding. This approach not only benefits autistic students but also enriches the educational experience for all learners, promoting a diverse and equitable learning environment. In conclusion, the transition from secondary to higher education presents unique challenges for students with autism. However, by employing transition support and UDL strategies, institutions can create an inclusive culture that empowers these students to thrive academically and socially. The combination of targeted support and adaptable teaching practices ensures that all students, regardless of their learning needs, have the opportunity to succeed and achieve their full potential in higher education.

CONCLUSION

Transition support programmes effectively address these issues and integrate with the UDL concepts would make a big difference. Individualised learning plans, mentorship opportunities, and customised orientation sessions are a few examples of these kinds of programmes. In order for student with autism to succeed in higher education, it is essential that the transition support and UDL to be integrated. In conclusion, integrating the transition support and UDL in higher education institutions not only benefits students with but also enhances the overall learning experience for all students.

ACKNOWLEDGEMENTS

REFERENCES

American Psychiatric Association. 2013. Diagnostic and statistical manual of mental

disorders (5th ed. text rev.). https://doi.org/10.1176/appi. books.9780890425596.

Anderson, A. H., Carter, M., & Stephenson, J. 2018. Perspectives of university students with

autism spectrum disorder. Journal of Autism and Developmental Disorders, 48(3), 651-665. https://doi. org/10.1007/s10803-017-3257-3

Accardo, A. L., Kuder, S. J., & Woodruff, J. 2019. Accommodations and support services

preferred by college students with autism spectrum disorder. Autism, 23(3), 574–583. https://doi. org/10.1177/1362361318760490

Aguilar, P., & Heusser, P. 2022. The Geneva Global Hub for Education in Emergencies: A

new ally for education in emergencies. *Prospects*, 1-11.

Alesech, J., & Nayar, S. 2020. Acceptance and belonging in New Zealand: Understanding

inclusion for children with special education needs. *International Journal of Whole Schooling, 16*(1), 84–116.

AlRawi, Jamelh Moshbab, and Mohammed Ali AlKahtani. 2021. "Universal Design for

Learning for Educating Students with Intellectual Disabilities: A Systematic Review." International Journal of Developmental Disabilities, 1–9.

Altogether Autism. 2018. *Strengths and abilities in autism*. https://www.altogetherautism.org.nz/ strengths-and-abilities-in-autism/

Austin, Kimberly S., and Edlyn Vallejo Peña. 2017. "Exceptional Faculty Members Who

Responsively Teach Students with Autism Spectrum Disorders." Journal of Postsecondary Education and Disability 30 (1): 17–32.

Bakker, T.; Krabbendam, L.; Bhulai, S.; Begeer, S. 2019. Background and enrollment

characteristics of students with autism in higher education. Res. Autism Spectr. Disord, 67, 101424.

Bargiela, Sarah, Robyn Steward, and William Mandy. 2016. "The Experiences of Late-

Diagnosed Women with Autism Spectrum Conditions: An Investigation of the Female Autism Phenotype." Journal of Autism and Developmental Disorders 46 (10): 3281–3294.

Barnhill, G. P. 2016. Supporting students with Asperger syndrome on college campuses:

Current practices. *Focus on Autism and Other Developmental Disabilities, 31*(1), 3-15. https://doi. org/10.1177/1088357614523121

Baron-Cohen, Simon, Fiona J. Scott, Carrie Allison, Joanna Williams, Patrick Bolton, Fiona

E. Matthews, and Carol Brayne. 2009. "Prevalence of Autism-Spectrum Conditions: UK School- Based Population Study." The British Journal of Psychiatry 194 (6): 500–509.

Berkell Zager. 2013. Educating college students with autism spectrum disorders. Routledge.

https://doi.org/10.4324/9780203111109

Bolourian, Y., Stavropoulos, K. K., & Blacher, J. 2019. Autism in the classroom: Educational

issues across the lifespan. In Autism Spectrum Disorders-Advances at the End of the Second Decade of the 21st Century.IntechOpen. https://doi.org/10.5772/ intechopen.84790

Bolstad, R., & Gilbert, J. 2012. *Supporting future-oriented learning and teaching: A New

Zealand perspective*. Ministry of Education. https:// www.educationcounts.govt.nz/__data/assets/ pdf_ file/0003/109317/994_Future-oriented-07062012.pdf

Brett, M. 2016. Disability and Australian higher education: Policy drivers for increasing

participation. In A. Harvey, C. Burnheim, & M. Brett (Eds.), *Student Equity in Australian Higher Education* (pp. 87-108). Singapore: Springer. https://doi. org/10.1007/978-981-10-0315-8_6

Briggs, A. R. J., Clark, J., & Hall, I. 2012. Building bridges: Understanding student transition

to university. Quality in Higher Education, 18(1), 3–21. https://doi.org/10.1080/ 13538322.2011.614468.

Burgstahler, Sheryl E. 2010. "Universal Design for Learning in Higher Education." In

Universal Design in Higher Education: From Principles to Practice, edited by Sheryl E. Burgstahler and Rebecca

C. Cory, 1–26. Cambridge: Harvard Education Press.

Burgstahler, Sheryl, and Rosalie J. Russo-Gleicher. 2015. "Applying Universal Design to

Address the Needs of Postsecondary Students on the Autism Spectrum." Journal of Postsecondary Education and Disability 28 (2): 199–212.

Capp, M. 2017. The effectiveness of universal design for learning: A meta-analysis of literature

between 2013 and 2016. International Journal of Inclusive Education, 21(8), 791–807, doi: 10.1080/13603116.2017.1325074

Cai, and Richdale, A. L. 2015. Educational Experiences and Needs of Higher Education

Students with Autism Spectrum Disorder. Journal of Autism and Developmental Disorders, 46(1), 31–41. https://doi.org/10.1007/s10803-015-2535-1

Cai, Ru Ying, and Amanda L. Richdale. 2016. "Educational Experiences and Needs of Higher

Education Students with Autism Spectrum Disorder." Journal of Autism and Developmental Disorders 46 (1): 31–41.

Carrington, S., Saggers, B., Webster, A., Harper-Hill, K., & Nickerson, J. 2020. What

universal design for learning principles, guidelines, and checkpoints are evident in educators' descriptions of their practice when supporting students on the autism spectrum? International Journal of Educational Research, 102, 1–11. https://doi.org/10.1016/j.ijer.2020.101583

CAST. 2018c. *Universal design for learning guidelines*. https://udlguidelines.cast.org/

Center for Applied Special Technology. 2020. "Cast.org. 2021. CAST: About Universal

Design for Learning." http://www.cast.org/impact/universal-design-for-learning-udl.

Chan, C. C., Yusof, Y., Saad, Z. M., Ramli, F. Z., & Hillaluddin, A. H. 2022. Physical

Accessibility in Malaysian Higher Educational Institutions: Voices of Students with Disabilities. *International Social Work*.

Chiang, H. M., Cheung, Y. K., Hickson, L., Xiang, R., & Tsai, L. Y. 2012. Predictive factors

of participation in postsecondary education for high school leavers with autism. Journal of Autism and Developmental Disorders, 42(5), 685–696. https://doi.org/10.1007/s10803-011-1297-7

Clark, M. R. 2005. Negotiating the freshman year: Challenges and strategies among first-year

college students. In Journal of college student development (Vol. 46, 3, pp. 296–316). Johns Hopkins University Press.

Cosden, M., Koegel, L. K., Koegel, R. L., Greenwell, A., & Klein, E. 2006. Strength-based

assessment for children with autism spectrum disorders. *Research and Practice for*

Persons with Severe Disabilities, 31(2), 134–143. https://doi.org/10.1177/154079690603100206

Cox, Bradley E., Kerry Thompson, Amelia Anderson, Amanda Mintz, Taylor Locks, Lindee

Morgan, Jeffrey Edelstein, and Abigail Wolz. 2017. "College Experiences for Students with Autism Spectrum Disorder: Personal Identity, Public Disclosure, and Institutional Support."Journal of College Student Development 58 (1): 71–87.

Cox, Edelstein, J., Brogdon, B., & Roy, A. 2021. Navigating Challenges to Facilitate Success

for College Students with Autism. The Journal of Higher Education (Columbus), 92(2), 252–278. https://doi.org/10.1080/00221546.2020.1798203.

Davis, Watts & López. 2021. A systematic review of firsthand experiences and supports for

students with autism Spectrum disorder in higher education. *Res Autism Spectr Disord* 84 (June): Article 101769. (2021) 84:101769. doi: 10.1016/j.rasd.2021.101769.

Drake, Sara. 2014. "College Experience of Academically Successful Students with Autism."

Journal of Autism 1 (5). doi:10.7243/2054-992X-1-5.

EU Healthcare and Social Care News. 2020. https: // www.healtheuro pa.eu/can-we-

predi ct-autis m-spect rum-disor der-years -befor e-sympt oms-appea r/97748 /

Friedman, N., Warfield, M.E., & Parish, S. 2013. Transition to adulthood for individuals with

autism spectrum disorders: current issues and future perspectives. Neuropsychiatry, 3(2), 181-192. https://doi.org/10.2217/npy.13.13

Gobbo, Ken, and Solvegi Shmulsky. 2014. "Faculty Experience with College Students with

Autism Spectrum Disorders: A Qualitative Study of Challenges and Solutions." Focus on Autism and Other Developmental Disabilities 29 (1): 13–22.

Gordon, D., Meyer, A., & Rose, D. 2014. *Universal design for learning: Theory and*

practice. CAST Professional Publishing.

Happé, F., & Frith, U. (2020). Annual Research Review: Looking back to look forward–

changes in the concept of autism and implications for future research. *Journal of*

Child Psychology and Psychiatry, 61(3), 218–232.

Hart, D., Grigal, M., & Weir, C. 2010. Expanding the paradigm: postsecondary education

options for individuals with autism spectrum disorder and intellectual disabilities, Focus on Autism and Other Developmental Disabilities, vol. 25, no. 3, pp. 134-150.

Jackson, Scott L.J., Logan Hart, Jane Thierfeld Brown, and Fred R. Volkmar. 2018. "Brief

Report: Self-Reported Academic, Social, and Mental Health Experiences of Post-Secondary Students with Autism Spectrum Disorder." Journal of Autism and Developmental Disorders 48 (3): 643–650.

Jansen, Dorien, Elke Emmers, Katja Petry, Laura Mattys, Ilse Noens, and Dieter Baeyens.

2018."Functioning and Participation of Young Adults with ASD in Higher Education According to the ICF Framework." Journal of Further and Higher Education 42 (2): 259–275.

Järkestig Berggren, U., Rowan, D., Bergbäck, E., & Blomberg, B. 2016. Disabled students'

experiences of higher education in Sweden, the Czech Republic, and the United States – a comparative institutional analysis. *Disability and Society, 31*(3), 339-356. https://doi.org/10.1080/09687599.2016.11 74103

Kumar and Wideman, M. 2014. Accessible by design: Applying UDL principles in a first year

undergraduate course. Canadian Journal of Higher Education (1975), 44(1), 125–147. https://doi. org/10.47678/cjhe.v44i1.183704

Lai, Meng-Chuan, and Simon Baron-Cohen. 2015. "Identifying the Lost Generation of Adults

with Autism Spectrum Conditions." The Lancet Psychiatry 2 (11): 1013–1027.

McMahon-Coleman, & Draisma, K. 2016. Teaching university students with autism

spectrum disorder : a guide to developing academic capacity and proficiency. Jessica Kingsley Publishers.

McMahon, Camilla M., Brianna Stoll, and Meghan Linthicum. 2020. "Perceived Versus

Actual Autism Knowledge in the General Population." Research in Autism Spectrum Disorders 71:101499.

McNicholl, A., Casey, H., Desmond, D., & Gallagher, P. 2021. The impact of assistive

technology use for students with disabilities in higher education: A systematic review. Disability and Rehabilitation Assistive Technology, 16(2), 130–143. doi:10.1080/17483107.2019.1642395

Mandy, W., Murin, M., Baykaner, O., Staunton, S., Hellriegel, J., Anderson, S., & Skuse, D.

2016. The transition from primary to secondary school in mainstream education for children with autism spectrum disorder. Autism, 20(1), 5-13. https://doi. org/10.1177/1362361314562616

Marsh, A., Spagnol, V., Grove, R., & Eapen, V. 2017. Transition to school for children with

autism spectrum disorder: A systematic review. World Journal of Psychiatry, 7(3), 184. https://doi. org/10.5498/wjp.v7.i3.184

Mayes, Susan Dickerson, Susan L. Calhoun, Michael J. Murray, Amanda Pearl, Amanda

Black, and Cheryl D. Tierney. 2014. "Final DSM-5 Under-Identifies Mild Autism Spectrum Disorder: Agreement Between the DSM-5, CARS, CASD, and Clinical Diagnoses." Research in Autism Spectrum Disorders 8 (2): 68–73.

Mitchell, D., & Sutherland, D. 2020. *What really works in special and inclusive education:*

Using evidence-based teaching strategies (3rd ed.). Routledge.

Morgan, Jeffrey Edelstein, and Abigail Wolz. 2017.

"College Experiences for Students with

Autism Spectrum Disorder: Personal Identity, Public Disclosure, and Institutional Support". Journal of College Student Development 58 (1): 71–87.

Moriña Díez, Anabel, Rosario Gavira López, and Víctor M. Molina. 2015. "Students with

Disabilities in Higher Education: A Biographical-Narrative Approach to the Role of Lecturers." Higher Education Research & Development 34 (1): 147–1

Odom, S. L., Collet-Klingenberg, L., Rogers, S. J., & Hatton, D. D. 2010. Evidence-based

practices in interventions for children and youth with autism spectrum disorders. Preventing School Failure, 54, 275–282

Pinder-Amaker, Stephanie. 2014. "Identifying the Unmet Needs of College Students on the

Autism Spectrum." Harvard Review of Psychiatry 22 (2): 125–137.

Retherford, K. S., & Schreiber, L. R. 2015. Camp campus: College preparation for adolescents

and young adults with high-functioning autism, Asperger syndrome, and other social communication disorders. Topics in Language Disorders, 35(4), 362–385. https://doi.org/10.1097/TLD. 0000000000000070

Rose, Hitchcock, Jackson and Meyer. 2002. Teaching every student in the digital

age: Universal Design for Learning. Alexandria, VA: Association for Supervision and Curriculum Development. Volume 35, Issue 2. https://doi. org/10.1177/004005990203500201

Roux, A.M.; Shattuck, P.T.; Rast, J.E.; Rava, J.A.; Anderson, K.A. 2015. National Autism

Indicators Report: Transition into Young Adulthood; Life Course Outcomes Research Program, A.J. Drexel Autism Institute, Drexel University: Philadelphia, PA, USA.

Sarrett. 2017. Autism and Accommodations in Higher Education: Insights from the Autism

Community. Journal of Autism and Developmental Disorders, 48(3), 679– 693. https://doi.org/10.1007/ s10803-017-3353-4

Shmulsky, S., Gobbo, K., & Donahue, A. 2015. Groundwork for success: A college transition

program for students with ASD. Journal of Postsecondary Education and Disability, 28(2), 235–241.

Starr-Glass, David. 2020. "Significant Learning Experiences and Implied Students." On the

Horizon 28 (1): 55–62.

Swart, E., & Greyling, E. 2011. Participation in higher education: Experiences of students

with disabilities. *ActaAcademica, 43*(4), 81-110. Retrieved from https://scholar.ufs.ac.za:8080/xmlui/ bitstream/handle/11660/2833/academ_v43_n4_ a4.pdf?sequence=1

Taylor, C. M. & Colvin, K. L. 2013. Universal design: a tool to help college students with

Asperger's Syndrome engage on campus, About Campus,

vol. 18, no. 3, pp. 9-15.

Tobin, Thomas & Behling, K. 2018. Reach everyone, teach everyone : universal design for

learning in higher education (First edition.). West Virginia University Press

Universal Design Learning Guidelines. 2023. Center for Applied Special Technology.

https://udlguidelines.cast.org/more/about-guidelines-2-0/

Van Hees, Moyson, T., & Roeyers, H. 2014. Higher Education Experiences of Students with

Autism Spectrum Disorder: Challenges, Benefits and Support Needs. Journal of Autism and Developmental Disorders, 45(6), 1673–1688. https://doi.org/10.1007/s10803-014-2324-2

Vincent. J. 2019. It's the fear of the unknown: Transition from higher education for young

autistic adults. Volume 23, Issue 6. https://doi.org/10.1177/1362361318822498

Vincent, Jonathan, Megan Potts, Daniel Fletcher, Simon Hodges, Jenny Howells, Alex

Mitchell, Brett Mallon, and Thomas Ledger. 2017. "'I Think Autism is Like Running on Windows

Waisman, Williams, Z. J., Cage, E., Santhanam, S. P., Magiati, I., Dwyer, P., Stockwell, K.

M., Kofner, B., Brown, H., Davidson, D., Herrell, J., Shore, S. M., Caudel, D., Gurbuz, E., & Gillespie-Lynch, K. 2022. Learning from the experts: Evaluating a participatory autism and universal design training for university educators. Autism : the International Journal of Research and Practice, 13623613221097207–13623613221097207. https://doi.org/10.1177/13623613221097207

Wehman. P. 2013. Transition From School to Work: Where Are We and Where Do We

Need to Go? Volume 36, Issue 1. https://doi.org/10.1177/2165143413482137

Whaikaha – Ministry of Disabled People, & Ministry of Education. 2022. *Aotearoa New*

Zealand autism guideline: He waka huia takiwātanga rau (3rd ed.). Whaikaha – Ministry of Disabled People. https://www.whaikaha.govt.nz/assets/Autism-Guideline/Aotearoa-New-Zealand- Autism-Guideline-Third-Edition.pdf

Windy, Y. D., Ningtyas, K., Amilia, F., & Kamilah, N. 2020. Inovasi Model Desain Universal

untuk Pembelajaran Kebutuhan Khusus di Perguruan Tinggi. Pendidikan, 5(20), 24–29.

Zeedyk, Sasha M., Yasamine Bolourian, and Jan Blacher. 2019. "University Life with ASD:

Faculty Knowledge and Student Needs." Autism 23 (3): 726–736.

Universiti Kebangsaan Malaysia
P132526@siswa.ukm.edu.my

Hasnah Toran
Universiti Kebangsaan Malaysia
hasnahto@ukm.edu.my

Mohd Syazwan Zainal
Universiti Kebangsaan Malaysia
syazwanzainal@ukm.edu.my

Corresponding author: syazwanzainal@ukm.edu.my

Shameilla Kamarull Bahsha