Article

Navigating University: The Design and Evaluation of a Holistic Support Programme for Autistic Students in Higher Education

Charlotte Brownlow [1,2,*,†] , **Neil Martin** [3,†] , **Donna-Marie Thompson** [4] , **Amelia Dowe** [5] , **Ding Abawi** [6] , **Jessica Harrison** [6] and **Sonja March** [2,6]

1   Graduate Research School, University of Southern Queensland, Toowoomba 4350, Australia
2   Centre for Health Research, Institute for Resilient Regions, University of Southern Queensland, Springfield 4871, Australia; sonja.march@usq.edu.au
3   Technology Enhanced Learning Collaborative, Institute for Resilient Regions, University of Southern Queensland, Toowoomba 4350, Australia; neil.martin@usq.edu.au
4   Luna Clinical Psychology Services, Maclean 2463, Australia; director@lunaclinic.com.au
5   Student Academic Success, University of Tasmania, Hobart 7005, Australia; amelia.dowe@utas.edu.au
6   School of Psychology and Wellbeing, University of Southern Queensland, Toowoomba 4350, Australia; ding.abawi@usq.edu.au (D.A.); jessica.harrison@usq.edu.au (J.H.)
*   Correspondence: charlotte.brownlow@usq.edu.au
†   These authors contributed equally to this work.

Abstract: Successfully engaging with university study can be challenging for autistic students and has been highlighted in the research literature as an area of concern. This study sought to address support for autistic students at one Australian university through the development of a bespoke programme called A-Skills. The programme was co-designed with autistic students drawing on principles of self-determination theory and it aimed to develop study and student life skills. This paper presents a longitudinal evaluation of the programme using semi-structured interviews and user engagement metrics from the online platform. Our findings indicated that engagement with the programme varied between individuals but adopting a principle of co-design ensured that the topics of focus were important to the needs of the students it sought to support. Further, interview data suggested both positive sentiment and value towards the initiative amongst participants. Although online delivery enabled choice, there were potential challenges in fostering relatedness, which was addressed to some degree through synchronous online weekly sessions facilitated by an autistic student. Core to the success of A-Skills is the co-design approach as a central principle in the design, development and evaluation of the programme. With continued research and iterative design, the programme could be adopted more widely.

Keywords: autism; higher education; peer support; self-determination theory; online learning; co-design

1. Introduction

Successfully engaging and completing a higher education programme of study requires motivation, self-regulation and commitment. A contributing factor towards successful engagement and achievement within education is the ability to feel in control of the management of individual learning. Facilitating the capacity to self-regulate learning has become increasingly important as higher education populations become more diverse [1,2]. A body of research has demonstrated that levels of self-determination directly correlate with motivation, academic performance and wellbeing for people with developmental differences [3–7] including autistic learners [8,9]. This paper seeks to explore the challenges faced by autistic students within higher education and presents longitudinal design-based research [10], using a case example to explore the effectiveness of a design framework for an online co-produced programme created by autistic students and academics at one Australian university.

A 2022 Australian government report found that the educational outcomes of autistic people are worse than those of the general population, with particular challenges within the higher education sector [11]. Although the report indicated that the number of autistic students embarking on higher education study was rising, the success of these students was of concern. Many of these students were found to have experienced discrimination, isolation and low expectations of their educational journey. Recommendation 57 of the report specified the provision of relevant information for students and university staff as well as "widespread adoption of autism inclusion and peer mentoring programs" (p. xxxix). In a recent study by Fabri et al. [12], which explored the experiences of 16 autistic students, the provision of both choice and support were identified as key themes, with a specific call to action for the provision of joined-up services that support students in an inclusive way. Autistic students may therefore have specific needs in navigating through educational systems and may require extra support to be put in place to facilitate success.

A diagnosis of autism may describe difficulties with organisational skills and social communication, a dependence on routine and hyper- or hypo-sensitivity to sensory input and environmental stimulation [13]. Each of these challenges may require the individual to negotiate their educational experience, sometimes through accessing appropriate support services. To address some of these complex issues, a programme of support called A-Skills was developed, which is the focus of this study. A-Skills is based on the principles of self-determination theory (SDT) [14,15]. Its aim is to provide an autonomous space for autistic students to achieve individual success at university. Being peer-led, it also provides opportunities for growth for the peer leaders who adopt a facilitator and mentor role to the students. The university relevant to the present research has a large cohort of online students and is increasingly using digital-first approaches in both learning and teaching and academic support.

The theoretical framework adopted for this project was a combination of SDT and principles of the neurodiversity movement. Traditionally, autism has been theorised within the medical model, with a key focus on issues of "individual impairment" and "lacking in abilities". In contrast, the neurodiversity movement has adopted a narrative of difference rather than deficit and while challenges for individuals are recognised, these are seen as differences to support rather than deficits to change or realign [16]. This approach, therefore, enables the adoption of an abilities framework, which is suitable for considering a population of individuals who are academically high achieving as reflected in their enrolment at university, but who need additional and bespoke support in achieving success within this educational context. The concept of "success" adopted for this project was at its broadest level, with a recognition that for some students this may mean graduation, whilst for others it may mean navigating an individual course or complex social environment. For the purpose of defining terms in the present research, the use of the word autistic reflects the identity-first language convention and recognition of autism as an integral part of an individual's identity. It allows an individual to choose their identity and label as a reflection of pride [17,18]. However, where participants use other labels to describe themselves, these have been preserved (e.g., ASD).

Self-determination theory (SDT) is a broad psychological theory of human motivation, development and wellbeing that emphasises the importance of autonomy (as one of three universal basic psychological needs) in facilitating human natural tendencies for growth and complexity [19]. SDT has been employed to help explain motivational and engagement phenomena in research across multiple life domains, including education. Given SDT's high degree of empirical soundness, universal applicability and "heuristic quality" [20] (p. 257), it was selected as the main theoretical perspective to underpin the A-Skills programme. Further, as a theory that focuses on the innate capacity for growth and learning in all, we saw important overlaps with principles and perspectives of neurodiversity.

Autonomy is characterised as acting with a sense of openness, choice, awareness and genuine endorsement of one's behaviours and actions [21]. Autonomous behaviours coincide with individual interest or identification of things of personal importance or

value. Furthermore, from a lifelong developmental perspective, autonomy facilitates the integration and synthesis of such identifications within a coherent sense of self. Within different domains of life, being autonomous is not a given—indeed, autonomy is easily thwarted—and from an SDT perspective, requires support in an ongoing way within the social environment. Autonomy is therefore described as a basic psychological need, along with competence and relatedness, and is universally required by all humans throughout their lifespan. Autonomy can be contrasted with heteronomy or control, which in essence involves acting under conditions of pressure, contingency, compliance or seduction. In the absence (or thwarting) of autonomy, SDT scholars have offered strong evidence of reduced engagement [22], challenges to psychological development [23] and impoverished wellbeing [24,25].

In employing an SDT lens to inform the design of A-Skills, we, therefore, consider supporting autonomy to be crucial in fostering an engaging learning environment for participants. Besides autonomy, there are two other basic needs that are necessary to support motivation, human growth and flourishing. The need for competence is a need to learn and master new skills and to feel effective within one's capabilities [26] and is a concept well understood in other theoretical approaches to motivation, e.g., self-efficacy theory [27]. In addition, the need for relatedness is a need to form close attachments and authentic relationships with others as well as a need to socially belong. Each of the three needs were considered central in the successful creation of a peer support programme for autistic students, who as a population historically are often marginalised within some contexts, with feelings of autonomy, competence and relatedness frequently thwarted [28].

A central goal of A-Skills was to design a programme that would foster autonomous forms of motivation in autistic students towards their university studies. It was anticipated that if such a motivational climate could be created, then participants would more likely: (a) find the course interesting or enjoyable; (b) identify with the value of the skills being developed; (c) volitionally engage and persist with the course; and (d) integrate the skills learned with their university studies as well as other aspects of their lives. A design framework was therefore adopted that prioritised the support of the basic psychological needs of autonomy, competence and relatedness. For the purposes of this paper, we will primarily focus on the design aspects that supported student autonomy. This is not to negate the importance of supporting competence through effective learning design and scaffolding, or relatedness through the development of community and interpersonal relationships. Indeed, in creating the programme, session plans were intentionally aligned to one or more of the three universal needs, for example, as a planned activity to build competence with study skills or as guided discussions on social behaviour to enhance relatedness between participants. However, the SDT literature shows that autonomy support often addresses more than one need at the same time, i.e., autonomy support acts as "a contextual factor" [15] (p. 247). For example, a course in which educational material is communicated in an open, non-judgmental and non-contingent way not only supports autonomy but also supports relatedness (e.g., through building warmth and trust) and competence (by providing an unpressured space to organise ideas and learn things that are personally relevant).

2. The Development of A-Skills

This paper seeks to present a longitudinal exploration of A-Skills, detailing its initial presentation through to the final developed online platform. As such, the A-Skills programme has been designed for two contexts. Initially, face-to-face delivery of the programme was created, primarily designed as a learning support tool. Given the initial purpose of a learning support tool, it was important to evaluate the programme in an iterative way and therefore the formal programme evaluation undertaken in 2015 allowed for changes to be made based on formal and informal feedback and opportunities for continuous feedback, which was key in selecting a design-based research approach to the evaluation and further programme development [10]. Following this evaluation, A-Skills

Online was subsequently redeveloped to provide online access for non-campus-based students, with openly licensed content being repurposed and bespoke co-creation of content where necessary delivered through a learning management system (LMS). This paper will briefly outline the key findings from the evaluation of the face-to-face version of A-Skills before discussing the design framework that translated the programme into an online learning resource and providing an evaluation of the online version. The evaluation provided useful foundational data for an online presentation of the programme and, therefore, the design framework.

Face-to-Face Programme Evaluation of A-Skills

The A-Skills programme was conceived and developed by the third author following the identification of a current gap in service provision for autistic students who were studying at their university. Specifically, it was identified that students were reporting difficulties in managing the transition to a new tertiary environment (whether studying online or on-campus), understanding and managing study load requirements and communicating with academic staff. Discussions with students identified that specific difficulties experienced by students were leading to an erosion of students' motivation toward completing their goals, subsequent disengagement and, in some cases, abandoning their studies altogether.

The programme was developed drawing on a framework of self-determination theory [20]. In developing the programme, sessions were intentionally aligned to one or more of the three basic psychological needs as specified in the theory. These are summarised in Table 1 below.

Table 1. Summary of the in-person A-Skills programme.

Module	Content	Alignment with Basic Psychological Needs
Module 1	Welcome and introductions; planning for the semester; sharing experiences; sensory preferences	Autonomy, competence and relatedness
Module 2	Study skills and student support	Autonomy and competence
Module 3	Problem-solving; reframing; experiencing setbacks; creating new supports	Autonomy and relatedness
Module 4	Invited guest academic; communication with lecturers; looking after yourself	Competence and relatedness
Module 5	Looking after yourself; stress and anxiety management	Autonomy, competence and relatedness
Module 6	Stress and anxiety management; coping strategies	Relatedness
Module 7	Career advice; employment interviews; life on campus check-in	Autonomy, competence and relatedness
Module 8	Autistic employment mentor; employment and disclosure experiences; life on campus check-in	Autonomy, competence and relatedness
Module 9	Exam preparation; values and goals	Autonomy, competence and relatedness
Module 10	Exam preparation; values and goals; student support resources	Autonomy, competence and relatedness

In order to foster environments to support the three basic psychological needs, lesson plans were carefully developed and activities designed to encourage these. Modules were designed to address areas that may pose challenges for individuals such as managing social interactions with academics and other students, navigating an often overwhelming university environment and developing knowledge of support networks available. Group discussions were relaxed and informal and led by facilitators in order to enhance relatedness and prompt autonomous interactions within and beyond the group. Each face-to-face session was facilitated by peers, who were a combination of senior autistic students and senior neurotypical students, or recent graduates.

Evaluation of the face-to-face programme drew on a mixed methods research approach, encompassing semi-structured interviews and focus groups plus ratings of core elements of the programme via rating scales. This enabled a range of features to be considered and a diversity of perspectives from both facilitators and students to be captured. Ethical approval was sought and gained from the host institution and evaluation of the programme was undertaken at the three university campuses at which it was delivered (HREC approval number H15REA005). Due to space constraints, only a brief selection of the interview data is presented in this paper, and this has been organised to support the quantitative ratings provided by the students on the various elements of the programme.

Sixteen students participated in the initial programme, which was specifically designed for attendance by small groups of up to eight students in order to foster a supportive community and contribute to the autonomous development of participants. The programme evaluation sought to explore the following evaluative research questions:

- What are participants' attitudes to, and beliefs about, the support provided by the A-Skills programme?
- What specific areas of learning did A-Skills participants identify as being of most/least benefit?

In general, the A-Skills programme was perceived as positive by participants as measured by the rating scale utilised, with 1 being the least and 5 being the most positive. Summary figures for the autistic student participants are displayed in Table 2 below.

Table 2. Overall student reflections of the A-Skills programme.

Campus	Goals Were Met	Better Able to Manage Studies	Facilitators Were Supportive	Confidence in Facilitators	Overall Benefit
Campus 1	4.25	3.50	5.00	4.75	4.50
Campus 2	3.00	3.00	4.00	4.00	4.00
Campus 3	3.50	2.67	5.00	4.00	5.00
Total	3.58	3.06	4.67	4.25	4.50

Note: Scores reported are mean results of participant ratings.

The positive feedback as indicated in the rating scale scores was also reflected qualitatively in the semi-structured interviews and focus group discussions. However, some of the key reflections by A-Skills participants subsequently prompted changes to the design of the programme, which would most effectively be captured through online delivery and prompted a stronger focus on co-design for the new iteration. For example:

> [A-Skills] was good with the information given, going over some examples . . . sometimes there was a bit too much to take away into class . . . I still like to go back over stuff and see if . . . apply it more. (Campus 2 participant)

The opportunity to revisit information is something that can be more readily facilitated in the online environment and formed a key impetus in the translation of the programme. Similarly, the affordance of meaningful choice for participants was more limited in the face-to-face delivery, as all participants would be accessing sessions at the same time. In contrast, the design of A-Skills online could allow for individual variations to the programme. For example:

> I wish they had said this is the . . . beginners program, because I didn't know it was people who'd never studied before . . . I will sign up for everything . . . I was hoping to find out something that I didn't know and I didn't. (Campus 2 participant)

However, the opportunity to connect with like-minded others was raised as a positive to the programme, highlighting its role in fostering support despite the focus being on the management and development of skills for navigating university. For example:

> [A-Skills] makes uni much more interesting and enjoyable, the whole A-Skills thing because you meet people that make sense. (Campus 3 participant)

Although the programme sought to help develop general study skills, such as time management, fostering a sense of community with an autistic context seemed to be an important additional outcome. For example:

> I really haven't been in an environment where I could just be ASD, just be me but also people knowing that I have [autism] and accepting it. So I think this is the first environment I've been in where people know and they accept it and it doesn't matter and I feel like being accepted so much for all my weirdness . . . I think it's helped me to accept myself more and be more confident. (Campus 3 participant)

Similarly, the decision to peer facilitate the programme was considered important in its success:

> I would say peers [are preferable as facilitators for A-Skills], definitely, by far. Peers because professionals don't tend to listen very much and I'm big on people listening to you . . . when you're with people that are studying as well they can see where to go from your point of view. (Campus 1 participant)

> It's very important to have peer mentors and not to have academics because you can relate well to the facilitators that you have now and you can't relate as well to academics because even if they're not your lecturer, there's still that very full lecturer/student kind of relationship and there are boundaries in the peer mentoring kind of relationship in A-Skills but it's more relaxed and less hierarchical kind of relationship . . . they're just much more approachable. (Campus 3 participant)

With regard to specific topic focus for the sessions, employment and learning university processes were joint primary topics for focus of the programme, with participants rating these of equal benefit. In contrast, general study skills and, particularly, assignment and exam preparation, were rated as low in priority for participants. This is shown in Table 3 below.

Table 3. Summary of ratings of most useful study area.

Learning Area	% of Selections as Most Useful
Learning university processes	27%
Employment	27%
Meeting new people	22%
General study skills	18%
Assignment preparation	0%
Exam preparation	0%
Other	4%

These recommendations were taken forward in the design of A-Skills Online in the choice of topics for focus. Firstly, with a dedicated topic for employment-related issues and more focused engagement with understanding university processes and secondly, flexibility in content to be adaptable in appeal for those new to university and those established and focusing on transitioning beyond university. This was reflected in the design of the online version, which afforded personal flexibility in what information students chose to engage. Further, a newly designed online presentation of A-Skills was considered to offer more choice in meeting the specific needs of this student population and, therefore, possibilities of meeting basic psychological need satisfactions. The useful input from participants led to the adoption of a co-design approach in which multiple autistic students wrote or co-wrote relevant content. Indeed, some of the co-designers were previous A-Skills participants, perhaps suggesting a genuine endorsement of A-Skills as a programme and a feature of autonomy as characterised by SDT. The co-design aspects are explored further below.

3. Design Framework for A-Skills Online

The findings from the evaluation of the face-to-face A-Skills programme helped to shape both the structure and content of the online version and, again, core principles of SDT were drawn upon in refining the design [29]. One core aspect of the design was in crafting an authentic learning experience that addressed the key support needs of the students. A decision was therefore taken at the start of the project for it to adopt a co-designed approach and include input from autistic students, clinicians, autism researchers and design experts. The design team, therefore, drew on clinicians who worked internally and externally at the university, student support staff, teaching and research academics from the faculties and, crucially, autistic students. The design team thus captured a range of expertise. This group oversaw the prioritisation of materials through the creation of content structured into relevant topics and the organisation of content optimised for online learning. Additionally, autistic students who had expertise in some of the topic areas (e.g., self-advocacy and disclosure) were recruited to write some of the online information, which the design team edited, adding additional resources and activities where necessary. The adoption of such a model meant that the speed of the design process was at times lengthy due to the need to build in layers of discussions but the ultimate selection of topics for focus and the narrative for the site was authentically reflective of autistic student experiences and perspectives. Co-creation of knowledge concerning autism is a central focus for autism research in order for programs such as A-Skills to be appropriately targeted and something reflected in the broader autism literature (see, for example, work by Ashburner et al. and den Houting et al.) [30,31]. The programme was designed in order to allow for continued iterative co-creation of knowledge by the students engaged with the programme through online meetings and feedback and discussion of topics in the online course. Opportunities were, therefore, afforded for the students taking the course to co-construct information and direct discussions within the peer-led group. The final evaluation presented in this paper is co-authored by a neurodiverse authorship team, comprising autistic and neurotypical researchers and clinicians.

In designing A-Skills Online modules, key design elements were utilised in order to support autonomy, drawing on a framework established by Martin et al. [29] and underpinned by SDT. Whilst the framework specifies a number of elements that should be considered for online design, we highlight two particularly relevant aspects that promote student autonomy: The adoption of an internal frame of reference and a warm and appropriate communication style. In highlighting these two elements in our design choices, we sought to create an environment in which the students were volitionally engaged, felt intrinsically motivated and the basic psychological needs of autonomy, competence and relatedness were met. The new online context for A-Skills meant that content was presented asynchronously through screen interaction; therefore, great care was taken to adapt the experience to the new context.

3.1. Adopting an Internal Frame of Reference

An internal frame of reference (i.e., authentically and empathetically taking the position of the student) [32] was adopted throughout the design process and this was assisted through the establishment at the start of the project of the design team who ensured that content and design development were relevant and appropriate to the autistic community. Further, a series of personas were developed in order to ensure that the learning experiences of users could be tailored to individual needs and variations in understanding of measures of "success" could be captured and discussed, as these are determined by individuals. Personas have been used by those engaging in user-centred design processes for several years and are intended to provide realistic representations of users of a service [33]. The A-Skills Online personas detailed a range of experiences from a school leaver who has had their diagnosis supported throughout their educational career to a returning student who had already completed a first degree and who had received a diagnosis of autism as an adult. The personas ensured that the needs of different individual contexts were considered in the

design process and this complemented findings from the previous programme evaluation. At any point in the design and content development process, the needs of the student personas were reflected on to gauge the appropriateness of materials.

Having an internal frame of reference also helped in selecting important topics for inclusion. These topics were not arranged sequentially, but given equal weighting in the design and were established to be self-paced. This ensured that participants could select the topics of most relevance to supporting them in their own education and engage with these in a timeframe and order that suited them. There were no deadlines imposed on learning activities and choice opportunities were embedded wherever possible so that participants could engage with a mixture of content to preferred depths. For example, the end of each topic contained a section called "summary and finding out more". This section was designed to provide interested users with links to move beyond the information provided and find out more information about aspects such as the theory underpinning the course or support services external to the university. The specific topics focused on for the online offering of A-Skills were as follows:

- *Introduction:* This topic provided an orientation to the programme and how the materials were organised and paced. It also included practical and concrete information about the university campus through the development of an interactive map to visually show key areas;
- *Support within the university:* This topic provided a description of the internal support available to students and how students could access. The services ranged from general student support to more specific support concerning equity and wellbeing;
- *Disclosure and self-advocacy:* This topic introduced students to information about their rights as students and avenues to support advocacy and disclosure;
- *Setting yourself up for success:* This topic focused on the importance of good study habits and how to manage more stressful aspects of university education;
- *Persisting through challenges:* This topic explored developing problem-solving strategies and reframing negative experiences to manage what can often be overwhelming situations;
- *Looking after yourself:* This topic focused more specifically on managing wellbeing, with a particular focus on stress and anxiety;
- *Life after university:* This topic focused on planning for a future after university.

Additionally, a weekly online meet-up was designed to allow those who wanted to engage in real-time to do so. These were facilitated on Zoom in real-time by an autistic student who also managed the online platform (including forums). Students were asked via the online platform to suggest and vote for weekly topics including inviting guest speakers. Such speakers had expertise in particular areas pertinent to student life such as employment, self-advocacy, interacting with academics and study skill support through the library and other areas. In recognition of their expertise, the autistic student facilitators were paid.

3.2. A Warm and Appropriate Communication Style

The use of a co-design process also ensured that appropriate language and tone were used throughout the site. While there were several different authors, editing by the advisory group ensured that a singular voice was adopted that was warm, open and friendly and above all appropriate to the students who would be using the site. The adoption of a neurodiversity perspective of autism ensured that concepts of difference rather than deficit were the focus and the language used reflected this theoretical position. For example, a recognition of autism as an identity, as well as a label, was interwoven in discussions, particularly concerning self-advocacy and disclosure, and appropriate identity-first language was adopted. Additionally, the language used sought to be as literal as possible and no terminology ambiguities were intentionally drawn on as part of the site narrative (e.g., avoiding figurative language such as "are you feeling blue"?).

One of the core challenges for the online version of the programme was the management and fostering of relatedness, which has been highlighted as problematic in previous

research [34]. Discussion threads were placed at the end of each page, which covered a specific topic and participants were encouraged to share their personal perspectives and experiences if they felt comfortable in doing so. As well as being open for general commentary, reflective activities were also included to encourage targeted individual reflection and subsequent sharing of experiences. Facilitators who identified as autistic were employed to manage discussions. Facilitators were financially supported via the peer-assisted study sessions programme operating within the host university. As part of this programme, all peer facilitators are paid and undertake training associated with this role including supporting approaches to study, supporting health and wellbeing and referral services if necessary. This peer-led model ensured that power differences were minimised and that a mentoring process could flourish, where more experienced students could share how they navigate university and optimise their experience as an autistic student. The use of an online platform also presented additional challenges with regard to trust, confidentiality and respect, and therefore clear guidelines were established outlining expected online etiquette and clarity of messages.

4. Student Engagement with A-Skills Online

A-Skills Online was piloted in 2018 and has been presented on a semester basis ever since, with materials remaining open outside of teaching time. Positive outcomes from the pilot were the ability to access the materials at times convenient to the student and the ability to revisit resources at times most pertinent throughout the semester. This flexibility is something that is readily afforded in an online environment that is not so easily captured in face-to-face presentations. The online environment also enabled participants to focus on areas of individual need or interest rather than negotiating the priority of topic focus as part of a face-to-face group. However, while these were positive additions to the A-Skills programme, there continued to be a lack of engagement in online discussions and consequently one of the core tenets of SDT, relatedness, did not appear to be being met. In addition, in the quest to make the programme openly accessible to audiences both within and external to the host university, specific information pertinent to systems and processes at the host university was diluted and students were unsure as to who else might be participating in the online programme. A decision was therefore taken to move A-Skills Online to within the host university's learning management system, to increase confidence in the participants, being internal to the university, and also to provide familiarity with the platform as A-Skills would be delivered on the same system as other courses that students may be enrolled in. What follows is a report of engagement analytics with the in-house A-Skills Online between June 2019 and June 2022. This phase of the research was approved by the host university (HREC approval number H18REA140).

In total, 38 students enrolled in the programme between June 2019 and June 2022, culminating in 4049 unique participant interactions (views and posts) within this time period (see Figure 1 below). A participant interaction was measured by the learning analytics built into the learning management system as a specific interaction with a page, not the number of clicks an individual user made. Unsurprisingly, activity peaked during semester teaching times when the programme was actively facilitated. Other peaks included those that aligned with exam and assessment tines. However, there were some views between semesters, suggesting the resources were found to be useful by the students on a general basis, with revisiting of resources made possible with the move to online delivery. This had been a key issue highlighted by participants in the initial evaluation of the face-to-face presentation and something that was able to be addressed in the online version.

It is also apparent that the number of student posts did not necessarily reflect the predominant mode of engagement by students, with views consistently outnumbering active posts across the duration of the study. This suggests that while students may choose to remain "quiet" in the forums, they are nevertheless interacting with the materials in a manner that suits them.
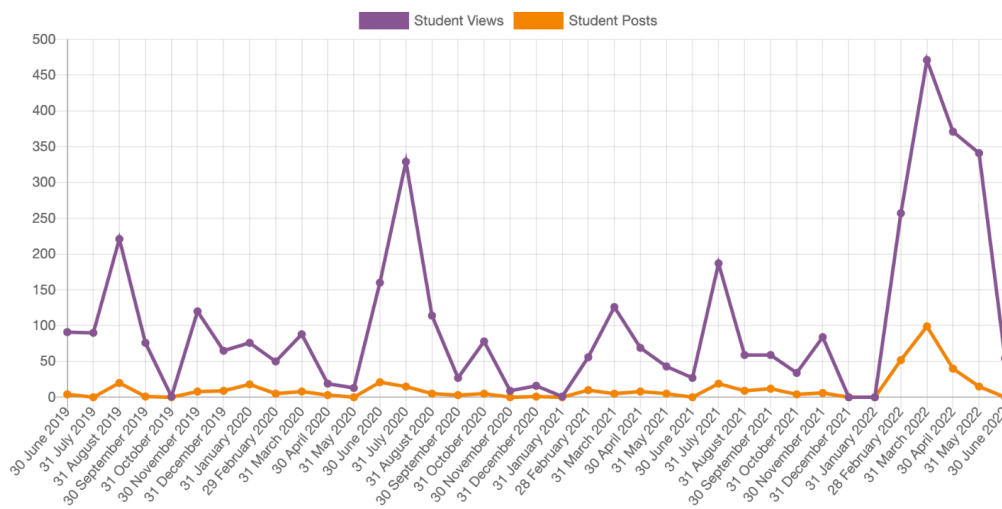
Figure 1. Activity graph of participant interactions by individual (*n* = 38; 4049 total interactions).

Further consideration of the interactions identified that there were some differences between individuals in terms of their frequency of interactions, as shown in Figure 2 below. We can see from examining the frequency of interactions that the majority of participants interacted between 1 and 151 times during the period of their enrolment, with a few over 150 times, up to 751 times. Given the small numbers, we would exercise caution in the interpretation of the higher interaction points. However, this may suggest that the flexibility afforded by moving the programme to an online mode allowed for diverse styles of engagement to be accommodated within a single presentation. This afforded opportunities for connection for a diverse group and accommodating specific student needs through flexible design. Students, therefore, did not need, or necessarily want, to complete the whole programme but rather valued having access to resources that are useful to them at a particular point in time.
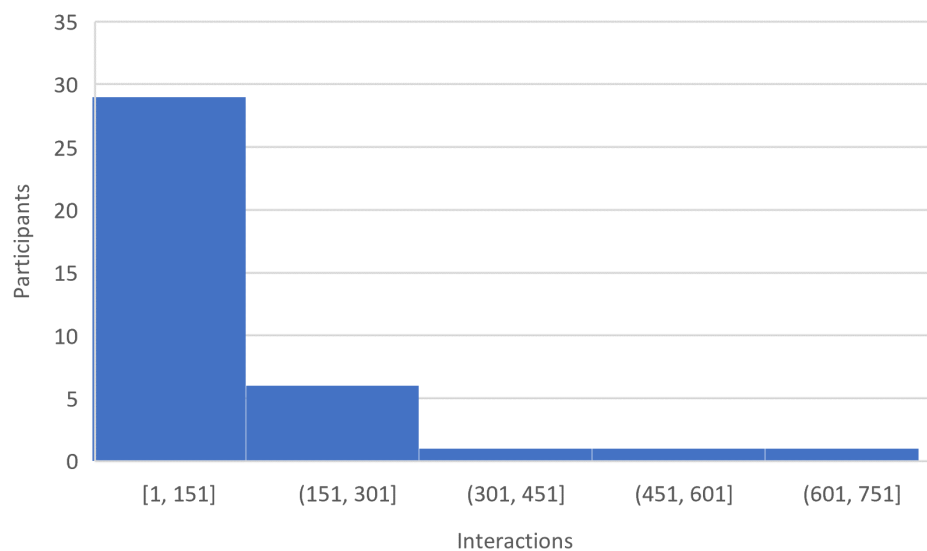
Figure 2. Frequency of participant interactions (*n* = 38).

We next considered the interactions based on the seven core topic areas developed for the online presentation. It can be seen from Table 4 below that students varied in their focus, with three topics receiving particular attention. Note that these are specific interactions with the topics rather than responding to questions or sharing in the social forum, reading facilitator posts or voting on what to cover in the synchronous online weekly sessions.

Table 4. Participant interactions with course topics.

Topic Focus	Participant Interactions
Support within the university	302
Introduction to A-Skills	233
Setting Yourself Up for Success	164
Persisting Through Challenges	98
Looking After Yourself	95
Life After University	68
Disclosure and Self-Advocacy	21

In line with the design focus on choice and autonomy, it can be seen that students focused on topics pertinent to them, with heavier engagement with elements concerning university support and educational success. Self-care was also a core focus, as indicated by the engagements with topics that provided techniques to support wellbeing. As earlier indicated, a series of weekly online social groups lasting about an hour were embedded within the teaching periods, facilitated by an autistic student, to complement and build upon the online content. These sessions were varying in their focus and were mutually agreed upon by the students attending. Their secondary aim was to allow for flexibility and community building amongst the student cohort in line with the SDT principles that governed the programme. On average, five students regularly attended each week.

5. Discussion and Conclusions

As a neurodiverse group of researchers, we have presented an account of the design of an educational skills programme specifically catering for autistic higher education students. The design of the programme was founded on an established theory of human motivation and wellness and incorporated the key tenets of neurodiversity. Further, the programme was evaluated in its initial on-campus presentation and, following a pilot, refined for an online learning context. A vital aspect of the new design was to incorporate autistic students both as co-designers and facilitators. We believe this shifted power towards the students and gave them an opportunity to develop tools to help other students navigate their way through university based on their own knowledge and experiences. Finally, the peer-to-peer aspect meant that the authentic life of being an autistic student could be harnessed as an educational scaffold through sharing and discussion.

The preliminary evidence presented here suggests that an intervention such as A-Skills has a role to play in engaging students and assisting them in navigating their way through the university experience. From the initial face-to-face presentation, feedback indicated that students expressed a strong positive sentiment and endorsement of the goals of the programme, and students, it would seem, valued the support provided and opportunities to link with other autistic students in a safe environment. Participant feedback indicated that they would welcome more choice in terms of the ability to revisit the information, and particularly to have the autonomy to select only topics that were pertinent to their needs. A-Skills online afforded these opportunities for flexibility, whilst maintaining a sense of community and connectedness through the weekly Zoom sessions. The engagement analytic metrics from a relatively small cohort of students ($n = 38$) suggest a degree of authentic engagement with the materials and complement the endorsements received from the feedback from the face-to-face presentation.

Limitations and Future Directions

A main limitation of the study was the lack of granularity in the engagement analytic metrics on offer from the university learning management system. Whilst we have some broad numbers, it is not possible to understand the quality of the engagement with materials; for example, how long students spent reading the material. Although not directly measured here, there is some indication that students often return to content, given the number of interactions versus the number of participants, and this would be in accordance

with the feedback we received from the initial presentation (i.e., students wanting repeat access to materials). Given the need for privacy and other ethical considerations, we are unable to report the type of discussions that took place in the forums and Zoom sessions. We, however, anticipate that these discussions were both rich and meaningful for the participants in line with the overall philosophy of A-Skills. Additionally, further research could explore the level of study of individual students and which elements of support were useful to students at a specific point in time.

Since A-Skills Online was launched in 2018, more research has emerged concerning the importance of support for autistic students at university. A scoping review by Morris and colleague [35] identified 15 unique programmes offered at higher education institutions in the USA, Canada, UK and Australia. Although these varied in specifics, the majority focused on the provision of general support in the navigation of university life. In contrast with A-Skills, the majority of programmes reviewed adopted an individual approach to mentoring, and the mentors were not typically autistic, a principle that was held as central for A-Skills. It was also unclear from the review how many of the programmes were collaboratively designed and developed with the autistic community. We suggest, therefore, that there are more opportunities for future work in the design and evaluation of programmes and the broader impacts of these in facilitating success within universities for autistic students. Furthermore, there is scope for refinement of agreed frameworks as to how such interventions are designed and, in particular, in paying close attention to the autistic voice. We would, therefore, suggest that future studies look beyond engagement and adopt a longitudinal approach to exploring the effectiveness of programmes such as A-Skills in achieving individual goals and increasing self-efficacy.

The 2022 Australian government report on autism [11] made a key recommendation for the provision of bespoke peer-to-peer support and relevant information for autistic university students. A-Skills is an example of such a programme that would fulfil this recommendation. We believe that such programmes should be intentionally designed with a strong theoretical framework to draw upon and with the central involvement of autistic students from project initiation right through to presentation. As we have mentioned previously, A-Skills takes an iterative approach, where subtle changes can be made to reflect the shifting and uncertain higher education landscape. Autistic students, like their neurotypical peers, are facing new issues around the cost of living, housing and repercussions from the COVID-19 pandemic. As part of our co-design approach, we can incorporate these changes into current and future iterations and therefore remain responsive to the needs of our autistic student community.

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