

Wilbraham, Susan ORCID: <https://orcid.org/0000-0001-8512-0041> , Jones, Emma, Brewster, Liz ORCID: <https://orcid.org/0000-0003-3604-2897> , Priestley, Michael, Broglia, Emma ORCID: <https://orcid.org/0000-0003-2137-8187> , Hughes, Gareth ORCID: <https://orcid.org/0000-0001-8190-0809> and Spanner, Leigh (2024) Inclusion or isolation? Differential student experiences of independent learning and wellbeing in higher education. *Education Sciences*, 14 (3). p. 285.

Downloaded from: <https://insight.cumbria.ac.uk/id/eprint/7571/>

Usage of any items from the University of Cumbria's institutional repository 'Insight' must conform to the following fair usage guidelines.

Any item and its associated metadata held in the University of Cumbria's institutional repository Insight (unless stated otherwise on the metadata record) may be copied, displayed or performed, and stored in line with the JISC fair dealing guidelines (available [here](#)) for educational and not-for-profit activities

provided that

- the authors, title and full bibliographic details of the item are cited clearly when any part of the work is referred to verbally or in the written form
- a hyperlink/URL to the original Insight record of that item is included in any citations of the work
- the content is not changed in any way
- all files required for usage of the item are kept together with the main item file.

You may not

- sell any part of an item
- refer to any part of an item without citation
- amend any item or contextualise it in a way that will impugn the creator's reputation
- remove or alter the copyright statement on an item.

The full policy can be found [here](#).

Alternatively contact the University of Cumbria Repository Editor by emailing insight@cumbria.ac.uk.

Article

Inclusion or Isolation? Differential Student Experiences of Independent Learning and Wellbeing in Higher Education

Susan J. Wilbraham ¹, Emma Jones ², Liz Brewster ^{3,*}, Michael Priestley ⁴, Emma Broglia ⁵, Gareth Hughes ⁶ and Leigh Spanner ⁷

¹ Institute of Health, University of Cumbria, Carlisle CA1 2HH, UK; susan.wilbraham@cumbria.ac.uk

² School of Law, University of Sheffield, Sheffield S10 2TN, UK; emma.j.jones@sheffield.ac.uk

³ Lancaster Medical School, Lancaster University, Lancaster LA1 4YW, UK

⁴ Department of Psychology, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London WC2R 2LS, UK; michael.1.priestley@kcl.ac.uk

⁵ Department of Psychology, University of Sheffield, Sheffield S10 2TN, UK; e.l.brogia@sheffield.ac.uk

⁶ Student Wellbeing, University of Derby, Derby DE22 1GB, UK; gareth@studentminds.org.uk

⁷ Student Minds, London OX1 3DH, UK; leigh@studentminds.org.uk

* Correspondence: e.brewster@lancaster.ac.uk

Abstract: Independent learning is frequently identified as instrumental to student success within higher education. Although there is a significant body of literature demonstrating the importance of independent learning for retention and progression, to date, the relationship between independent learning and student wellbeing within higher education has been under-explored. This article addresses the gap in the literature by interrogating this relationship, with a particular emphasis on the barriers and enablers to independent learning and the implications for the wellbeing of university students as part of a whole university approach. Drawing on data from a large national student survey and nine focus groups with university staff conducted during the formulation of the University Mental Health Charter, the findings demonstrate important intersectionalities between independent learning and student wellbeing. In particular, they highlight that facilitating independent learning has the potential to allow students to flourish in higher education but only when factors relating to accessibility, inclusivity, expectations, and goals are explicitly addressed. Going forward, it is imperative that these links are more widely acknowledged and addressed within higher education research, policy, and practice to ensure that students are supported to develop as learners during both their transition into university and their journey through and beyond their studies.

Keywords: wellbeing; independent learning; higher education; inclusion; isolation; students



Citation: Wilbraham, S.J.; Jones, E.; Brewster, L.; Priestley, M.; Broglia, E.; Hughes, G.; Spanner, L. Inclusion or Isolation? Differential Student Experiences of Independent Learning and Wellbeing in Higher Education. *Educ. Sci.* **2024**, *14*, 285. <https://doi.org/10.3390/educsci14030285>

Academic Editor: Helen Payne

Received: 7 February 2024

Revised: 1 March 2024

Accepted: 6 March 2024

Published: 7 March 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Existing evidence indicates that students in higher education institutions are reporting elevated and increasing levels of psychological distress, with a corresponding increase in demand for university mental health services [1–3]. It has been estimated that 29% of students report clinical levels of distress [4], with mental wellbeing decreasing upon entry to university and not returning to pre-university levels until after graduation [5]. Transition into higher education has consistently been highlighted as a particular stressor, with students often experiencing the unfamiliar academic demands and expectations of university as challenging, stressful, and anxiety-inducing [6,7]. Another commonly identified stressor is the requirement for students to undertake a significant level of independent learning [8], a practice that has been described as ‘one of the cornerstones of UK higher education’ [9]. To date, there is little understanding of how different pedagogical styles and strategies can impact student wellbeing, both positively and negatively, while at university [10,11].

Wellbeing has been defined as ‘encompass[ing] a wider framework, of which mental health is an integral part, but which also includes physical and social wellbeing’ [12]. In the

UK the growing interest in ‘a whole university approach’ to student mental health, ‘which recognises that all aspects of university life can support and promote mental health and wellbeing’ [12], underscores the imperative to investigate how student wellbeing can be influenced by academic policies, processes, and pedagogy [13]. Developed by the charity Student Minds, the University Mental Health Charter (‘the Charter’) seeks to inform and incentivise UK universities to adopt a holistic and inclusive ‘whole university approach’ in practice, wherein ‘Learn’ constitutes one of four core domains with themes relating to transition, teaching and learning, and progression [12]. The Charter’s principles underline the need for teaching practice to support wellbeing by ‘enabling all students to develop skills, confidence, academic self-efficacy and improve performance’ [12]. The operationalisation of an effective ‘whole university approach’ therefore demands an evidence-informed conceptualisation of the barriers and enablers to independent learning and the relationship with student wellbeing to proactively support the diverse experience of the whole university community [14]. This paper draws on data collected as part of the Charter consultations (see Design and Methodology) to explore the relationship between independent learning and student wellbeing. It highlights key issues to consider in supporting students’ development of independent learning skills as part of a whole university approach to wellbeing.

1.1. Independent Learning

In the UK, independent learning is a key part of the expectations around educational outcomes and educational systems [15]. Contemporary practitioner guidance and constructivist educational philosophy advocate active, autonomous, and student-centred pedagogy in higher education settings to promote independent learning over didactic passive instructional methods [16]. In particular, cognitive constructivist theories focus on the need for students to ‘...construct knowledge by transforming, organizing, reorganizing previous knowledge’ [17]. Independent learning is ‘a process during which learners develop the values, attitudes, knowledge, and skills needed to make responsible decisions and take appropriate actions in regard to their own learning’ [18]. Therefore, constructivist approaches to higher education involve a focus on students as independent learners who will construct and engage with their own meanings and interpretations. This focus positions educators as facilitators of independent learning who retain an active role in scaffolding the students’ journey, providing sound foundations from which learning becomes increasingly independent [19,20]. This includes fostering students’ metacognition, so they can understand and regulate their own learning processes [18,21]. At its core, independent learning involves taking active responsibility to self-direct one’s own learning practices, self-evaluating and monitoring academic progress, and developing an ability for inquiry, exploration, and critical evaluation [18,22,23]. Independent work is also identified as a key graduate attribute by employers [24] and has been found to improve academic performance, motivation, and self-efficacy [18].

1.2. Independent Learning and Wellbeing

Despite the importance of independent learning in higher education, many students find that the transition to independence can lead to increased levels of stress and anxiety [7]. Existing evidence suggests that unfamiliarity with academic demands and expectations of independent learning and/or inadequate guidance from teaching staff can decrease self-efficacy [25], and reduce both wellbeing and examination performance, with some students describing uncertainty, anxiety, procrastination, and lack of motivation when engaging in independent learning [9,26]. Where parallels with deep learning and learner autonomy [9] suggest that fostering independent learning may support long-term wellbeing [27], the lack of explicit explanation of what is expected, and the skills required to achieve this, has been identified as a ‘significant student wellbeing issue’ [8]. There are implications for wider issues of equality, diversity, and inclusion within higher education, given that students from non-traditional backgrounds may lack the cultural capital to anticipate and adapt

to the demands for increased levels of independent learning [28,29]. Indeed, evidence suggests international students [30] and students from non-traditional backgrounds [26] may particularly struggle to navigate academic expectations, expecting a didactic approach with greater teacher input.

Against this backdrop, this study explores a subset of the data collected for the Charter with the aim of investigating the barriers and enablers to independent learning in university settings (as perceived by both staff and students) and the intersections with student wellbeing. Using both qualitative and quantitative analysis of data with students and staff, these findings can inform strategies to support independent learning and address the consequences for student wellbeing in line with the Charter's principles of good practice.

2. Materials and Methods

The dataset includes the results from transcripts of focus groups with university staff held in six locations across the UK as well as a cross-sectional UK-wide student survey. The authors were part of a wider research team involved in data collection on behalf of Student Minds. Each data collection instrument was designed to inform the development of the Charter [12]. These datasets are explored complementarily, providing an overview of trends in the student population and rich perspectives from a range of staff. The paper's overall research question was 'what is the relationship between independent learning and student wellbeing within higher education?'. A data-driven approach was implemented that first extracted key themes from the staff focus group data to inform the interrogation of student survey data, using a qualitative approach with complementary quantitative follow-up [31]. For example, as equality, diversity, and inclusion were key themes, the authors then reviewed survey questions that covered the topic to understand whether these themes were reflected in student experiences as captured in the survey data. This multi-modal approach of beginning with qualitative data and then developing it via quantitative insights has been recognised as assisting in capturing multi-dimensional experiences and avoiding an artificial divide between macro- and micro-level factors [32]. The configuring or meshing of both data types enabled the further extension of focus group themes via the survey data [32,33].

These data were collected prior to the pandemic and so do not cover shifts to remote or hybrid learning, which may have affected experiences of independent learning and could be the subject of future research. Ethical approval for data collection was given by the University of Derby Arts Humanities and Education research ethics committee.

2.1. Data Collection and Analysis: Staff

Participants from 181 different higher education institutions attended the Charter consultation focus groups, but to maintain anonymity, we refer to data using the host university name (Strathclyde; Staffordshire; Cardiff; Leeds; Ulster; University of the Arts, London (UAL)). Participants had a diverse range of responsibilities within their university, including some with direct responsibility for student mental health (e.g., counselling services) and others with broader academic, professional, and/or leadership roles. Whilst analysis is contextualised against the entire dataset of 93 focus groups, befitting a whole university approach, data shared in this paper are taken from nine focus groups on student mental health, learning, and the role of academics as the only groups focused specifically upon learning. These focus groups, in which 33 university staff members contributed, ranged in size from 2–9 participants per group and predominantly contained academic staff at all levels of seniority and experience, with some professional services staff (e.g., learning developers).

Questions explored relationships between student learning, curriculum design, and student mental health, including if any particular types of student learning activity were more problematic in terms of student mental health (Table 1). All focus groups were audio-recorded and fully transcribed for analysis; each lasted approximately 60 min, and all were facilitated by an experienced member of the Charter's research team. The focus

group transcripts were thematically coded, using a reflexive, emergent structure [34,35], which took ‘independent learning’ as an initial concept for analysis. Two researchers independently coded the focus group transcripts, following detailed discussions to ensure consistency, with all authors collaboratively reviewing the themes and contributing to the analytical process.

Table 1. Focus group questions.

Do you see any relationship between student learning and mental health? If so, what is the relationship?	Research suggests that deep learning is associated with better wellbeing and higher achievement. How ready are your students to engage in deep learning as opposed to surface learning? Have you found any strategies that help or persuade students to move from surface to deep learning?
Do you believe the way in which the curriculum is designed and taught can have either positive or negative effects on student mental wellbeing?	Can a strong focus on grades on the part of a student have any impact on the student’s mental health?
Do you believe wellbeing support should be embedded in the curriculum?	How able are your students to take confidently control of their own learning? At what stage are they able to do this and how do they get to this point?

2.2. Data Collection and Analysis: Students

Qualitative and quantitative student survey data were collected online in 2019 by Student Minds to establish a cross-sectional comparative representation of diverse student experiences in the UK. The survey formed part of national research and consultation activities that were conducted to inform the development of the Charter [12]. The survey opened with the following explanation “The Student Survey asks a range of questions relating to your experience of mental wellbeing at university, and gives you space to share your thoughts and ideas on what the Charter should look like”. The term “mental wellbeing” was left open to the interpretation of respondents and were advised that the survey was “investigating the experiences, perceptions and attitudes of staff and students in relation to mental wellbeing”.

All undergraduate and postgraduate students at UK universities were eligible to participate and were recruited via Student Minds’ communication networks. A total of 1032 students completed the survey, though not all students answered all the questions. Incomplete responses were retained. For the purpose of the current paper, data relating to equality, diversity, and inclusion were extracted from the student survey to further explore the themes from staff focus group data. Students provided demographic information relating to age, gender, disability, and LGBTQ identity; these data allowed for a cross-group comparison of relevant quantitative data. Open-text questions provided qualitative data from which relevant comments were taken. Demographic information was extracted alongside key questions to contextualise the intersectionality between students’ characteristics, wellbeing, and independent learning. Group means were explored across demographic groups (e.g., gender, ethnicity, student status) for the following questions to explore the potential differential experiences of different student groups:

- How much of an impact does your mental wellbeing have on your academic learning and performance?
- How much of an impact does the quality of your learning and academic performance have on your mental wellbeing?
- How confident are you that you will have the skills, resources, and knowledge to be successful when you leave university?

Question responses were rated on a 5- or 7-point Likert scale from ‘not confident/disagree’ to ‘confident/agree’. For the purpose of this study, students’ responses were grouped into ‘disagree/low confidence’ and ‘agree/high confidence’ in order to identify specific student groups that were positively or negatively affected by the experiences described. Students

who responded in the middle of a Likert scale were removed to ensure that these responses did not inflate either positive or negative experiences. The quantitative survey data was analysed using SPSS statistics package (version 20).

Data from open-text responses were included where these data explored concerns around independent learning, where students were asked ‘what aspect of your learning, teaching, and assessment has the most negative and/or positive impact on your mental wellbeing?’; 912 students provided a ‘negative’ and 866 provided a ‘positive’ example. Free text responses were reviewed and thematically coded by one author, using the same approach as for staff focus group data and taking ‘independent learning’ as an initial concept for analysis. All authors collaboratively reviewed this coding and themes, ensuring analytical rigour.

2.3. Limitations

The strengths of this research include the large sample size and a national dataset, as well as the inclusion of both staff and student perspectives, although the self-selecting method of recruitment may have encouraged those with stronger opinions on these topics to participate. Future studies may wish to adopt purposeful sampling techniques to engage staff and students with barriers to participation and to explore intersectionality in experiences of independent learning in greater depth. It is also noteworthy that the term “mental wellbeing” was left to the interpretation of the respondents, and, therefore, individual understandings of mental wellbeing cannot be accounted for in our analysis. More recent studies emphasise the importance of using clear language and definitions for mental health, wellbeing, and mental wellbeing [36,37], and future research should consider defining or even measuring these constructs to improve clarity and data integrity.

3. Results

Taken together, the findings demonstrate important intersectionalities between independent learning and student wellbeing. In particular, links between independent learning and wellbeing, and equality, diversity, and inclusion were identified in both the staff focus group and student survey data. The findings from each dataset are presented in turn.

3.1. Staff

Three key themes were identified within the staff focus group data: namely, equality, diversity, and inclusion; student mindset; and the scaffolding of development. Overall, staff participants highlighted that particular student demographics encounter additional challenges and barriers to independent learning, and subsequently experience additional stress, distress, and anxiety. Moreover, student expectations of higher education as a commodity can prevent engagement with independent learning, with the weighting placed on academic outcomes increasing stress, distress, and desire for support. The findings demonstrate that while independent learning has the potential to allow students to flourish in higher education, without consideration of inclusivity, structure of teaching, and student mindsets, it can negatively impact both academic performance and student wellbeing.

3.1.1. Equality, Diversity, and Inclusion

In recent years, universities have widened participation in higher education and have recruited students from more diverse backgrounds [28]. Staff described how diversity in student background was associated with different preparedness and familiarity with the ‘rules’ of academia. Issues such as prior educational experience, age, socio-economic status, disabilities (in particular mental health conditions), commuting students, and international students were all highlighted as potentially impacting students’ readiness to learn independently, as well as the levels and forms of support required. For example, conflicting demands on time, such as childcare commitments, prevented some students from accessing the full range of support available.

'We were talking about controlling their own learning, there are many things that are outside of my students' control, like the hours that they can work, the space that they have to work, the money that they have to buy resources.' (Strathclyde)

Individual differences were identified as impacting students' ability and willingness to undertake independent learning based on varying student approaches to learning and personalities (Strathclyde) and specific personality traits (Cardiff, Leeds, UAL).

There were repeated references to previous educational experiences 'not preparing' students for university study, highlighting the widely-held view that higher education requires a different way of studying with different aims.

'They don't know what the rules are anymore because the rules are different to how you do education at school.' (Strathclyde)

This lack of knowledge of 'the rules' could present a challenge to students' wellbeing, and their sense of self: While they had previously been successful learners, the change in focus at university meant that the strategies they had used to establish this identity no longer worked. In particular, the unstructured nature of the independent study meant inexperienced or unskilled students were overwhelmed by expansive choice architecture and often struggled to judge what to do, or how much to do; something that caused anxiety.

'I think that it makes a lot of people very unwell, I think it makes people very isolated and I think people do it and they are productive because they have to.' (UAL)

'There's a greater onus on individuals being adults and acting in an adult way [...] students, quite often, they'll struggle. What you'll see is an exponential increase in their overall levels of stress, which then translates into distress and then we have problems.' (Ulster)

3.1.2. Student Mindsets and Staff Expectations

Staff described the ways in which attitudes, expectations, and goal orientation could impact independent learning. When discussing student approaches to learning, participants emphasised an 'unhealthy perfectionism' (Cardiff) or 'competitiveness' (Leeds) among students, particularly where students were used to a high standard of academic attainment.

'If one thing goes wrong or if they fail an exam, because they've had a bump in the road in their learning, that shatters their whole self-esteem.' (Leeds)

It was suggested that the focus on academic outcomes could lead to students prioritising academic achievement over their wellbeing during independent learning, with a UAL participant noting 'some of my students who do best in our academic set-up at the moment are the illest' [UAL]. In the same focus group, it was noted that students may experience a sense of shame if they find independent learning challenging.

Nevertheless, academics' expectations around how students should work independently, ask questions, and engage with content were described by participants as tacit rather than clearly conveyed to students. For example, the purpose of 'office hours' was evoked as an unfamiliar structure that students were unable to use effectively to support their independent learning. Some participants emphasised how universities could respond differently to the difficulties experienced by students during the transition to independent learning, indicating that, rather than denigrate inadequate previous educational experience, there was a need to explicate what had changed, to scaffold the path to independence, and help students to make the most of university education. It was suggested that, while university staff saw study as a process of growth, stretch, and change, the expectation that university should be challenging was not clearly articulated to students, leading to a disconnect between the aims of university staff and the expectations of students. Participants noted that some students perceived a lack of explicit guidance during independent learning tasks as a lack of desire to help.

'We understand, as teachers, that learning is about struggle, and we try and sort of design that almost. But we're not very good at helping them [the students] understand that and getting through that.' (UAL1)

'People don't feel like tutors want to help and there's this feeling of complete isolation and you end up having these essay crises which are very avoidable if you just had a bit of guidance.' (UAL)

This idea that learning should contain a degree of difficulty or struggle to be worthwhile elicited a difference between staff and students' expectations of the purpose of university education, compounded by the commodification of education. The independent learning process was mostly presented in staff focus groups as a positive opportunity for growth but could be seen as in tension with other motives for attending university—a tension infusing student emotional disengagement and dissatisfaction with independent learning. Whilst staff saw university as a place that supported and encouraged learning for its own sake, staff perceived student desire for a university education as related more to the outcome: obtaining a degree. The 'employability agenda' was seen as a barrier to both good wellbeing and independent learning.

'There's another pressure [...] they've been sold the—I don't want to call it a myth because it's not quite a myth—but the idea that getting a degree is their passport to earning squillions and getting an amazing job [...] I think that encourages a lot of surface learning because 'actually the point of me being here is to get a job or to get a better job.' (Cardiff)

This expectation around outcomes affected students' experiences of independent learning, creating an unwillingness to be independent and dissatisfaction with independent learning experience. Instead, students were seen as feeling 'short changed' when university staff asked them to learn for themselves.

'One of the things we've had quite a bit of as well is with the student fees and students actually saying, 'I'm paying x amount of money. Therefore, I should be getting such a grade,' as if one is linked to the other'. (Leeds)

A focus on the expected outcomes of education, rather than the process, was seen to affect students' motivation for learning and independent learning practices. Some participants described students' learning as 'strategic' or 'assessment focused' because of this.

'I think students want to know what they need to do to pass.' (Ulster 1)

Participants identified this assessment or outcome-driven mindset as affecting attempts to support increased independence for students, who did not seem to acknowledge their need for agency in the learning process, preventing the wellbeing benefit associated with academic growth.

'The other thing is I think that students sometimes think that help is something that you receive, whereas, actually, what you have to do is engage with that. Taking the help: it means you have to work really hard, just like therapy is hard work. If you want to get someone to support you with your study skills, that takes a lot of time and a lot of effort.' (Leeds)

To address some of the issues with goal orientation and engagement, staff noted the potential benefits of 'experience-based learning' to foster an alternative attitude to independent learning. For some, this involved allowing students to contextualise their academic work, for example, via field trips and placements.

'I think those types of things are where students start to make connections, and it's like, 'Oh, that's why we learnt about that and that's why it's important.' (Leeds)

Focus groups discussed forms of problem- or situation-based learning more widely, suggesting that this could inspire and engage students and encourage them to consider

issues from different perspectives, resulting in enjoyment and satisfaction with independent learning practices.

3.1.3. Scaffolding Student Development

Participants described some of the key issues that students experience as they acquire independent learning skills; for example, managing time and judging how much work to do, understanding what to do and where to begin, and coping with the pressures of project management were identified as impacting perceived workload, academic anxiety, and coping mechanisms. Participants underlined the need to scaffold students' experience as they dealt with these challenges. In particular, it was acknowledged that without structure, students could struggle to plan their time, which could negatively impact wellbeing.

'If you had no lectures one day, it'd be very tempting to not do much at all. . . Or overdo it because nobody is telling you to stop. I think sometimes, knowing when you've done enough is a big anxiety for students.' (Strathclyde)

One repeated suggestion from staff was that the first year of university study was vital in reframing these expectations, scaffolding how to structure independent learning, and easing the transition between previous learning experiences and current opportunities.

'Students need that level of input at the beginning because they don't know what they should be expected to do or how to manage that time when they've got quite a lot of their own time.' (UAL)

A key pedagogic issue referred to was the need for scaffolding, including scaffolding assessment through the use of formative tasks.

'It's about recognising that there may be additional support required at the beginning but the ambition would be to taper off that support.' (Cardiff)

It was emphasised that to scaffold effectively, there was a need to set clear expectations for students, particularly new students, with implications for wellbeing where students were simply left to learn independently without sufficient support. One participant described year one as an 'adjustment phase' and spoke of how the need for support changed as students become more used to independent learning. However, there was acknowledgement that scaffolding independent learning skills in year one would require significant restructuring to degree programmes, with several references to the time required to develop independent learning and wider skills that would support wellbeing as a 'luxury'. Providing students with what was referred to as 'soft skills' for learning at university (and beyond) was not possible within current curricula.

'Lots of things are seen as luxuries that are actually really fundamental if they're going to learn at the level that keeps their passion, keeps their head okay, keeps them in a space where this is a good experience for them.' (Ulster 1)

The value of these 'soft skills' was clearly recognised as part of improving student wellbeing, establishing independent learning practices, and preparing students for future careers.

'It's not to say it shouldn't be challenging, but we need to be mindful that we need to support people to develop strategies, which they can then take out into the workplace. You know, you develop strategies to cope with stress or challenge, they're with you for your whole life.' (Cardiff)

In this way, the role of the university in learning and its role in improving employability were both acknowledged, and independent learning was positioned more as a facilitator in the process.

'When I speak to employers, they say one of the skills [students] lack the most is resilience. We don't care if they have a first-class degree. They can't deal with anything. They can't turn up on time. They can't manage things.' The world, as you know, out there is so competitive. Finding a job is so competitive.' (Leeds)

Participants saw the norms of individual different academic disciplines as affecting student experiences of independent learning.

'Humanities and science are very different. Humanities is very much like: 'Here's a reading list, read it and write an essay.' Science is, you're in the lab all day and then you've got more work after the lab. So I think humanities has got a massive issue [...] especially if you're a fresher, your first reading list and you're just told to read and write this essay. It's super unstructured.' (UAL)

Taken together, the findings demonstrate interrelations between independent learning and wellbeing, mediated by individual and demographic factors, expectations and mindset, and the scaffolding of support. The findings suggest that, while independent learning has the potential to allow students to flourish in higher education, without consideration of these factors, it can negatively impact on student wellbeing.

These three themes were then used as concepts to explore relevant links to student survey results. Analysis focused on whether staff perceptions around student wellbeing and independent learning being related to diversity and inclusion were mirrored in students' self-reported data.

3.2. Students

Two quantitative survey questions explored the impact of students' wellbeing on their learning and vice versa (see Design and Methodology). Analysis of these questions followed on from the focus group theme surrounding intersectionality, given that both mental wellbeing and academic learning are differentially affected across specific student groups and their unique situations.

Across the sample, most students (85–95%) reported a large reciprocal relationship between their wellbeing and academic learning. There were marginal differences between student characteristics; however, between-group comparisons revealed that the greatest impact of learning on wellbeing was seen in students aged 30–34 years old, those identified as non-binary, or transgender. By contrast, the greatest impact of wellbeing on learning was seen in international students or those aged 25–29 years old. Mental health status was the only factor that differentiated students' views on this relationship. For instance, students who reported mental health difficulties believed that their wellbeing had a large impact on their learning, and the opposite was true for students with no mental health difficulties.

The final quantitative survey question concerned students' outcomes (see Design and Methodology). Figure 1 shows that students differed in terms of how confident they felt that they would achieve these skills. For example, students with the lowest confidence, in descending order, included those who were non-binary, transgender, disclosed a long-term disability, had experienced mental health difficulties, had international status, were 16–24 years old, and were women. Students with the most confidence were those who had not experienced mental health difficulties and students aged 30–34 years old, respectively.

Differences in experiences of university culture and wellbeing were apparent in the quantitative survey data (Figure 2). Across all student characteristics, students who identified as transgender or non-binary believed that their university culture was not conducive to maintaining good wellbeing. This was also true for students aged 30–34 years old or those who disclosed a long-term disability. By contrast, students who had not experienced mental health difficulties believed that their university culture positively contributed to their wellbeing, followed by international students, students older than 35 years, students that did not disclose a disability, and men.

Open-text responses from students showed that students identified the impact of independent learning on their wellbeing. Students saw *'the very independent way of working'*, and *'how independent everything has to be'* as detrimental to wellbeing. They highlighted a *'lack of support'* and *'confusion'*, with *'lack of communication from lecturers'* and *'being left to figure things out alone without guidance'*. Academic staff were described as assuming students would understand independent learning expectations, meaning that *'they tend to be vague on what you actually have to do'*, which *'gives me anxiety because I don't know what is expected of me'*.

As a result, students often described ‘*feel[ing] quite lost*’ and ‘*having little sense of direction*’. Isolation from peers and academic staff was described as problematic, with one respondent identifying ‘*how isolated independent learning has to be, it does feel like a lonely path sometimes*’ and another noting they felt ‘*anonymous and that most tutors I’ve had haven’t learned my name or made an effort to forge a relationship*’.

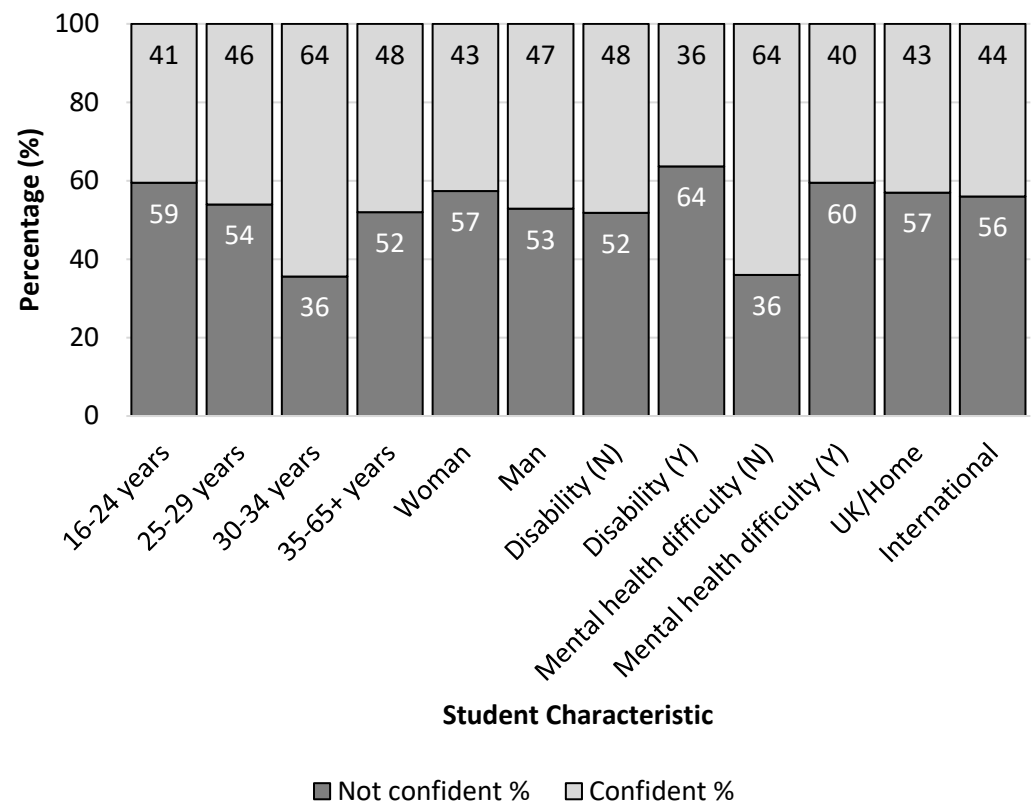


Figure 1. Students’ confidence in having the necessary knowledge and skills after graduation, split by student characteristics (n = 759).

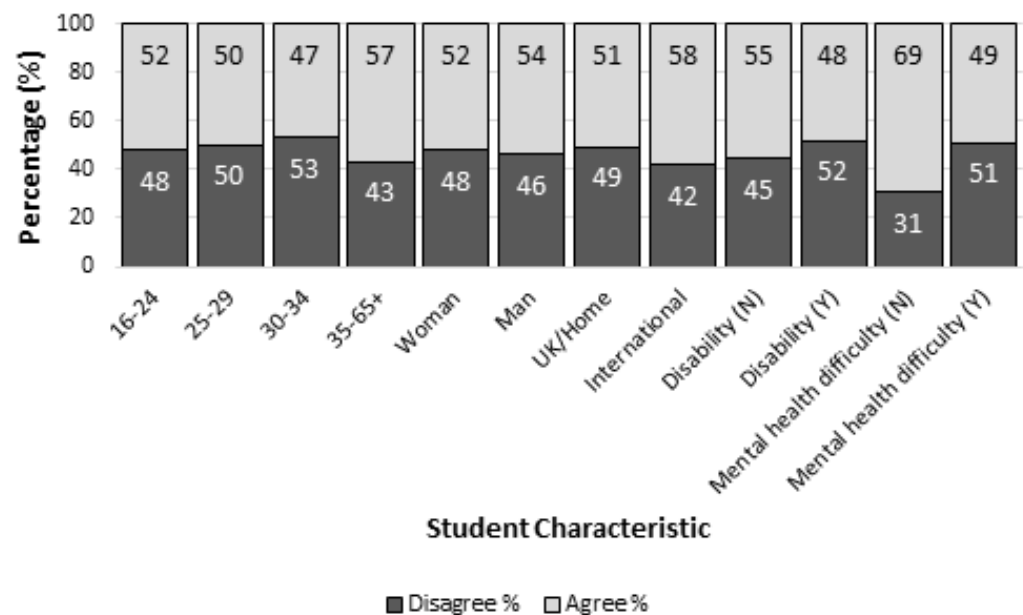


Figure 2. Students’ views on whether their university culture was conducive to maintaining good wellbeing, split across student characteristics (n = 762).

Students were asked to identify positive impacts on wellbeing in the learning process. Whilst some described the intrinsic rewards of independent, transformative, and constructivist learning, others emphasised that this must be coupled with positive relationships and supportive, inclusive pedagogy and assessment practices. The most commonly described benefit related to relationships where students identified personal, caring relationships with academic staff that were readily accessible for one-to-one academic support. Students noted *'taking time outside of lecture time to help answer questions and provide extra help'* as the most supportive factor for wellbeing, whilst also *'having such a great impact on my learning and performance'*. This was not the same as being *'spoon fed'*; instead, lecturers were valued if they were able to *'answer your questions and encourage you, and help point you in the right direction'*. Indeed, students identified the benefits of regular, timely, supportive, constructive, and clear feedback practices *'with clear instructions on how to improve'*.

Students identified the intrinsic benefits of learning content that was interesting, enjoyable, relevant, and which they had autonomy over, highlighting the accompanying feelings of personal growth and accomplishment from achieving success. When students felt sufficiently supported, there was evidence that independent learning could be beneficial to wellbeing. Specifically, although extrinsic rewards such as good grades and praise from others did emerge, the autonomy *'to self-direct your project and choose what you do'*, *'being allowed to organise my own time'* and *'focus on the things that I am passionate about learning'* recurred as a component of *'completing independent study that is very empowering and exciting'*.

4. Discussion

This study has identified barriers and enablers to independent learning and its intersections with student wellbeing. Findings from staff focus groups centred around three themes: equality, diversity, and inclusion; student mindsets and staff expectations; and the scaffolding of learning. First, staff noted the challenges and complexity of supporting independent learning, given the differentiation in academic skills and experience across the student body. Some students may be under-equipped and unable to adapt to newer independent ways of working and subsequently experience stress and distress. Echoing the existing literature, barriers to independent learning included inadequate educational preparedness [8,14], conflicting demands such as part-time work or caregiving [38], and a lack of understanding of the culture of learning in higher education [8]—all of which could be detrimental to wellbeing.

Second, the mismatch between student mindsets and staff expectations demonstrates that independent learning is impacted by resilience, perfectionism, goal orientation, and a students-as-consumers culture [39]. Consistent with the prior literature, key barriers to independent learning were described by staff as including passive engagement in study, expectations of directive tutor support [28], a pragmatic focus on individual assessments rather than broader development of personal and professional skills [40], and an inability to judge how much work was required [41]. Student attitudes and expectations regarding the intrinsic and/or extrinsic purpose of a degree programme and the role of challenge versus consumption may explain the (lack of) willingness to engage in independent learning. Staff explained that student mindsets had the potential to be detrimental to wellbeing; for example, given the emphasis on academic outcomes, failed assessments had the potential to be damaging to self-esteem [13], while perfectionism could drive students to work to such an extent that they would become unwell [42]. To overcome some of these barriers to independent learning, staff suggested that experiential learning and promoting reflection could foster a mindset of personal growth and skill development [43].

Third, staff participants identified the importance of scaffolding, highlighting that the unstructured nature of independent study meant inexperienced or unskilled students are overwhelmed by expansive choice architecture and often struggled to judge what to do or how much to do—something that caused anxiety [44]. Furthermore, independence could be experienced as abandonment and could create feelings of isolation [45]. Participants suggested that students needed to have their learning scaffolded with explicit instruction

during their first year to help them adjust to higher education and form realistic expectations about assessment support [8].

Open-text responses from the student survey complementarily outlined the potential negative impact of independent learning on wellbeing, with students reporting feelings of isolation, being 'lost' with no direction, stress, exhaustion, and loneliness. At the same time, responses also highlight the potential for independent learning to promote a nurturing, rewarding, developmental environment that enables students to shape their academic identity. They demonstrated that, while undertaking independent work, students valued peer support and appreciated skilled and inclusive teaching—aspects that highlight the importance of social connectedness and belonging at university [46].

Overall, quantitative findings from the student survey indicate a bidirectional relationship between academic work and student wellbeing. Demographic data revealed that for some student groups, these associations were more pronounced, underscoring the importance of supporting international, transgender, non-binary, and mature students, as well as those with mental health difficulties. It is noteworthy that marginalised student groups were underrepresented in this survey sample, and this highlights the ongoing challenges to achieving adequate representation of a diverse student population. Future research should consider oversampling underrepresented student groups to increase participation across the student body and ensure that all student groups are represented in research and national consultations. Of the data that were available, it was apparent that confidence in academic skill acquisition was the lowest in students from particular socio-demographic backgrounds, again underlining the imperative to enhance support for diverse students. These findings align with previous research on the importance of relationships [46], culture [47], and inclusive support attuned to the diversity of the student population [48]. However, they do not provide explanatory information about how or why such associations exist.

5. Conclusions

This paper makes a significant contribution to the literature by exploring the implications of independent learning for student wellbeing. These data were used in the development of the Charter, and so the findings here help to contextualise the principles of the best practice the Charter sets out. The findings demonstrate that, while independent learning has the potential to allow students to flourish in higher education, without consideration of inclusivity, the structure of teaching, and student mindsets, it can negatively impact on both academic performance and student wellbeing.

The data presented here show that structurally and culturally addressing the facilitators and barriers to independent learning has the potential to benefit student wellbeing and learning as part of a whole university approach. Through independent work, students may enhance aspects of their eudaimonic wellbeing such as meaning, purpose, fulfilment, and accomplishment [49]. Scaffolding is needed to help students navigate the expansive range of choices associated with independent learning and inclusively support the development of independent learning skills across the diverse student population [50]. Independent learning is an emotional as well as a cognitive and organisational process that needs to be sufficiently acknowledged and supported [51]; therefore, scaffolding should structure student expectations about assessment practice and tutor support. Diversity results in differences in academic skills, experience, and familiarity with teaching methods; historically underserved student groups including international students, trans and non-binary students, and students with mental health difficulties may need more explicit instruction about how to engage with independent learning. Developing independent learning should therefore be considered part of equality, diversity, and inclusion work at universities; strategies must acknowledge the complexity of supporting diverse student populations [13] and address the need for staff to be aided in doing so [47]. Finally, independent learning skills should be supported and delivered through the curriculum, rather than being seen as additional [8,51]. Barriers to engagement with independent learning include attitudinal

and practical factors, which may mean that students lack either the motivation or capacity to attend optional support sessions, leading to feelings of isolation.

Taken together, the findings above should inform a holistic and inclusive approach to student wellbeing through teaching, learning, curriculum, and assessment in line with the principles of good practice in the University Mental Health Charter. At a theoretical level, this implies a (re-)examination of underpinning educational philosophies to ensure independent learning remains fully aligned with its constructivist roots [52], including being integrated into the curriculum in a scaffolded and supported way. In practice, it also requires intentional and explicit acknowledgment and discussion of the implications for equality, diversity, inclusion, and student wellbeing in a way that aligns with the Charter principles.

Author Contributions: Conceptualization, S.J.W., E.J., L.B. and M.P.; formal analysis, S.J.W., E.J., L.B., M.P. and E.B.; visualization, E.B.; writing—original draft, S.J.W., E.J., L.B., M.P. and E.B.; writing—review and editing, G.H. and L.S.; funding acquisition, G.H. and L.S. All authors have read and agreed to the published version of the manuscript.

Funding: Data collection for this work was funded by The UPP foundation and the Office for Students, through the charity Student Minds, as part of the development of the University Mental Health Charter. The authors received no specific funding for writing of this paper.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of University of Derby Arts Humanities and Education (January 2019).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Access to the data is provided to experienced researchers who sign to accept the requirements of the ethical agreement.

Acknowledgments: We thank the university staff and students who participated in data collection.

Conflicts of Interest: No potential conflict of interest was reported by S.J.W., E.J., L.B. and M.P., G.H. and L.S. report that they are employed by Student Minds, the charity developing the University Mental Health Charter.

References

1. Auerbach, R.P.; Mortier, P.; Bruffaerts, R.; Alonso, J.; Benjet, C.; Cuijpers, P.; Demyttenaere, K.; Ebert, D.D.; Green, J.G.; Hasking, P.; et al. WHO World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders. *J. Abnorm. Psychol.* **2018**, *127*, 623–638. [CrossRef] [PubMed]
2. Broglia, E.; Millings, A.; Barkham, M. Challenges to Addressing Student Mental Health in Embedded Counselling Services: A Survey of UK Higher and Further Education Institutions. *Br. J. Guid. Couns.* **2018**, *46*, 441–455. [CrossRef]
3. Thorley, C. *Not by Degrees: Improving Student Mental Health in the UK's Universities*; IPPR: London, UK, 2017.
4. Bewick, B.; Mulhern, B.; Barkham, M. Changes in Undergraduate Student Alcohol Consumption as They Progress through University. *BMC Public Health* **2008**, *8*, 163–171. [CrossRef] [PubMed]
5. Bewick, B.; Koutsopoulou, G.; Miles, J.; Slaa, E.; Barkham, M. Changes in Undergraduate Students' Psychological Wellbeing as they Progress through University. *Stud. High. Educ.* **2010**, *35*, 633–645. [CrossRef]
6. Cage, E.; Jones, E.; Ryan, G.; Hughes, G.; Spanner, L. Student Mental Health and Transitions into, through and out of University: Student and Staff Perspectives. *J. Furth. High. Educ.* **2021**, *45*, 1076–1089. [CrossRef]
7. Worsley, J.D.; Harrison, P.; Corcoran, R. Accommodation environments and student mental health in the UK: The role of relational spaces. *J. Ment. Health* **2023**, *32*, 175–182. [CrossRef] [PubMed]
8. Field, R.; Duffy, J.; Huggins, A. Teaching Independent Learning Skills in the First Year: A Positive Psychology Strategy for Promoting Law Student Well-Being. *J. Learn. Des.* **2015**, *8*, 1–10. [CrossRef]
9. Hockings, C.; Thomas, L.; Ottaway, J.; Jones, R. Independent Learning—What We Do When You're Not There. *Teach. High. Educ.* **2018**, *23*, 145–161. [CrossRef]
10. O'Brien, M.; Tang, S.; Hall, K. No Time to Lose: Negative Impact on Law Student Wellbeing May Begin in Year One. *Int. J. First Year High. Educ.* **2011**, *2*, 49–60. [CrossRef]
11. Broglia, E.; Byrom, N.C.; Dodd, A.L.; Ortega Vega, M.; Priestley, M.; Robotham, D.; Sampson, K.; Tyrrell, K.; Wykes, T. Key questions: Research priorities for student mental health. *BJPsych Open* **2022**, *8*, e90. [CrossRef]
12. Hughes, G.; Spanner, L. The University Mental Health Charter. Leeds: Students Minds. 2018. Available online: <https://hub.studentminds.org.uk/resources/charter-framework/> (accessed on 6 February 2024).

13. Jones, E.; Priestley, M.; Brewster, L.; Wilbraham, S.; Hughes, G.; Spanner, L. Student Wellbeing and Assessment in Higher Education: The Balancing Act. *Assess. Eval. High. Educ.* **2021**, *46*, 438–450. [CrossRef]
14. Field, R.; Kift, S. Addressing the High Levels of Psychological Distress in Law Students through Intentional Assessment and Feedback Design in the First Year Law Curriculum. *Int. J. First Year High. Educ.* **2010**, *1*, 65–76. [CrossRef]
15. The Quality Assurance Agency for Higher Education. Explaining Student Workload: Guidance about Providing Information for Students. Gloucester: The Quality Assurance Agency for Higher Education, 2013. Available online: https://www.qaa.ac.uk/docs/qaa/quality-code/explaining-student-workload.pdf?sfvrsn=7f45f981_8 (accessed on 6 February 2024).
16. The Quality Assurance Agency for Higher Education. *UK Quality Code for Higher Education: Advice and Guidance—Learning and Teaching*; The Quality Assurance Agency for Higher Education: Gloucester, UK, 2018. Available online: www.qaa.ac.uk/quality-code (accessed on 6 February 2024).
17. Kalpana, T. A Constructivist Perspective on Teaching and Learning: A Conceptual Framework. *Int. Res. J. Soc. Sci.* **2014**, *3*, 27–29.
18. Meyer, B.; Haywood, N.; Sachdev, D.; Faraday, S. What Is Independent Learning and What Are the Benefits for Students? In *Department for Children, Schools and Families Research Report 051*; Department for Children: London, UK, 2008. Available online: <https://ahpo.net/assets/whatisindependentlearningandwhatarethebenefits.pdf> (accessed on 6 February 2024).
19. Amineh, R.J.; Asl, H.D. Review of Constructivism and Social Constructivism. *J. Soc. Sci. Lit. Lang.* **2015**, *1*, 9–16.
20. Gordon, M. The Misuses and Effective Uses of Constructivist Teaching. *Teach. Teach.* **2009**, *15*, 737–746. [CrossRef]
21. Papleontiou-louca, E. The Concept and Instruction of Metacognition. *Teach. Dev.* **2003**, *7*, 9–30. [CrossRef]
22. McLinden, M.; Edwards, C. Developing a Culture of Enquiry-Based, Independent Learning in a Research-Led Institution: Findings from a Survey of Pedagogic Practice. *Int. J. Acad. Dev.* **2011**, *16*, 147–162. [CrossRef]
23. Murad, M.; Coto-Yglesias, F.; Varkey, P.; Prokop, L.J.; Murad, A.L. The Effectiveness of Self-Directed Learning in Health Professions Education: A Systematic Review. *Med. Educ.* **2010**, *44*, 1057–1068. [CrossRef] [PubMed]
24. Lowden, K.; Hall, S.; Elliot, D.; Lewin, J. *Employers' Perceptions of the Employability Skills of New Graduates*; Research Commissioned by the Edge Foundation; Edge Foundation: London, UK, 2011. Available online: https://www.educationandemployers.org/wp-content/uploads/2014/06/employability_skills_as_pdf_-_final_online_version.pdf (accessed on 6 February 2024).
25. Sotardi, V.A.; Brogt, E. Influences of Learning Strategies on Assessment Experiences and Outcomes during the Transition to University. *Stud. High. Educ.* **2020**, *45*, 1973–1985. [CrossRef]
26. Cramp, A.; Lamond, C.; Coleyshaw, L.; Beck, S. Empowering or Disabling? Emotional Reactions to Assessment Amongst Part-Time Adult Students. *Teach. High. Educ.* **2012**, *17*, 509–521. [CrossRef]
27. Postareff, L.; Mattson, M.; Lindblom-Ylänne, S.; Hailikari, T. The Complex Relationship between Emotions, Approaches to Learning, Study Success and Study Progress during the Transition to University. *High. Educ.* **2016**, *73*, 441–457. [CrossRef]
28. Leese, M. Bridging the Gap: Supporting Student Transitions into Higher Education. *J. Furth. High. Educ.* **2010**, *34*, 239–251. [CrossRef]
29. Meuleman, A.-M.; Garrett, R.; Wrench, A.; King, S. 'Some People Might Say I'm Thriving But...': Non-Traditional Students' Experiences of University. *Int. J. Incl. Educ.* **2015**, *19*, 503–517. [CrossRef]
30. Menzies, J.L.; Baron, R. International postgraduate student transition experiences: The importance of student societies and friends. *Innov. Educ. Teach. Int.* **2014**, *51*, 84–94. [CrossRef]
31. Morgan, D. Practical Strategies for Combining Qualitative and Quantitative Methods: Applications to Health Research. *Qual. Health Res.* **1998**, *8*, 362–376. [CrossRef] [PubMed]
32. Mason, J. Mixing Methods in a Qualitatively Driven Way. *Qual. Res.* **2006**, *6*, 9–25. [CrossRef]
33. Voils, C.I.; Sandelowski, M.; Barroso, J.; Hasselblad, V. Making Sense of Qualitative and Quantitative Findings in Mixed Research Synthesis Studies. *Field Methods* **2008**, *20*, 3–25. [CrossRef] [PubMed]
34. Braun, V.; Clarke, V. Using Thematic Analysis in Psychology. *Qual. Res. Psychol.* **2006**, *3*, 77–101. [CrossRef]
35. Braun, V.; Clarke, V. Reflecting on reflexive thematic analysis. *Qual. Res. Sport Exerc. Health* **2019**, *11*, 589–597. [CrossRef]
36. Barkham, M.; Broglio, E.; Dufour, G.; Fudge, M.; Knowles, L.; Percy, A.; Turner, A.; Williams, C.; SCORE Consortium. Towards an Evidence-Base for Student Wellbeing and Mental Health: Definitions, Developmental Transitions and Data Sets. *Couns. Psychother. Res.* **2019**, *19*, 351–357. [CrossRef]
37. Brown, P. *The Invisible Problem? Improving Students' Mental Health*; Higher Education Policy Institute: Oxford, UK, 2016. Available online: <https://www.hepi.ac.uk/wp-content/uploads/2016/09/STRICTLY-EMBARGOED-UNTIL-22-SEPT-Hepi-Report-88-FINAL.pdf> (accessed on 6 February 2024).
38. Salamonson, Y.; Everett, B.; Koch, J.; Andrew, S.; Davidson, P.M. The Impact of Term-Time Paid Work on Academic Performance in Nursing Students: A Longitudinal Study. *Int. J. Nurs. Stud.* **2011**, *49*, 579–585. [CrossRef] [PubMed]
39. Pötschulat, M.; Moran, M.; Jones, P. 'The Student Experience' and the Remaking of Contemporary Studenthood: A Critical Intervention. *Sociol. Rev.* **2020**, *69*, 3–20. [CrossRef]
40. Pereira, D.; Flores, A.; Niklasson, L. Assessment Revisited: A Review of Research in Assessment and Evaluation in Higher Education. *Assess. Eval. High. Educ.* **2015**, *41*, 1008–1032. [CrossRef]
41. McKendry, S.; Boyd, V. Defining the "Independent Learner" in UK Higher Education: Staff and Students' Understanding of the Concept. *Int. J. Teach. Learn. High. Educ.* **2012**, *24*, 209–220.
42. Thomas, M.; Bigatti, S. Perfectionism, Impostor Phenomenon, and Mental Health in Medicine: A Literature Review. *Int. J. Med. Educ.* **2020**, *11*, 201–213. [CrossRef]

43. Morris, T. Experiential learning: A Systematic Review and Revision of Kolb's model. *Interact. Learn. Environ.* **2020**, *28*, 1064–1077. [\[CrossRef\]](#)
44. Christie, H.; Tett, V.; Cree, V.; Hounsell, J.; McCune, V. 'A Real Rollercoaster of Confidence and Emotions': Learning to Be A University Student. *Stud. High. Educ.* **2008**, *33*, 567–581. [\[CrossRef\]](#)
45. Hagenauer, G.; Volet, S. Teacher-Student Relationships at University: An Important Yet Under-Researched Field. *Oxf. Rev. Educ.* **2014**, *40*, 370–388. [\[CrossRef\]](#)
46. Priestley, M.; Hall, A.; Wilbraham, S.; Mistry, V.; Hughes, G.; Spanner, L. Student Perceptions and Proposals for Promoting Wellbeing Through Social Relationships at University. *J. Furth. High. Educ.* **2022**, *46*, 1243–1256. [\[CrossRef\]](#)
47. Brewster, L.; Jones, E.; Priestley, M.; Wilbraham, S.; Spanner, L.; Hughes, G. "Look after the Staff and they Would Look after the Students": Cultures of Wellbeing and Mental Health in the University Setting. *J. Furth. High. Educ.* **2021**, *46*, 548–560. [\[CrossRef\]](#)
48. Priestley, M.; Broglia, E.; Hughes, G.; Spanner, L. Student Perspectives on Improving Mental Health Support Services at University. *Couns. Psychother. Res.* **2021**, *22*, 197–206. [\[CrossRef\]](#)
49. Hughes, G.; Wilson, C. From Transcendence to General Maintenance: Exploring the Creativity and Wellbeing Dynamic in Higher Education. In *Creativity, Innovation and Wellbeing: Research Papers on Knowledge, Innovation and Enterprise Volume V*; Reisman, F., Ed.; KIE Conference Publications: London, UK, 2017.
50. Lister, K.; Seale, J.; Douce, C. Mental health in distance learning: A taxonomy of barriers and enablers to student mental wellbeing. *Open Learn. J. Open Distance E-Learn.* **2021**, *38*, 102–116. [\[CrossRef\]](#)
51. Kift, S. A Decade of Transition Pedagogy: A Quantum Leap in Conceptualising the First Year Experience. *HERDSA Rev. High. Educ.* **2015**, *2*, 51–86.
52. Holmes, A. Constructivist Learning in University Undergraduate Programmes. Has Constructivism been Fully Embraced? Is there Clear Evidence that Constructivist Principles have been Applied to all Aspects of Contemporary University Undergraduate Study? *Shanlax Int. J. Educ.* **2019**, *8*, 7–15. [\[CrossRef\]](#)

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.