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'It is ambiguous, but I know what I am doing': undergraduates' experiences and agency in an interdisciplinary programme

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ABSTRACT

Responding to the increasing need to develop graduates with capabilities for solving complex problems, interdisciplinary degree programmes are growing in numbers. However, few studies have investigated undergraduate students' learning experiences in these programmes despite acknowledging such experiences can be challenging and confusing. Moreover, the current understanding of experiences in interdisciplinary programmes is also limited by the lack of studies that fully recognise the liminality in students' experience and their agency. We drew on the concepts of liminality and agency to analyse student learning experiences in one interdisciplinary programme integrating arts, science, and social sciences. Data were collected from 29 semi-structured interviews conducted by four student co-researchers. Our main findings are that students exercised their agency in different forms, for example, finding their anchors and pursuing a second major, in response to the liminality of the learning environment. Some individuals creatively anchor their experiences with their own aspirations, allowing them to find directions to move forward in interdisciplinary learning. The implications are to avoid presenting a single way of navigating interdisciplinarity and to support students' agency by helping them find their aspirations and anchors.

Introduction

Interdisciplinary education has received growing interest, motivated by the notion that many important issues in today's world cannot be resolved by a single discipline (Spelt et al. 2017; Vereijken et al. 2023). Tackling global challenges, such as sustainability, climate change, and pandemics, requires collaboration among experts from different disciplines. Subsequently, there is an increasing number of interdisciplinary degree programmes in universities (Lindvig, Lyall, and Meagher 2019). It is expected that students in these programmes can excel at integrating various perspectives and solving complex problems (Knight et al. 2013).

However, interdisciplinarity is an ambiguous term, described as 'among the most talked about but most misunderstood topics in education on all levels' (Graff 2016, 775 cited in Ripley, Markauskaite, and Goodyear 2023). Ripley, Markauskaite, and Goodyear (2023) have identified large

variations in how leaders of interdisciplinary courses interpret 'interdisciplinarity', ranging from following institutional definitions to focusing on how knowledge is created and applied. These diverse views result in difficulties in incorporating interdisciplinarity into degree programmes. Among different and often contested definitions of interdisciplinarity, we follow the definition provided by Hannon et al. (2018): 'integration of knowledge and ways of thinking from two or more disciplines to produce an outcome that advances student learning in a way that is not possible from a single discipline' (1425). This definition was chosen because it emphasises the integration of knowledge and connects it with student learning, which supports our examination of students' experiences with interdisciplinarity.

Interdisciplinary learning is expected to be challenging for almost all students, including undergraduates and postgraduates, because it potentially situates them in liminality and requires their abilities to synthesise different perspectives (Turner et al. 2024). The challenges can be especially onerous for undergraduates who have not yet developed their knowledge, skills, and attributes in any particular discipline (Spelt et al. 2017). The scarcity of empirical studies on how undergraduates navigate interdisciplinarity limits our understanding of students' experiences and creates barriers to effectively designing interdisciplinary programmes. Furthermore, existing studies tend to depict students as 'needing support' and focus on making the transitioning process easier while largely overlooking liminality as a necessary position towards the formation of student identity (Gravett and Winstone 2021). We argue more studies on undergraduates' navigation in interdisciplinarity are needed, and more importantly, consideration of students' agency will be useful to help understand how students choose their courses and pathways in the programmes (cf. Klemenčič 2023). The research questions this study aimed to address are:

Research question 1: What are undergraduates' learning experiences in an interdisciplinary degree programme, in particular, what kind of liminality do they experience?

Research question 2: In what ways does agency support these undergraduates in their navigation of liminality within interdisciplinary programmes?

To address these research questions, we examined undergraduates' experiences in an interdisciplinary degree programme through a collaborative process. Four undergraduates in the same programme worked as student co-researchers, one form of students-as-partners (Weller et al. 2013). Twenty-nine interviews were conducted with undergraduates on the programme and co-analysed by the six authors: two experienced researchers and four student co-researchers. The findings showed that students experienced three types of liminality associated with the nature of interdisciplinary study, shifting between different streams of the programme, and the transition from school to university learning, respectively. More importantly, students exercised their agency in various creative forms to navigate *into, within, and out* of the liminality.

Literature review

Students' experiences of liminality within interdisciplinary programmes

The ways interdisciplinary programmes are designed are diverse. Yet, a key feature of these programmes is that they involve the integration of several disciplines (Knight et al. 2013). Subsequently, it is suggested that interdisciplinary programmes should not only have courses and components from multiple disciplines but also include considerable opportunities for students to synthesise knowledge from various disciplines to solve a problem (Klein 2010).

A significant proportion of interdisciplinary education is introduced in taught postgraduate degrees and senior years of undergraduate education (Lyall et al. 2015). There is no consensus on when interdisciplinary education should be introduced, and there are at least two schools of thought with contrasting views. One stream of scholars advocates that students must have developed substantial knowledge and skills in their initial discipline before they can effectively engage

in interdisciplinary education (e.g. Spelt et al. 2009). Others believe that it is beneficial to introduce students to interdisciplinary education earlier in their undergraduate study because students can use their interdisciplinary lens to better understand different disciplines (e.g. Tsao, Kochhar-Lindgren, and Lam 2024). In recent years, interdisciplinary degree programmes are becoming more popular (Lyall et al. 2015; Schijf, van der Werf, and Jansen 2023). Compared to the volume of studies on how interdisciplinary education is designed (e.g. Knight et al. 2013; Power and Handley 2019; Ripley, Markauskaite, and Goodyear 2023), there is a scarcity of empirical studies on students' experiences in interdisciplinary programmes. Existing studies tend to focus on interdisciplinary courses (e.g. Vuojärvi et al. 2022) or introductory modules for first-year students (e.g. Turner et al. 2024).

The concept of liminality provides a useful lens to understand the onerous challenges and opportunities for undergraduates in an interdisciplinary programme. Liminality is defined as a status of being, a 'transient, betwixt status' (Palmer, O'Kane, and Owens 2009, 38); they are not what they were before but have not yet developed into a more mature or sophisticated stage. Learners often enter a liminal space when they learn something that leads to a change in their worldviews and, subsequently, they have to abandon their previous worldviews and integrate the new concepts (Land, Vivian, and Rattray 2012). In some cases, the liminal space can be prolonged, lasting for a significant period, for example, several years for undergraduates (Gordon, Rees, and Jindal-Snape 2020).

Interdisciplinary degree programmes create conditions for multiple types of liminality. One is associated with the nature of interdisciplinary learning (Kligyte et al. 2022). Compared with their counterparts in monodisciplinary programmes, students in interdisciplinary programmes are likely to struggle with unlearning the subject-based structure to acquire new thinking frames that allow them to navigate across disciplines in the situation where they have not yet formed their perspectives in any one specific discipline (Kligyte et al. 2022). The literature shows that a significant barrier to interdisciplinary learning is that many students do not completely understand the rationale for interdisciplinarity (Turner et al. 2024). Even if students understand the rationale, they often cannot independently integrate knowledge from different disciplines right away, meaning that they are likely staying in a liminal space while trying to abandon old thinking frames and develop new ones (Klaassen 2018). Meanwhile, a low level of confidence in students' disciplinary knowledge and skills and the associated frustrations are widely identified among students studying interdisciplinary programmes (Kim et al. 2012; Spelt et al. 2017). In many cases, these students also worry about their future careers as they perceive that they have not spent enough time to acquire in-depth knowledge and practical skills in any discipline (Kim et al. 2012).

Another type of liminality is not specifically about interdisciplinarity but is associated with the transition from school to university; the latter promotes self-directed learning and problem solving (Palmer, O'Kane, and Owens 2009). Students are found to show uncertainties and frustrations when they are required to solve complex problems as part of the learning process in interdisciplinary programmes. In Cabras and Mondo's (2018) study, students need to develop various coping strategies to get used to the problem-focused nature of university learning.

Though these findings are insightful, there are still many unanswered questions. First, insufficient studies on students' experiences in interdisciplinary degree programmes limit our understanding of those students who start with an interdisciplinary education rather than a discipline of their own. It would be valuable to find out how undergraduates without solid disciplinary grounding acquire an interdisciplinary perspective. Second, existing studies have only highlighted the existence of liminality without a thorough examination of how students navigate within the liminal space. Third, liminality, in the literature, is often discussed in negative terms associated with difficulties (Kligyte et al. 2022), a sense of 'not belonging' (Palmer, O'Kane, and Owens 2009, 37), and the feeling of inadequacy in one's competencies (Atkinson et al. 2022). Although it can also be a source of creativity, this more productive aspect of liminality is still under-explored (Wallin and Aarsand 2019). We argue that these unanswered questions are not just the result of the scarcity of studies on the topic but also of the lack of a suitable theoretical lens to examine the phenomenon.

The role of agency in student learning

Given the increasing importance of recognising student agency in higher education (Stenalt and Las-sesen 2022), we argue that focusing on how students exercise their agency to respond to the liminality in interdisciplinary programmes will offer new insights. We adopt the definition of agency as 'students' capabilities to navigate, influence, and take responsibility for their learning and education pathways and environments' (Klemenčič 2023, 26). According to Klemenčič (2023), student agency comprises two constructs. The first resides in the environment, specifically, the actual opportunities in the programme structure that allow students to exercise autonomy. The second construct, agentic orientations, is about students' internal responses to external opportunities, denoting their predispositions and determination to enact their agency.

Student agency plays an important role in their learning experiences and outcomes. Choi, Hyun, and Lee (2025) identified that high-achieving Korean students enact their agency to intentionally participate in interconnected knowledge-creation processes across college life exposures, classroom learning, and extra-curricular activities. In comparison, learners with average achievements do not actively mobilise their learning resources (Choi, Hyun, and Lee 2025). A study in Hong Kong covering four undergraduate degree programmes in the disciplines of science and social science shows that agency enables approximately one-third of the students to develop an understanding of the learning progression and utilise various learning opportunities to support their own areas of exploration (Zou et al. 2024).

In recent years, an emergent concept, liminal agency, receives increasing attention. Defined as the ability to navigate and find meaningfulness in liminality in a study of worker identity in the gig economy (Weidenstedt et al. 2024), liminal agency can be used to describe learners' active pursuit of making progress in a liminal space. Few studies in education adopt the term 'liminal agency', but it is evident that students exercising agency in a liminal space can often support their navigation in the space. In Pym and Kapp's (2013) study on disadvantaged students in a South African university, agency helps students negotiate their transition from school to university and choose courses that enable them to achieve their goals.

Research design

Research framework

This study aims to explore undergraduates' experiences in an interdisciplinary degree programme based on the concepts of liminality and agency. We adopt Meyer and Land's (2005, 380) definition of liminality as 'a "liquid" space, simultaneously transforming and being transformed by the learner as he or she moves through it'. Following Klemenčič (2023), we position agency as dynamic and developmental rather than fixed, which means students develop their capabilities to navigate interdisciplinarity through interacting with the structures, for example, the curriculum design. We also recognise that agency is 'socio-structurally and relationally conditioned' (Klemenčič 2023, 33), implying that it is a result of students' interactions with the academic and social lives within the university.

Research paradigm and methodology

We followed the interpretive research paradigm (Merriam and Tisdell 2015) and adopted an interview-based approach to understand students' experiences of navigating interdisciplinarity. We recognise there are multiple realities and interpretations of interdisciplinarity (cf. Merriam and Tisdell 2015) and aim to elicit the subjective meanings individual students associated with their experiences. Our methodologies also drew on the notion of students as partners (Zou et al. 2023). We engage undergraduates in researching their own learning experiences. Specifically, the four student co-researchers not only contributed their own perspectives based on their experiences in

the programme, but also participated in all research stages, including conceptualisation, data collection and analysis, and manuscript writing.

Data collection

Ethical approval (No. SBRE-21-0297) was obtained from the institution where the first author was based. All participants, including student co-researchers, provided informed consent for their participation. Semi-structured interviews were conducted with 29 students about their learning experiences (37.9% in Year 1, 37.9% in Year 2, 17.2% in Year 3, and 6.9% unspecified) by student co-researchers, as part of a larger study on undergraduate learning experiences (Zou et al., 2024).

Each interview took approximately 30 min, and all interviews were transcribed verbatim. The interviews focused on experiences of interdisciplinarity, including how students perceived it, in what ways it affected their learning, what the challenges were, and what students did to overcome the challenges and address the concerns. Initially, the interview protocol drafted by the faculty researchers only included experiences within the programme. This was revised after discussion with co-researchers because they emphasised how experiences outside the programme, for example, collaboration with students studying non-interdisciplinary programmes, affected their learning experiences.

To support co-researchers in conducting interviews, the first author as an experienced researcher provided a two-hour interview training. The co-researchers were also asked to provide the transcripts of their first two interviews and received feedback before continuing the rest of the interviews.

It needs to be highlighted that the rapport student co-researchers built with their student interviewees helped collect rich data since the interviewees were willing to share their thoughts, especially their struggles and uncertainties, with the student co-researchers. The low power distance between the co-researchers and their interviewees as well as the co-researchers' abilities to ask relevant probing questions contributed to the rich data collected, which illustrates the strengths of insider researchers who conduct research in their own working contexts (Hellawell 2006).

Data analysis

All interviews were analysed through thematic analysis (Braun and Clarke 2022). Firstly, open coding was conducted by student co-researchers and faculty researchers independently to avoid students being unduly influenced by the faculty researchers. An online annotation software Perusall (https://www.perusall.com/) was adopted to facilitate the process. Each student co-researcher was given an account so that they could use the annotation function to perform open coding. Then, discussions were held to categorise the open codes into clusters around various initiatives participants undertook to navigate interdisciplinarity. These clusters were then compared and contrasted to form themes to respond to the research questions on liminality in the experiences (RQ1) and agency (RQ2). Any disagreement about the coding and categorisation was resolved via Zoom discussion. When all the themes were identified, all authors, including student co-researchers, were given an opportunity to comment on what they thought of each theme. Furthermore, student co-researchers were invited to reflect on whether they could relate the theme to their own learning experiences, and their comments were recorded as part of the research data. This approach echoed one key premise of students-as-partners, which requires students' unique expertise and positionality to be leveraged in the partnership process (Mercer-Mapstone 2020).

Indeed, the student co-researchers' participation made unique contributions to the study. Their comments helped break the usual tendency of the faculty researchers in conducting research. At the beginning stage of the data analysis, one of the faculty researchers immediately identified several categories of students' experiences as it was her most familiar way of organising findings.

However, the student co-researchers voiced that they did not see several 'profiles' that could be neatly defined; instead, they saw every participant's intention and action as unique, which motivated the author team to organise the findings based on the liminality and agency. Moreover, in the later stage of the data analysis when the four co-researchers had already experienced the final year and the capstone project (i.e. an integrative project requiring students to apply what they have learned in earlier years to solve a complex problem), they helped confirm the salience of the themes identified using their entire four-year experience as a reference.

Case description

The interdisciplinary degree programme under study is located in a comprehensive research-intensive university in Hong Kong. The university is organised based on a traditional structure where closely related disciplines are grouped into departments (cf. Lindvig, Lyall, and Meagher 2019). Although interdisciplinarity is on the university's policy agenda and reflected in teaching, research and service dimensions, launching interdisciplinary degree programmes is a relatively new initiative starting in 2019. The programme is housed in the Faculty of Social Sciences and involves collaborations between arts, science, and social sciences. Students need to complete a significant portion of courses (47.5%) in the interdisciplinary curriculum, comprising three core courses on interdisciplinarity, research methodology courses, an interdisciplinary capstone, and an internship. Specifically, the core courses introduce interdisciplinary research and data science. Research methodology courses cover both qualitative and quantitative methodologies. The capstone requires students to integrate multiple disciplines to form an interdisciplinary perspective and tackle a complex issue defined by students. The main pedagogy underpinning the programme is research-based learning through which students learn by undertaking research and inquiry activities (Fung 2017). In this sense, the interdisciplinary core courses and research methodology courses prepare students for defining and tackling complex real-world problems.

Interdisciplinarity is a prominent theme in the programme design. Students are offered considerable opportunities to experience interdisciplinarity and choose their paths. The programme satisfies the criteria for a strong interdisciplinary programme according to Klein (2010), as it has dedicated full-time teaching staff and a series of interdisciplinary core courses rather than merely assembling courses from several disciplines. The curriculum consisted of two pathways, one focusing on humanities, cultures and societies, and the other on physical worlds, human sciences, and biology. To fulfil graduation requirements on either pathway, students need to successfully complete five elective courses from across three faculties – arts, science, and social sciences. Additionally, a student cannot take more than two courses from one faculty.

Alongside their interdisciplinary major, students have the option to choose a second major, minors, or electives within a wide range of disciplines, for example, philosophy, finance, education, and engineering. Moreover, students can declare their personalised areas of interest once they build sufficient expertise in one interdisciplinary area, named as a focused area of study. Other optional learning opportunities included ad-hoc projects featuring collaborative interdisciplinary research between students and faculty members.

The flexibility presented in the programme, including the autonomy to choose pathways, identify research topics, and undertake a second major, minors or electives, provides agentic opportunities for students to make decisions according to their goals, interests, and preferences (cf. Klemenčič 2023).

Findings

In the following sub-sections, we will first present the three types of liminality students experienced in the interdisciplinary programme and then explain the different ways that student exercised their agency to navigate into, within, and out of the liminality.

The liminality students experienced

Three types of liminality were found in students' experiences. The first one was associated with the difficulties in understanding and making sense of the concept of interdisciplinarity. Many students recognise interdisciplinarity as ambiguous and vague as these two words were repeatedly found across many interviewee transcripts as shown in the example below.

> It was quite confusing to most of us because not a lot of us were very sure what interdisciplinarity meant. (Sofia, Year 2)

Fong, in the following quote, explains precisely the struggle of undergraduates in drawing on different disciplines to be interdisciplinary while not having developed any solid foundation in one discipline.

> I think it [studying in an interdisciplinary programme] is quite tough. They [the teachers] want us to be interdisciplinary and use our knowledge from different streams, but we have just started. What is the knowledge there that we can use? (Fong, Year 1)

The second type of liminality is related to the role ambiguity, partially related to the fact that students take courses from several steams, e.g. the interdisciplinary programme and courses hosted in the Faculties of Science, Social Science, and Arts. Shifting between these different streams can lead to a kind of liminality featured by the unsettling and 'not belonging' mentality.

> I don't like the programme being so scattered. I know we are expected to bring it together by ourselves. But, I am not sure what and how we are going to do that. This kind of lost feeling is like floating in the middle of the ocean. I am not sure what is going on. (Lok, Year 3)

The third type of liminality was associated with the transition from school learning to university learning. Students found the transition challenging and noted that they were still trying to figure things out.

> I just graduated from secondary school, so I still have the mentality of 'that is a direct path to it'. … I could feel how the university and I were trying to figure things out together. (Ping, Year 1)

The three types of liminality were interwoven rather than separate. Students mentioning one type of liminality often continued to talk about the other types. So, the next sub-section on how students exercised agency as a response to the liminality does not distinguish between the three types of liminality.

The agency students exercised to navigate liminality

Turning ambiguity into learning opportunities. When navigating within the liminality, participants tried to experiment with interdisciplinarity and the ambiguity of their academic homes, and some students managed to turn these liminal experiences into learning opportunities. For example, Amrita tried to turn the uncertainty into 'something productive' through exploring her research interests.

> The programme just gave me the ability to take my uncertainty and turn it into something productive. That is what really attracted me …. there comes a lot of confusion as well, sometimes, you know, at least in the first year, I feel we just don't know what is happening. … I think it depends on the person. I have understood that I am interested in food. I am interested in films. I am also interested in literature. I am interested in so many things. So, I think it is up to me to put all of that into depth and essentially do my own research, study on my own, in order to understand all of these … (Amrita, Year 2)

Wesley explained that interdisciplinarity posed many questions that cannot be fully addressed. Yet, he showed confidence in navigating through these uncertainties and, more importantly, Wesley seemed to be relatively comfortable staying in the liminal space despite having many unresolved questions.

> [About interdisciplinarity] … I'm going to say, it is ambiguous, but I know what I am doing. There are many new questions that I have not got answers for. These new questions provide a sense of direction, and you may not reach the end of it, because interdisciplinarity itself is very inquisitive. (Wesley, Year 2)

Within one individual's narrative, liminality could be both an enabling and an inhibiting factor to learning. For example, Meera liked the flexibility of the programme, but was also overwhelmed by a wide range of choices because of the flexibility. Yet, eventually, Meera believed the liminality is worthwhile.

> I really liked its flexibility … , but then suddenly, we were asked to do a lot of creative things. I'm being part of this group and we had this task where we had to take on leadership roles and collaborative roles … . You can do literally whatever you want to do. And, it is difficult, but it is quite worthwhile because you are exposed to a lot of different disciplines that not a lot of other degrees would offer. (Meera, Year 2)

Finding anchors in diverse ways. Our analysis shows that students exercised agency, for example, utilising different resources, in diverse ways to navigate the liminality. Individuals had their own creative ways of finding their anchors in the liminal space. Kenji expressed that she valued interdisciplinarity whilst seeing herself as belonging more to the disciplines of linguistics and English.

> I am mostly interested in linguistics and English. I am planning to take more linguistics courses in Year 2 … . I'm part of the English society. I collaborate with other people to investigate issues in English. … So, for example, I volunteered at a primary school as a kind of speech therapist assistant, so that has helped me investigate the behaviours of children in their speech and learning development. (Kenji, Year 1)

While Kenji has clearly indicated her main interest, Kong showed interest in a variety of subjects. Not having confirmed the specific interest did not seem to be a concern for Kong. On the contrary, Kong appreciated interdisciplinarity and exercised agency to attend seminars beyond the formal requirement of the programme to explore his research interests.

> Interdisciplinarity encourages novel solutions … [it] might bring some insights … [Interviewer: have you had any idea about what kind of themes you might want to focus on?] I don't have very clear or specific thoughts now. But I have indeed thought of several research directions, including green-tech, language and communication, culture, and even education … . I have attended several seminars about these topics. (Kong, Year 1)

Once a student finds their anchors, they show a stronger confidence in their navigation within the liminal space. Oscar noted that the programme focused more on the breadth of knowledge and less on the depth, yet he did not find this to be an issue at all. On the contrary, he even showed initiative in actively constructing liminal situations so as to strengthen his research capabilities. Rather than focusing on one interest area to reduce uncertainties, Oscar applied for special approval to get into more advanced interdisciplinary courses.

> At the moment, I do feel that the programme focuses more on breadth and not much on depth. But, I don't particularly mind it. I know what my interests are, and I know what I am doing. There are opportunities to get into advanced courses. I tried to get special approval for an advanced course over the summer semester in year one when apparently that wasn't allowed. (Oscar, Year un-specified)

In the process of finding their anchors in liminality, some students, nevertheless, encountered more challenges than others. A few participants who had a science background in their secondary school found it challenging to learn qualitative research methods in a core interdisciplinary course. For example, Lyra was more interested in science and statistics. When she attempted to use her knowledge in science as an anchor to experience interdisciplinarity, she encountered many challenges.

> Until now, my research experience is based on Arts and Social Sciences, and it is more about the qualitative parts. I feel like it is difficult. … I am also disappointed with the final project assignment. It is all about social science. Only the methodology is about science and statistics, but that is the only part about science. I am quite disappointed. (Lyra, Year 1)

Pursuing a second major and minors. Concerned about lacking a sense of belonging to an academic home, some students resorted to a second major. Sofia found interdisciplinarity confusing

and addressed the concerns by taking a second major, where she believed she learned solid knowledge. That said, Sofia did not give up interdisciplinarity; rather, she moved between the interdisciplinary programme and her second major and enhanced her capabilities in both. Impressively, Sophia demonstrated her attempt to construct new liminality by entering a second major and leveraging it for learning interdisciplinarity.

> I think it opened up [possibilities]. For myself, I am someone who is naturally kind of curious about everything and anything. It is really nice to learn whatever I want to learn. But, at the same time, there is also this like a little bit of a nagging feeling. That is why I took a second major. I do enjoy learning in the [interdisciplinary] programme, but the reason I took a second major was to make sure that I was going to get something out of it. (Sofia, Year 2)

Like Sofia, Abbena also has been studying in minor programmes. Her experiences in the interdisciplinary programme supported her learning in the two minor programmes – Science Entrepreneurship and Arabic.

> With the programme, I think, it just really allows me to explore more subjects because … we get to choose from so many different subjects … . And I think like that also helps with entrepreneurship as well because it gives you more information about different things and stuff. (Abbena, Year 2)

Though many students who studied a second major or minor programme seemed to show confidence in their future, some experienced a sense of being 'lost'. For example, Lok found that he became more focused on his second major while losing interest in the interdisciplinary programme.

> It kind of feels like my second major is my first major, and I am picking and choosing my free electives in the […] programme. … It is a mess. It is really a big mess. (Lok, Year 3)

Initiating collaborations and developing connections. Students shared in the interviews how they learned and became who they were through initiating collaborations and developing connections. Kelvin made efforts in reading books and talking to friends to achieve the depth of learning that he perceived as missing in the programme.

> Interdisciplinary kind of allows you to jump between different subjects without committing a lot of credits in them. … [Interviewer: So, you really like the interdisciplinarity in the programme?] Yeah, I guess so. But sometimes it is just about the breadth and the depth is not enough. So, I need to spend so much time reading books and talking to friends to kind of make up for the knowledge that I didn't study in the courses. (Kelvin, Year 2)

During our collaborative data analysis, a student co-researcher commented that connecting with friends within and outside the programme constitutes a unique way for students to learn and to become. She further explained that the flexible course selection allowed students to meet those from diverse backgrounds.

Some students were inspired by the faculty members through formal interactions in courses and ad-hoc collaborations in the student-staff collaborative research projects. For example, Layla showed an understanding of the expertise of many faculty members in interdisciplinary arenas. She highlighted that her interactions with professors shaped her attitudes towards interdisciplinarity.

> I talked to my professors here, and they genuinely respect the fact that interdisciplinarity is a thing, and that it is like a future for academia … My future is looking a lot sexier than when I first got here. You know what I mean! (Layla, Year 3)

Discussions

Students' experiences of liminality in the interdisciplinary programme

Regarding the first research question on students' experiences of liminality, we identified three types of liminality associated with the ambiguity of interdisciplinarity, the frequent shifting between academic streams, and the transition from school to university, respectively. Although earlier studies

have also shown some of these liminal experiences (e.g. Kim et al. 2012), our findings have provided additional insights. First, we identified the kind of liminality caused by role ambiguity and the seeming lack of an academic home for undergraduates in interdisciplinary programmes, which was not extensively discussed in the literature. This liminality is specific to the design of the interdisciplinary programme that draws on the curriculum based in different faculties, which requires students to shift between several streams in their learning. This type of liminality is not identified in existing studies mainly focusing on interdisciplinary courses rather than programmes (e.g. Vuojärvi et al. 2022). Second, we found that students were not entirely negative about the liminality they experienced; instead, many of them initially felt challenging, difficult, confusing, and sometimes frustrating, but they also acknowledged, often at a later stage, the exciting and productive aspects of liminality after they found their direction or anchor. This finding extends the insights from Kim et al. (2012) and Spelt et al. (2017) to illustrate how students' emotions and evaluations of their experiences change as they navigate *within* and *out of* liminality.

The critical role of student agency in navigating liminality

Regarding Research Question 2 on student agency, we suggest that agency played a critical role in students' navigation of liminality. Aligning with the definition of agency by Klemenčič (2023), many participants took the initiative to choose their learning pathways in the interdisciplinary programme. To some extent, some participants even created their own learning trajectories within and beyond the curriculum by, for example, pursuing a second major. In the literature, only a few studies conceptualise students' enactment of agency in liminality, and the existing conceptualisations often describe agency as a means of moving out of liminality (Atkinson et al. 2022; Wallin and Aarsand 2019). In contrast, our findings illustrate diverse ways students exercised their agency to navigate *into, within,* and *out of* liminality. More importantly, some have embraced or even proactively constructed liminality by, for example, leveraging their knowledge in the second major as a resource to support their learning about interdisciplinarity. These findings also call for more attention to the emerging concept of liminal agency that could more appropriately explain the navigation within a liminal space to make progress and discover meaningfulness (cf. Weidenstedt et al. 2024).

Nevertheless, we should not assume that all students who have exercised agency have navigated successfully in the liminal space. Indeed, our data contained multiple accounts in which students attempted to study minor programmes or find their anchors using their expertise in one discipline but finally felt lost and decided to move away from the interdisciplinary programme.

While we intend to highlight the critical role of agency in student learning and navigation of liminality, we also need to clarify that a range of factors affect the quality of interdisciplinary programmes (Klaassen 2018). Student agency, though important, cannot resolve complex issues such as programme coherence and careful communication needed to introduce the programme to students.

Implications

Our findings have implications for supporting students in interdisciplinary degree programmes. First, we should normalise liminality, which is sometimes criticised for being a 'negative' feature. In our study, some students recognise these features to be necessary and inevitable. Therefore, programme directors should communicate transparently with students about liminality and offer support rather than trying to eliminate liminality. When students are seemingly 'lost', educators should try to understand their own aspirations before providing a certain direction. Second, we should support students in enacting their agency in the liminal space by creating sufficient flexibility in the programme so that students can have agentic opportunities to explore. Finally, we should not underestimate students' capabilities to create a positive impact on the programme structure through agency. Such an

impact can possibly be achieved in many ways, including, but not limited to, students joining as co-researchers and initiating collaborations.

Limitations

Two limitations need to be acknowledged. Our study only involved one programme, and thus, our findings were influenced by the contexts of the university where the programme was based and the programme design. We tried to address this limitation by providing contextual information about the agentic opportunities offered by the programme. In addition, our chosen programme represented a strong interdisciplinary curriculum according to Klein (2010), and some of its characteristics were shared by other interdisciplinary programmes in different universities. The second limitation was that our sample only involved students in the first three years of their study. This is because the programme had only existed for three years when the data were collected. Important experiences, such as the interdisciplinary capstone, were not captured. On the other hand, collecting data earlier allowed us to provide implications for enhancing the programme timely. Considering the richness and the variety of student experiences in our data, we suggest that our contributions are more about honouring the various ways students exercised agency to navigate liminality than providing a full account of the experience. Future studies might purposively sample students in each of the four years of study and conduct multiple interviews at different stages of learning with each student to offer a more comprehensive picture. Another promising direction will be longitudinal studies that follow the same cohort of students throughout their learning journey into the final capstone experiences or even after graduation. Such a longitudinal design will likely offer robust conclusions on how students navigate into, within, and out of liminality together with their final learning outcomes.

Conclusion

By drawing on the concepts of liminality and agency in the analysis of students' learning experiences in an interdisciplinary programme, this study helps fill a gap in the literature regarding the scarcity of empirical studies on undergraduate experiences in interdisciplinary degree programmes, and the insufficient recognition of the various types of liminality students experienced and their unique ways of navigating through liminality. Our findings call for acknowledgement of the role of liminal agency and a normative view of liminality. Importantly, agency not only helps students make informed decisions on the available learning options and pathways in the existing curriculum but also enables them to actively construct liminality that benefits their learning of interdisciplinarity. Additionally, we hope that our collaboration with student co-researchers can be a reference for future studies that aim to inquire into student learning experiences.

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References

Atkinson, Michael, Adrienne Brodie, Phillip Kafcaloudesa, Sidrah McCarthya, Ebony A. Monson, Clement Sefa-Nyarko, Shauni Omondb, et al. 2022. "Illuminating the Liminality of the Doctoral Journey: Precarity, Agency and COVID-19." *Higher Education Research & Development* 41 (6): 1790–1804. https://doi.org/10.1080/07294360.2021.1968354.

Braun, V., and V. Clarke. 2022. *Thematic Analysis: A Practical Guide*. London: Sage.

Cabras, Cristina, and Marina Mondo. 2018. "Coping strategies, optimism, and life satisfaction among first-year university students in Italy: gender and age differences." *High Education* 75 (4): 643–654. https://doi.org/10.1007/s10734-017-0161-x.

Choi, Yeseul, So Hee Hyun, and Seunghyeop Lee. 2025. "The (Mis)Understood Image of the Korean Students: How do High-Achieving College Students Navigate Their College Experiences?" *Asia Pacific Education Review* 26 (1): 61–74. https://doi.org/10.1007/s12564-023-09878-6.

Fung, Dilly. 2017. *A Connected Curriculum for Higher Education*. London: UCL Press.

Gordon, Lisi, Charlotte E. Rees, and Divya Jindal-Snape. 2020. "Doctors' Identity Transitions: Choosing to Occupy a State of 'Betwixt and Between'." *Medical Education* 54 (11): 1006–1018. https://doi.org/10.1111/medu.14219.

Graff, Harvey J. 2016. "The 'Problem' of Interdisciplinarity in Theory, Practice, and History." *Social Science History* 40 (4): 775–803. https://doi.org/10.1017/ssh.2016.31.

Gravett, Karen, and Naomi E. Winstone. 2021. "Storying Students' Becomings Into and Through Higher Education." *Studies in Higher Education* 46 (8): 1578–1589. https://doi.org/10.1080/03075079.2019.1695112.

Hannon, John, Colin Hocking, Katherine Legge, and Alison Lugg. 2018. "Sustaining Interdisciplinary Education: Developing Boundary Crossing Governance." *Higher Education Research and Development* 37 (7): 1424–1438. https://doi.org/10.1080/07294360.2018.1484706.

Hellawell, D. 2006. "Inside-Out: Analysis of the Insider-Outsider Concept as a Heuristic Device to Develop Reflexivity in Students Doing Qualitative Research." *Teaching in Higher Education* 11 (4): 483–494. https://doi.org/10.1080/13562510600874292.

Kim, Kwanmyung, Namhun Kim, Seonhee Jung, Duck-Young Kim, Younshin Kwak, and Gyouhyung Kyung. 2012. "A Radically Assembled Design-Engineering Education Program with a Selection and Combination of Multiple Disciplines." *International Journal of Engineering Education* 28 (4): 904–919.

Klaassen, Renate G. 2018. "Interdisciplinary Education: A Case Study." *European Journal of Engineering Education* 43 (6): 842–859. https://doi.org/10.1080/03043797.2018.1442417.

Klein, Julie Thompson. 2010. *Creating Interdisciplinary Campus Cultures: A Model for Strength and Sustainability*. San Francisco, CA: Jossey-Bass.

Klemenčič, Manja. 2023. "A Theory of Student Agency in Higher Education." In *Research Handbook on the Student Experience in Higher Education*, edited by Chi Baik and Ella R. Kahu, 25–40. Gloucestershire: Edward Elgar.

Kligyte, Giedre, Adrian Buck, Bem Le Hunte, Sabrina Ulis, Amanda McGregor, and Beth Wilson. 2022. "Re-imagining Transdisciplinary Education Work Through Liminality: Creative Third Space in Liminal Times." *The Australian Educational Researcher* 49 (3): 617–634. https://doi.org/10.1007/s13384-022-00519-2.

Knight, David B., Lisa R. Lattuca, Ezekiel W. Kimball, and Robert D. Reason. 2013. "Understanding Interdisciplinarity: Curricular and Organizational Features of Undergraduate Interdisciplinary Programs." *Innovative Higher Education* 38 (2): 143–158. https://doi.org/10.1007/s10755-012-9232-1.

Land, R., P. Vivian, and J. Rattray. 2012. "A Closer Look at Liminality: Incorrigibles and Threshold Capital." Presented at the Fourth Biennial Conference on Threshold Concepts: From Personal Practice to Communities of Practice, Dublin, Ireland.

Lindvig, Katrine, Catherine Lyall, and Laura R. Meagher. 2019. "Creating Interdisciplinary Education Within Monodisciplinary Structures: The Art of Managing Interstitiality." *Studies in Higher Education* 44 (2): 347–360. https://doi.org/10.1080/03075079.2017.1365358.

Lyall, Catherine, L. J. Meagher, Bandola Gill, and A. Kettle. 2015. *Interdisciplinary Provision in Higher Education: Current and Future Challenges*. York: Higher Education Academy.

Mercer-Mapstone, Lucy. 2020. "The Student–Staff Partnership Movement: Striving for Inclusion as we Push Sectorial Change." *International Journal for Academic Development* 25 (2): 121–133. https://doi.org/10.1080/1360144X.2019.1631171.

Merriam, Sharan B., and Elizabeth J. Tisdell. 2015. *Qualitative Research: A Guide to Design and Implementation*. San Francisco: Wiley.

Meyer, Jan H. F., and Ray Land. 2005. "Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning." *Higher Education* 49 (3): 373–388. https://doi.org/10.1007/s10734-004-6779-5.

Palmer, Mark, aula O'Kane, and Martin Owens. 2009. "Betwixt Spaces: Student Accounts of Turning Point Experiences in the First-Year Transition." *Studies in Higher Education* 34 (1): 37–54. https://doi.org/10.1080/03075070802601929.

Power, E. J., and J. Handley. 2019. "A Best-Practice Model for Integrating Interdisciplinarity Into the Higher Education Student Experience." *Studies in Higher Education* 44 (3): 554–570. https://doi.org/10.1080/03075079.2017.1389876.

Pym, June, and Rochelle Kapp. 2013. "Harnessing Agency: Towards a Learning Model for Undergraduate Students." *Studies in Higher Education* 38 (2): 272–284. https://doi.org/10.1080/03075079.2011.582096.

Ripley, Dwayne, Lina Markauskaite, and Peter Goodyear. 2023. "A Phenomenographic Exploration of Course Leaders' Understandings of Interdisciplinarity." *Studies in Higher Education* 49 (11): 1–14. https://doi.org/10.1080/03075079.2023.2293932.

Schijf, Jenniffer E., Greetje P. C. van der Werf, and Ellen P. W. A. Jansen. 2023. "Measuring Interdisciplinary Understanding in Higher Education." *European Journal of Higher Education* 13 (4): 429–447. https://doi.org/10.1080/21568235.2022.2058045.

Spelt, Elisabeth J. H., Harm J. A. Biemans, Hilde Tobi, Pieternel A. Luning, and Martin Mulder. 2009. "Teaching and Learning in Interdisciplinary Higher Education: A Systematic Review." *Educational Psychology Review* 21 (4): 365–378. https://doi.org/10.1007/s10648-009-9113-z.

Spelt, Elisabeth J. H., Pieternelleke Arianne Luning, Martinus A. J. S. van Boekel, and Martin Mulder. 2017. "A Multidimensional Approach to Examine Student Interdisciplinary Learning in Science and Engineering in Higher Education." *European Journal of Engineering Education* 42 (6): 761–774. https://doi.org/10.1080/03043797.2016.1224228.

Stenalt, M. H., and Berit Lassesen. 2022. "Does Student Agency Benefit Student Learning? A Systematic Review of Higher Education Research." *Assessment & Evaluation in Higher Education* 47 (5): 653–669. https://doi.org/10.1080/02602938.2021.1967874.

Tsao, Jack, Gray Kochhar-Lindgren, and Adrian M. H. Lam. 2024. "Institutionalising a Transdisciplinary Curriculum: Assemblages, Territories, and Refrains." *Higher Education*, https://doi.org/10.1007/s10734-024-01250-w.

Turner, Rebecca, Debby Cotton, David Morrison, and Pauline Kneale. 2024. "Embedding Interdisciplinary Learning Into the First-Year Undergraduate Curriculum: Drivers and Barriers in a Cross-Institutional Enhancement Project." *Teaching in Higher Education* 29 (4): 1092–1108. https://doi.org/10.1080/13562517.2022.2056834.

Vereijken, Mayke W. C., Sanne F. Akkerman, Susan F. te Pas, Iris van der Tuin, and Manon Kluijtmans. 2023. "'Undisciplining' Higher Education Without Losing Disciplines: Furthering Transformative Potential for Students." *Higher Education Research and Development* 42 (7): 1762–1775. https://doi.org/10.1080/07294360.2022.2156482.

Vuojärvi, Hanna, Henriikka Vartiainen, Miikka Eriksson, Ilkka Ratinen, Kaija Saramäki, Piritta Torssonen, Petteri Vanninen, and Sinikka Pöllänen. 2022. "Boundaries and Boundary Crossing in a Multidisciplinary Online Higher Education Course on Forest Bioeconomy." *Teaching in Higher Education* 29 (5): 1–18. https://doi.org/10.1080/13562517.2022.2122791.

Wallin, Patric, and Liselott. Aarsand. 2019. "Challenging Spaces: Liminal Positions and Knowledge Relations in Dynamic Research Partnerships." *International Journal for Students as Partners* 3 (1): 69–83. https://doi.org/10.15173/ijsap.v3i1.3739.

Weidenstedt, L., A. Geissinger, B. Leick, and N. Nazeer. 2024. "Betwixt and Between: Triple Liminality and Liminal Agency in the Swedish gig Economy." *Environment and Planning A: Economy and Space* 56 (4): 1280–1297. https://doi.org/10.1177/0308518X231172984.

Weller, Saranne, Grete Domarkaite, Joseph Lam, and Lidya Metta. 2013. "Student-faculty Co-Inquiry Into Student Reading: Recognising SoTL as Pedagogic Practice." *International Journal for the Scholarship of Teaching and Learning* 7 (2), https://doi.org/10.20429/ijsotl.2013.070209.

Zou, Tracy X. P., Gray Kochhar-Lindgren, Andrew Pau Hoang, Kristy Lam, Tom J. Barry, and Lily Y. Y. Leung. 2023. "Facilitating Students as Partners: Co-researching with Undergraduates in Asian University Contexts." *Educational Review* 76 (6): 1–19. https://doi.org/10.1080/00131911.2023.2246674.

Zou, Tracy X. P., J. C. Y. Lee, K. S. Yu, K. L. Chow, T. J. Barry, Lily Y. Y. Leung, and Angela Brew. 2024. "Faculty Members' Perceptions and Students' Experiences of Research-Based Curricula: A Multiple Case Study of Four Undergraduate Programmes." *Higher Education* 88 (3): 1205–1225. https://doi.org/10.1007/s10734-023-01166-x.