



## Knowing your learners: Strategic inclusive educational practices for creative students' transitioning to higher education

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### ABSTRACT

Transitioning from secondary education (SE) to higher education (HE) for students pursuing a creative subject such as Product Design (PD), is fraught with challenges. It is commonplace for first year students studying a creative subject to face various difficulties and this is exacerbated further when considering diverse educational, cultural, and socio-economic backgrounds. Students arrive in HE with varying levels of confidence, communication skills, and in some cases with no prior subject experience resulting in many challenges for academics to mitigate. Furthermore, some students find the transition challenging due to having to unlearn bad habits or overcome limited tuition/guidance due to declining specialist subject knowledge.

This paper presents a case study from Nottingham Trent University, exploring how a PD course team intentionally designed induction activities to support students' transitioning into HE. Drawing on academic insights and student experiences, this article explores how open-ended, iterative, and critique-based learning environments can be unfamiliar/intimidating to new learners. Fear of judgment, social anxiety, and introversion may limit participation, while random groupings can lead to imbalanced teams and limit opportunities for inclusive collaboration. Additionally, students may be reluctant to disclose learning difficulties or mental health concerns, and tutors may not immediately recognize the subtle signs displayed by students if they are struggling.

Through a range of learner-centred strategies including, strategic group formation through friendship clusters, scaffolded critique practices, and early relationship-building activities/approaches, many of the aforementioned issues can be mitigated/overcome. Importantly we will highlight the significance of tutor awareness in identifying hidden barriers to engagement. By 'knowing your learners', educators can foster inclusive, supportive environments that enhance student confidence, collaboration, and development. This contribution adds to the growing literature on inclusive pedagogies, whilst offering practical approaches and advice for educators, academics, early transition specialists, student support practitioners, professional services, educational developers, amongst others. This case study offers transferable, practical strategies that educators/institutions can apply to the design of more inclusive inductions and first-year learning environments, thus helping improve student confidence, engagement, and retention.

**Keywords:** educational transitions, inclusive group work, learning environment adaptation, product design education, student confidence.

## Introduction

The transition from secondary education to higher education (HE) for many students presents a complex set of challenges which educators, academics, educational institutions/practitioners, early transition specialists, student support practitioners and professional services educators/academic developers need to adapt to. This is especially prevalent in creative disciplines, none more so than for students entering Product Design (PD) or Industrial Design (ID) courses. First-year PD/ID students often encounter a steep learning curve as they adapt to academic expectations, studio-based practices, collaborative environments, demanding deadlines, and critique from staff, peers and industry professionals. These difficulties are compounded by the diverse educational, cultural, and socio-economic backgrounds students bring with them, as well as varying levels of prior exposure to the Design & Technology (D&T) subject. D&T has historically been underfunded and drastically cut from certain schools/academies curriculum (Harris, 2021; Tuckett, 2022). In some cases, students arrive in HE with no formal experience in PD, requiring educators to address gaps in confidence, communication, and foundational skills, whilst also ensuring students establish a sense of belonging within their studies and friendship groups.

This article presents a case study from Nottingham Trent University (NTU), where the PD course team developed targeted induction strategies to ease this transition, but also enhance a student's sense of belonging through careful curation of friendship clusters. By examining student experiences and pedagogical needs, we explore how inclusive, learner-centred practices, such as friendship-based group/cluster formation, scaffolded critiques, and early relationship-building, can develop and enable a more supportive and engaging learning environment. Central to this discussion is the role of tutor awareness in identifying and responding to hidden barriers to participation. Through this lens, we join the ongoing conversation about making design and engineering education more diverse and inclusive (Rao & Meo, 2016; Boothe et al., 2018, Wilson et al., 2019; Watkins et al., 2020; Seeschaaf-Veres & Giuliano, 2021; Rossi & Bricchetto, 2024; Heller et al., 2026), whilst also sharing hands-on ideas and strategies that will help tutors support students as they find their feet within HE.

## Rationale & horizon scanning

Research highlights that the early period of university life plays an important role in students' adjustment and sense of belonging. Developing supportive peer relationships and feeling connected to the university community are key to positive transition experiences (Thomas, 2000, 2012; Hommes et.al, 2012; Lane, 2020), and are associated with enhanced wellbeing, satisfaction, and student retention (Maunder, 2017; Gilani & Thomas, 2025). Peer education research highlights the value of both immediate-peer approaches (such as peer learning and cohort-based support) and near-peer models (including peer mentoring and peer transition roles) in fostering early belonging and supporting students' transition into university life (Topping, 2005; Graham et al., 2022; Pointon-Haas et al., 2024; Le at al., 2024). Where belonging is absent, students are more likely to disengage and withdraw, with loneliness identified as the strongest predictor of distress amongst UK undergraduates (McIntyre et al., 2018; Richardson et al., 2017). Course-level transition support and academic staff play a pivotal role in fostering students' sense of belonging (Thomas, 2012). Peer relationships significantly influence transition experiences (Meehan & Howells, 2018) and staff can actively support these by designing curricula that create structured opportunities for meaningful peer interactions and sustained, relational engagement.

In creative disciplines, active collaborative learning (ACL) is a core pedagogical approach that supports creative and professional practice. Collaborative learning enables students to work interdependently, learning with and from peers while building shared ownership of ideas (Scager et al., 2016). Such approaches are closely aligned with the creative process, which requires students to engage in iterative experimentation, reflection, and feedback exchange as part of developing innovative solutions (Daly et al., 2014). As such, inductions that intentionally scaffolds relationships is not an 'add-on' but foundational to learning.

Structured opportunities to form multiple, overlapping peer identities resonate with the Social Identity Model of Identity Change (Griffin et al., 2024), which shows that gaining new social group memberships protect wellbeing during transitions and is associated with a better ability to cope with stress. Intentional design of small-group and peer-learning experiences allow students to feel safe while gradually expanding their networks.

Equally important is the attention to inclusivity and hidden barriers. Early collection of student information, such as learning support needs, technology access, geographic location, or medical considerations, enables staff to anticipate challenges that may not otherwise be disclosed. Evidence suggests that early engagement and staff awareness of student needs, supports timely interventions, reduces inequities, and promotes inclusive learning environments (Thomas, 2012). Recognizing issues like social anxiety or reluctance to share learning needs aligns with inclusive practice, ensuring that no student is disadvantaged in the crucial transition period.

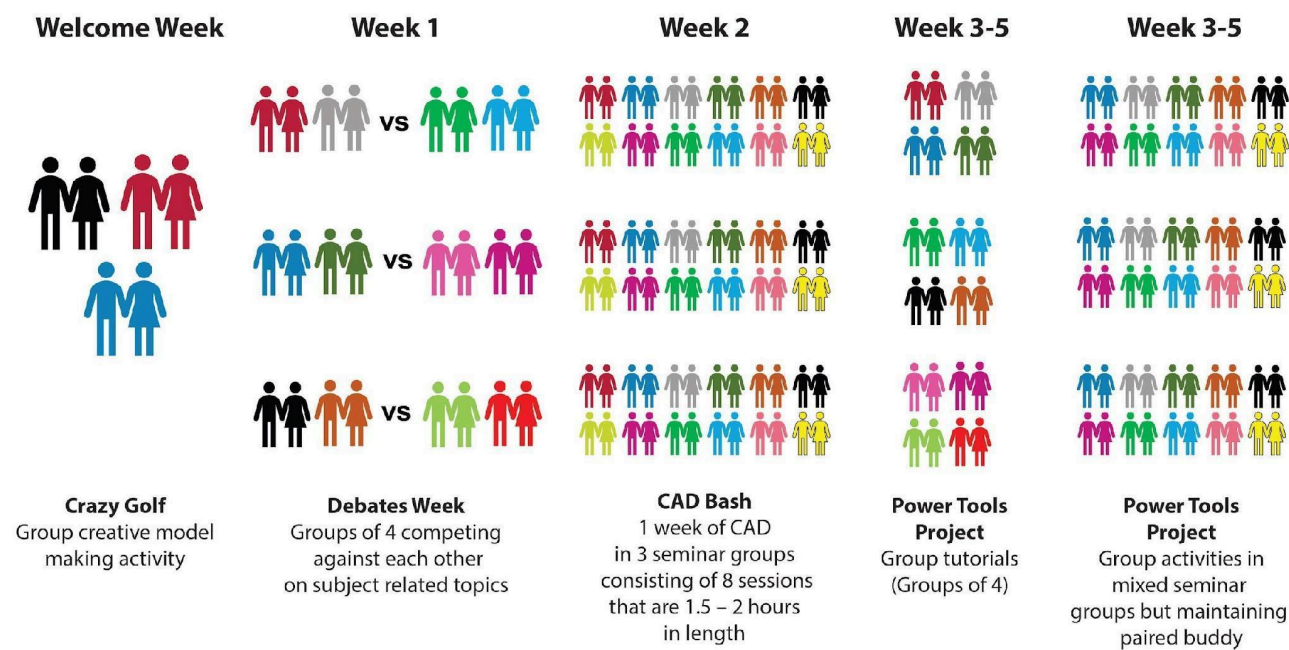
### Approach & logistics

Establishing meaningful peer connections early is critical for a supportive, inclusive learning environment. Strategic group formation can help cultivate 'Friendship Clusters' (FCs). This is a term we define as "small, evolving peer groups/networks that promote collaboration, confidence, and belonging within course cohorts". The term 'Friendship Clusters' has been influenced by academic literature from Christie et al., 2008, who describes the importance of peer networks; Thomas (2012), who provides insights into the significance of belonging and retention; and Lave and Wenger (1991), whose research identifies the importance of social participation and communities of practice. These works highlight that peer networks are groups typically formed during early stages of study that support students' social integration, academic engagement, and sense of belonging which act as core communities which learners use as they transition into higher education practices. In our curriculum we have enabled the development of FCs to occur over a short introductory period (Figure 1) to ensure students create friendships and meet all members of their year group whilst in an academic environment.

Initial groupings for FCs draw upon student complementary skill sets, interests, and learning preferences, identified during an induction week known as 'Welcome Week' at NTU. This information is gathered from a course introductory survey, staff observations of activities during Welcome Week and inductions, and observations gathered from a set of course pre-arrival activities that focuses on student personalities and interests. FCs are intentionally rotated across activities/projects to encourage broader interaction and reduce social silos. Low-stakes, engaging challenges, such as the 'Crazy Golf' (Miniature Golf) model making induction task have been designed to be a playful and collaborative design activity (in groups of six) whereby students design/build imaginative obstacles for a small-scale golf course. Using creative model-making as an activity, this helps break down barriers, build early learning communities, and support

the transition into studio-based practices. Critically an emphasis is placed on experimentation, teamwork, and process rather than the quality of final outcomes (Brook et al., 2024).

Activities such as structured debates, conducted in groups of four help start conversations, trust-building, and shared experiences. Weekly mini-projects and skill preparation weeks, including debates, CAD Bash and a Power Tools redesign project, use seminar-based groupings that maintain familiar pairings while developing FCs through the gradual introduction of new peers. Further information on FC development can be found in the 'implementation of strategic approaches' section of the article and in Figure 2. The integration of these varied collaborative activities and the structured development of FCs ensure there is a balance that helps students expand their social network while retaining stability and minimising anxiety in continual new scenarios. Group tutorials and collaborative activities help reinforce connections, whilst buddy systems and peer mentoring supports interpersonal development. Off-campus trips embed group-based tasks and competition to encourage wider cohort engagement. By aligning FCs with seminar groups and mixing them strategically over time, the course team ensures that students build resilient, diverse peer relationships that enhance both academic and personal growth.



**Figure 1** Friendship Cluster Development: Structured Regrouping of Students That Promotes Early Peer Familiarity While Progressively Broadening Social & Learning Networks Within Course Cohorts.

### Implementation of strategic approaches (Weeks 0-5)

The introductory weeks of the academic year are intentionally structured to support a student's transition into HE through a series of scaffolded, learner-centered activities as described in Figure 2 and explained further in later sections of this article. These activities help the course team focus on de-schooling and creating FCs. De-schooling refers to the process of supporting learners to move away from habits, expectations, and assumptions developed through school-based education, and develop towards more self-directed, inquiry-based approaches that enable a successful transition to HE learning formats and other independent learning environments (Christie et al., 2008; Briggs et al., 2012).

Activities including targeted surveys, personal academic support/pastoral support opportunities, collaborative induction tasks, and foundational skill-building projects help staff create 'student profiles' ensuring all students' needs are captured and supported. Each initiative is designed to help develop early engagement, build confidence, and promote inclusive peer networks. By combining creative practices with strategic group formation and tutor awareness, the course team are able to establish a dynamic and supportive learning environment from the outset.



Figure 2 Overview Schematic of Student Activities Across Weeks 0–5 & Associated Core Learning Activities.

**Week 0 - Welcome Week**

To support a smooth transition into higher education, incoming Product Design students at NTU complete the "Welcome to Nottingham Trent University Product Design" survey. This gathers key data on learning support needs, device access, location, medical considerations, pandemic-related adjustments, and personal details (e.g., preferred names and pronouns), enabling staff to initiate tailored learning design conversations. Students are also introduced into a structured pastoral support programme, including scheduled meetings with personal academic tutors (Weeks 0, 3, 8, and 16), the assignment of a Collaborative Engagement and Retention Team (CERT) mentor, and a one-to-one meeting with the Year Leader to establish rapport and identify individual needs. A creative induction activity themed Crazy Golf (Brook et al., 2024) encourages peer interaction and social integration. Students work in groups of 4–6, with staff observing to enable formation/assignment of collaborative pairs. The activity culminates in a shared course experience, fostering a collaborative ethos and cross-cohort networking.

### **Week 1 - Debates**

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The first week of term features a structured debate project introducing students to university-level research and presentation skills (Siena et al., 2024a). Using predefined resources, students rapidly investigate subject-specific topics and deliver concise presentations followed by live debates. Topics are chosen to spark discussion around controversies in PD, fostering critical thinking and reflective dialogue. Debate groupings are created from Welcome Week cohorts utilising the FC model presented. Groupings for the debates are derived from initial Welcome Week cohorts, with students first paired within their original groups of 4–6. These pairs are then redistributed into new groups of 4–6 students, ensuring a balance between familiar and unfamiliar peers. This approach promotes the first step of generating wider FCs within the course whilst maintaining some continuity through peer relationships. As students debate topics closely aligned with their field of study, they engage with both newly acquainted peers and those with whom they have already established rapport during Welcome Week, thus allowing the building blocks of a dynamic and inclusive learning environment.

### **Week 2 – Accelerated CAD Syllabus (CAD Bash)**

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In the second week of the term, students participate in CAD Bash, which is an intensive Computer Aided Design (CAD) training programme comprising eight SolidWorks sessions over five days (Kennea et al., 2023). Designed to rapidly upskill first-year PD students, it offers a focused introduction to core engineering CAD practices, which is a core competency for any PD/ID student. This training programme is designed to improve technical confidence and garner positive engagement from students in relation to critical software skills which are required for the duration of their degree and their transition into industry. This programme runs alongside a weekly design sketching syllabus (Kennea et al., 2024; Siena et al., 2024b), reinforcing engineering drawing principles and studio-based interpretation. CAD class groupings are informed by early cohort interactions, placing students with peers they have begun to connect with. This promotes a supportive environment for engaging with new software, accommodating varied skill levels within an accelerated learning format.

### **Week 3-5 – Introductory Design Project (Power Tools Redesign)**

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Students begin a three-week design project exploring iterative design methodologies. The project emphasises that initial ideas rarely become solutions, encouraging continuous refinement. Students redesign a selected power tool, applying iterative techniques to develop ideas. To accelerate early skills acquisition through the project, a rotation-based breakout session format is introduced with smaller group activities (Siena et al., 2025). These sessions facilitate activities around research, ideation, design sketching, iteration, ergonomics and collaborative critique/reviews of peer work. The project is further enriched by the integration of reverse engineering principles, including product teardowns/disassembly's which provide insight into existing design solutions and inform the students' own design iterations.

The approach described by Siena et al. (2025) is not new pedagogy but a different approach to implementing structure and timing in a physical design studio space through the delivery of core activities. Design education literature identifies that the studio learning environment is often structured around concurrent, small-group activities, where students move physically and cognitively between making, reflecting, critiquing and iterating (Crowther, 2013; Al Maani & Roberts, 2023). However, the power tools project described by Siena et al. (2025) sets out an explicit structure with specific timings of activities in a

rotation-based breakout format, ensuring that collaboration is scaffolded into early learning with alignment to FCs. This subsequently leads to high engagement with core learning activities/topics.

Active collaborative learning techniques are also used alongside FCs to encourage engagement and adaptability. A critical component of the power tools project involves empathising with a user persona from an unfamiliar demographic, challenging assumptions and broadening perspectives. Each student selects a power tool from a curated list, to ensure diverse outcomes within a consistent assessment framework. The project concludes at the final concept stage, emphasising the quality and rationale of the iterative journey.

### End Of Module Trip (Lea Green Outdoor Activities Centre)

At the conclusion of the introductory period to the course, students participate in an off-campus experience at Lea Green Learning and Development Centre in Derbyshire, UK. This event strategically integrates late enrollers and targets students who may not have formed strong peer connections through the initial FC attempts. This cross-course trip splits students into teams of eight (whilst maintaining a minimum of a friendship pair) and engages students in a series of structured activities including bushcraft, survival skills, ropes courses, and collaborative problem-solving exercises. Each activity is designed to cultivate professional competencies such as leadership, communication, delegation, teamwork, and initiative. The spirit of friendly competition runs throughout, encouraging students to build rapport and strengthen social bonds as they collaborate and compete in academic, skill-based, and physical challenges.

### Emerging outcomes & impact

Based on the outlined weekly activities and interventions, conclusions can be drawn regarding the strategic inclusive approaches used to support PD/ID students transitioning into higher education. The structured induction activities such as debates, CAD Bash, and creative model-making have contributed to consistently high student engagement. Attendance rates for first-year students in cohorts that have ranged from 50-70 students averaged between 74–85% over the past three academic years (2022-23, 2023-24 and 2024-25) with the most recent cohort (2025-26) consisting of 45 students averaging 90%. As we continue to refine activities and opportunities for closer course collaboration, the benefits of structured inductions clearly demonstrate sustained participation and minimise disengagement.

Group-based learning experiences, particularly collaborative problem-solving and creative tasks, have enabled FCs to form/grow, promoting a culture of peer support. Students are intentionally grouped to balance familiarity with new social connections. This helps reduce anxiety by encouraging shared learning while gradually introducing new members. Activities such as the Crazy Golf model-making project (Brook et al., 2024) and off-campus experiences have facilitated broader friendship groups across the cohort through healthy competition and collaboration.

At first the 'curation of friendship clusters' helps support the students' scaffolded learning, allowing students to get to know their peers and course mates, however it is important to note that friendships then naturally develop. Subsequently it is then important for staff to adjust their plans by adapting to the evolving FCs and the developing peer collaboration. Subsequently, additional learning initiatives become more successful as students feel more comfortable networking beyond their immediate FCs, contributing to a more inclusive and socially cohesive learning environment.

Greater engagement occurs when students feel they are part of a group but also when they feel supported by academics committed to learning (McInnis, 2003). While these initiatives offer positive outcomes,

students who join late or skip early activities may experience social isolation regardless of staff intervention. Despite one-to-one and targeted support, these individuals may struggle to integrate into established peer networks formed from the initiatives implemented. This highlights a small subset of students who do not engage in the structured activities and therefore they may be at increased risk of academic and social disengagement. Although these numbers are minimal, this emphasizes the importance of continued monitoring and integration efforts beyond the initial initiatives. Student feedback has highlighted the positive impact the introductory programme has had on their studies and their friendship group development:

**Student Quote 1:** “During the first 5 weeks I formed the strongest relationships of my university career. This introduced me to most of my course mates and gave me better conversational and social skills that allowed me to engage in the whole university experience”.

**Student Quote 2:** “I found that the first 5 weeks with group projects and course socials allowed me to get to know my peers. My sketching and CAD groups in particular allowed me to get to know people outside my usual circle”.

**Student Quote 3:** “The first five weeks of the term formed the majority of my friendships and relationship up until my final year, including choosing my housemates after first year. The variety of activities helped me get to know most of my course in a short time period, and I can confidently say in final year that I am friendly with all my course mates and have made friendships for life”.

**Student Quote 4:** “In the welcome week activity, I ended up meeting and befriending close friends and housemates to be. The structure of these first weeks helped inform the rest of my time at university”.

**Student Quote 5:** “During the opening weeks of my first year, we were tasked with doing a variety of team-based projects. During these, it introduced me to two people in my group and two people in the group next to me, with whom I got along very well with. This gave us the opportunity to get to know each other, attend fresher’s fairs together, and quickly become close friends in a city full of strangers. Now in my final year, these friends are and have been my closest friends, and I have lived with one of them for the past 3 years”.

### Practical guidance & conclusions

Drawing upon the case study presented in this article, we can provide a top ten list of practical guidelines/key principles that other academics/educators can adopt/implement. These focus on inclusive and strategic educational practices that enable students to have a smoother transition into higher education.

1. Treat student transition as an extended, structured induction process across the first 4–6 weeks of their learning, not just as one-off induction.
2. Design early academic curriculum activities that help prioritise relationship-building as foundational to learning, wellbeing, and retention.
3. Use data to help inform FC group formation. This approach should be used rather than random student allocation. This reduces student anxieties and supports inclusion. Getting to know your students’ preferences as early as possible is critical.

4. Curate small evolving FCs that gradually increase in size, but balance stability with a diverse and familiar range of new and consistent peers.
5. Collect early student insights (e.g. confidence, access, learning needs) to identify hidden barriers thus helping prevent problems from emerging. Using personal academic tutorials to gain these insights is essential.
6. Explicitly scaffold “de-schooling” into the early stages of the curriculum by helping students adjust to self-directed and inquiry-based HE learning practices through active collaborative learning approaches.
7. Introduce collaborative and critique-based learning progressively, using clear structures to lower participation barriers and anxiety.
8. Maintain a balance between continuity and change in group work to build confidence whilst widening social networks gradually over the introductory period.
9. Embed pastoral support and tutor visibility into the curriculum from the outset, whilst informing students on a clear structure aligned to support mechanisms such as personal academic tutors, student mentors etc.
10. Monitor engagement and adapt practices iteratively, recognising that inclusive education design must evolve alongside the cohort whilst accepting this will differ between different cohorts year on year.

In conclusion, course teams are uniquely positioned to adopt smooth social and academic transitions if a clear structure is put in place. By intentionally designing extended inductions that prioritize relationships and inclusiveness, this can enhance belonging, wellbeing, and retention while aligning with the pedagogical culture of a subject discipline. Future research over the course of future academic years will enable data to be captured across multiple cohorts enabling a full evaluation of the approach as well as developing an understanding of the impact this initiative has on a range of cohorts with varying peer dynamics.

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## References

- Al Maani, D., & Roberts, A. (2023). An Attempt to Understand the Design Studio as a Distinctive Pedagogical Setting. *The International Journal of Design Education*, 17(2), 31-44.  
<https://doi.org/10.18848/2325-128X/CGP/v17i02/31-44>
- Briggs, A. R. J., Clark, J., & Hall, I. (2012). *Building bridges: Understanding student transition to university*. *Studies in Higher Education*, 37(1), 37–54. <https://doi.org/10.1080/03075079.2010.488377>
- Brook, E. E., Siena, F. L., & Riding, G. T. (2024). A hole in one: breaking barriers & creating communities by engaging product design students with creative model making & collaboration events. The Design Society.  
[https://www.designsociety.org/publication/47212/a\\_hole\\_in\\_one\\_breaking\\_barriers\\_creating\\_communities\\_by\\_engaging\\_product\\_design\\_students\\_with\\_creative\\_model\\_making\\_collaboration\\_events](https://www.designsociety.org/publication/47212/a_hole_in_one_breaking_barriers_creating_communities_by_engaging_product_design_students_with_creative_model_making_collaboration_events)
- Boothe, K. A., Lohmann, M. J., Donnell, K. A., & Hall, D. D. (2018). Applying the principles of universal design for learning (UDL) in the college classroom. *Journal of Special Education Apprenticeship*, 7(3), n3.  
<https://eric.ed.gov/?id=EJ1201588>
- Christie, H., Tett, L., Cree, V. E., Hounsell, J., & McCune, V. (2008). "A real rollercoaster of confidence and emotions": Learning to be a university student. *Studies in Higher Education*, 33(5), 567–581.  
<https://doi.org/10.1080/03075070802373040>
- Crowther, P. (2013). Understanding the signature pedagogy of the design studio and the opportunities for its technological enhancement. *Journal of Learning Design*, 6(3), 18-28. <http://dx.doi.org/10.5204/jld.v6i3.155>.
- Daly, S. R., Mosyjowski, E. A., & Seifert, C. M. (2014). Teaching creative process across disciplines. *Journal of Engineering Education*, 103(4), 618–644. <https://doi.org/10.1002/jee.20061>
- Gilani, D., & Thomas, L. (2025). Understanding the factors and consequences of student belonging in higher education: A critical literature review. *Journal of Learning Development in Higher Education*, (34).  
<https://files.eric.ed.gov/fulltext/EJ1464789.pdf>
- Graham, M., Wayne, I., Persutte-Manning, S., Pergantis, S., & Vaughan, A. (2022). Enhancing Student Outcomes: Peer Mentors and Student Transition. *International Journal of Teaching and Learning in Higher Education*, 34(1), 1-6.
- Griffin, S. M., McGowan, N., McEwan, C., Baird, A., & Gallagher, S. (2024). Identity change and the transition to university: Implications for cortisol awakening response, psychological well-being and academic performance. *Applied Psychology: Health and Well-Being*  
[https://pure.qub.ac.uk/files/623529439/Applied\\_Psych\\_Health\\_-2024-Griffin-\\_Identity\\_change\\_and\\_the\\_transition\\_to\\_university\\_Implications\\_for\\_cortisol.pdf](https://pure.qub.ac.uk/files/623529439/Applied_Psych_Health_-2024-Griffin-_Identity_change_and_the_transition_to_university_Implications_for_cortisol.pdf)
- Harris, G. (2021, September 28). UK government approves 50% funding cut for arts and design courses. *The Art Newspaper* - International art news and events.  
<https://www.theartnewspaper.com/2021/07/22/uk-government-approves-50percent-funding-cut-for-arts-and-design-courses>
- Heller, B., Pakala, K., Lowenthal, P. R., Jankowski, E., Hamby, A., & Adams, S. (2026). Inclusive curricular interventions and pedagogy in undergraduate engineering: a literature review. *Discover Education*.
- Hommel, J., B. Rienties, W. de Grave, G. Bos, L. Schuwirth, & Scherpbier, A. (2012). "Visualising the Invisible: A Network Approach to Reveal the Informal Social Side of Student Learning." *Advances in Health Sciences Education* 17(5): 743–57. doi:10.1007/s10459-012-9349-0.
- Kennea, P., Siena, F. L., Forbes, C., Malcolm, R., Martin, L., Stewart, J., ... & Pope, D. (2023). CAD bash: accelerating 2D/3D computer aided design competencies for first year product design students. In *DS 123: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2023)*.  
<https://doi.org/10.35199/EPDE.2023.49>
- Kennea, P., Malcolm, R., Luke Siena, F., Stewart, J., & Cutts, A. (2024). The Power Of The Pen/Pencil: Developing A Design Sketching Syllabus To Help 1st Year Product Design Students Communicate Effectively. DRS Digital Library -

- DRS Biennial Conference Series: The Power Of The Pen/Pencil: Developing A Design Sketching Syllabus To Help 1st Year Product Design Students Communicate Effectively
- Lane, S.R. (2020). 'Addressing the stressful first year in college: could peer mentoring be a critical strategy?'. *Journal of College Student Retention: Research, Theory & Practice*, 22(3), 481–496. Available at: <https://doi.org/10.1177/1521025118773319>.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Le, H. G., Sok, S., & Heng, K. (2024). The Benefits of Peer Mentoring in Higher Education: Findings from a Systematic Review. *Journal of Learning Development in Higher Education*. <https://eric.ed.gov/?id=EJ1447398>
- Maunder, R. E. (2017). Students' peer relationships and their contribution to university adjustment: The need to belong in the university community. *Journal of Further and Higher Education*, 42(6), 756–768 <https://doi.org/10.1080/0309877X.2017.1311996>
- McInnis, C. (2003, August). New realities of the student experience: How should universities respond. In *25th Annual Conference European Association for Institutional Research* (pp. 24-27). University of Limerick.
- McIntyre, J. C., Worsley, J., Corcoran, R., Harrison Woods, P., & Bentall, R. P. (2018). Academic and nonacademic predictors of student psychological distress: The role of social identity and loneliness. *Journal of Mental Health*. <https://doi.org/10.1080/09638237.2018.1437608>
- Meehan, C., & Howells, K. (2018). In search of the feeling of 'belonging' in higher education: Undergraduate students' transition into higher education. *Journal of Further and Higher Education*, 43(10), 1376–1390. <https://doi.org/10.1080/0309877X.2018.1490702>
- Pointon-Haas, J., Waqar, L., Upsher, R., Foster, J., Byrom, N., & Oates, J. (2024). A systematic review of peer support interventions for student mental health and well-being in higher education. *BJPsych open*, 10(1), e12. <https://doi.org/10.1192/bjo.2023.603>
- Rao, K., & Meo, G. (2016). Using universal design for learning to design standards-based lessons. *Sage Open*, 6(4), <https://doi.org/10.1177/2158244016680688>
- Richardson, T., Elliott, P., & Roberts, R. (2017). Relationship between loneliness and mental health in students. *Journal of Public Mental Health*, 16(2), 48–54. <https://doi.org/10.1108/JPMH-03-2016-0013>
- Rossi, E., & Brischetto, A. (2024). Contribution of the equality, diversity, and inclusion concept to design education: A systematic literature review. *Sustainability*, 16(19), 8478. <https://doi.org/10.3390/su16198478>
- Scager, K., Akkerman, S. F., Pilot, A., & Dam, G. T. (2016). Collaborative learning in higher education: Evoking positive interdependence. *Cultural Studies of Science Education*, 11(4), 727–750. <https://doi.org/10.1007/s11422-015-9742-7>
- Seeschaaf-Veres, A., & Giuliano, M. (2021). Designing for equity, accessibility, diversity and inclusion in an undergrad Industrial Design course. In *DS 110: Proceedings of the 23rd International Conference on Engineering and Product Design Education (E&PDE 2021)*, VIA Design, VIA University in Herning, Denmark. 9th-10th September 2021.
- Siena, F. L., Malcolm, R., Kennea, P., Forbes, C., & Stewart, J. (2024a). Reimagining design fundamentals: deschooling 1st year product design students. In *DS 131: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2024)* (pp. 324-329). <https://doi.org/10.35199/EPDE.2024.55>
- Siena, F. L., Malcolm, R., Kennea, P., Stewart, J., & Cutts, A. (2024b). The trajectory of design sketching: an inquiry into educational pathways, higher education transitions & design sketching syllabus development for 1st year product design students. In *DS 131: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2024)* (pp. 330-335). <https://doi.org/10.35199/EPDE.2024.56>
- Siena, F. L., Malcolm, R., & Kennea, P. (2025). DEVELOPING IDEATION & ITERATIVE DESIGN SKILLS THROUGH HUMAN-CENTRED PRODUCT DESIGN PROJECTS. In *DS 137: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2025)* (pp. 595-600).
- Thomas, S. L. (2000). Ties that bind: A social network approach to understanding student integration and persistence. *The journal of higher education*, 71(5), 591–615.
- Thomas, L. (2012). *Building student engagement and belonging in higher education at a time of change: Final report from the What Works? Student Retention & Success programme*. Paul Hamlyn Foundation. <https://www.phf.org.uk/publications/what-works-student-retention-success-report>

Topping, K. J. (2005). *Trends in Peer Learning*. *Educational Psychology*, 25(6), 631–645.

<https://doi.org/10.1080/01443410500345172>

Tuckett, S. (2022). A spotlight on Design and Technology study in England: Trends in subject take up and the teacher workforce. *Education Policy Institute*.

<https://www.data.org.uk/media/4402/spotlighton-dt-report-epi-march-2022.pdf>

Watkins, C., Treviranus, J., & Roberts, V. (2020). Inclusive design for learning: Creating flexible and adaptable content with learners. [https://openresearch.ocadu.ca/id/eprint/3142/1/2020\\_Inclusive\\_Design\\_for\\_Learners.pdf](https://openresearch.ocadu.ca/id/eprint/3142/1/2020_Inclusive_Design_for_Learners.pdf)

Wilson, N., Thomson, A., Thomson, A., & Holliman, A. F. (2019). *Understanding inclusive design education*. Proceedings of the International Conference on Engineering Design, 1(1), 3341–3350. <https://doi.org/10.1017/dsi.2019.66>