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Active Learning Strategies in Purposefully Designed Learning Spaces: A Mixed-Methods Quality Improvement Project in a UK Higher Education Institution

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Abstract

Further and higher education has moved from teacher-centred, transmission-based teaching towards student-centred pedagogy. Active learning strategies, supported by well-designed learning spaces, are widely advocated as a means of improving student engagement, critical thinking and problem-solving. Evidence from UK further education settings, and from Level 4 HND and DET provision delivered within higher education institutions (HEIs), remains limited. This Quality Improvement Project (QIP), conducted in 2022, evaluated the effectiveness of integrating active learning strategies within purposefully designed learning environments in a UK HEI, and explored educator and student perceptions of these spaces. A mixed-methods design was used. A total of 125 participants took part: 25 teachers and 100 students drawn by purposeful sampling from Level 4 HND and DET programmes across different disciplines and backgrounds. Data were collected through pre- and post-implementation interviews, focus groups, semi-structured interviews with students and faculty, participant observation and online surveys, and were analysed through methodological triangulation. The project produced consistently positive results. Students reported that the learning spaces encouraged them to spend more time on campus, that social interaction improved and that peer support was utilised. Teachers reported witnessing greater engagement and more supportive classrooms. Overall participant results improved from 68% to 81%, a gain of 13 percentage points. Student reports, teacher reports, observational data and survey responses converged on improved engagement, interaction and peer support. Integrating active learning strategies within purposefully designed learning spaces was associated with improved engagement, peer support and overall participant results in this UK HEI context. The findings indicate that space alone is insufficient: positive change depends on active pedagogy, teacher confidence in using the space, inclusive norms and sustained staff development.

Keywords: active learning; learning spaces; student engagement; higher education; further education; quality improvement; mixed methods; pedagogy

1. Introduction

The traditional model of education, in which students passively receive information from teachers, has been increasingly questioned as further and higher education have moved towards student-centred pedagogy. Within this shift, flipped learning has become a prominent approach: learners meet content beforehand through digital resources, and in-class time is then used for discussion and application, which promotes active participation over passive listening. Learning spaces designed to support collaboration and interaction have been proposed as a way of strengthening this pedagogical shift.

The relationship between space and pedagogy is receiving sustained research attention. A recent narrative review of learning spaces in higher education concluded that the design and use of learning environments may substantially influence student engagement and motivation, and that physical features such as seating arrangements, lighting and acoustics matter alongside technology (Papaioannou et al., 2023). A systematic review of active learning spaces likewise notes that the literature lacks a consistent definition and terminology, although the many labels in use all refer to spaces enhanced with technology to support learning through social interaction and collaboration (Carlos et al., 2023).

The quantitative case for active learning is well established. A meta-analysis of 225 studies comparing active learning with traditional lecturing in undergraduate science, technology, engineering and mathematics found that examination performance improved by approximately half a standard deviation under active learning, and that failure rates were 1.5 times higher under lecturing (Freeman et al., 2014). The case for the physical environment is also strengthening: a systematic review of the effects of learning environments on student outcomes identified evidence that different spatial arrangements influence learning outcomes, while cautioning that much of the available evidence is methodologically uneven (Byers et al., 2018), and a mixed-methods systematic review of flexible learning spaces reported greater on-task engagement, more collaboration and interaction, and higher academic results than in traditional classrooms (Kariippanon et al., 2021).

Despite this growing literature, much of the evidence on active learning spaces comes from universities or from school sectors, and relatively little concerns UK further education or Level 4 HND and DET provision delivered within HEIs, where learner profiles, programme structures and resourcing differ. This Quality Improvement Project (QIP) was designed

to address that gap. It examined how active learning strategies, embedded in thoughtfully designed learning environments, were perceived by educators and students, and what practical lessons could be drawn for improving teaching quality.

The remainder of the article reviews the relevant literature, sets out the aims and methodology, presents the findings, discusses their implications and limitations, and closes with recommendations for practice.

2. Literature Review

2.1 From passive reception to active learning

Active learning positions students as participants who construct understanding through discussion, problem-solving and application, rather than as recipients of content. Its adoption is shaped by organisational as well as pedagogical conditions. A rapid review of European studies of active lessons found that students in active learning conditions generally outperformed those in non-active conditions, and concluded that positive outcomes depend on favourable change mechanisms: proactive leadership, teacher engagement, the ease of finding and implementing active approaches, and their genuine integration into curricula and lessons (Bailey et al., 2023). That review concerned school classrooms and used a broad conception of active learning that includes physical activity, so its findings are best treated as indicative of implementation conditions rather than as direct evidence for further or higher education.

Where active learning has been tested at scale in higher education, the effects are substantial. Freeman et al. (2014) demonstrated performance gains and reduced failure rates across STEM disciplines, establishing that the pedagogical approach itself, not merely student enthusiasm, drives improvement. The implication for the present project is that redesigned space is most plausibly effective when it is accompanied by genuinely active pedagogy.

2.2 Active learning spaces and student engagement

Active learning spaces are physical or virtual environments intended to support interaction, collaboration and flexibility. A qualitative systematic literature review of their design and assessment reported that no consensus exists on a definition, and that the variety of terms in use, such as innovative learning environment, active learning lab and technology-enhanced learning space, reflects inconsistent nomenclature (Carlos et al., 2023). A systematic mapping review of innovative learning spaces in higher education has similarly charted research themes in this area and underlined the breadth of the field (Khamitova, 2023; Chohan et al., 2018).

The empirical record linking space to engagement is accumulating. The mixed-methods review by Kariippanon et al. (2021) found that flexible learning spaces, combined with student-centred pedagogy and a range of furniture and layout options, were associated with greater on-task engagement, more collaboration and interaction, and higher academic results than traditional classrooms. Byers et al. (2018) reached a compatible but more cautious conclusion, finding evidence that spatial arrangements affect learning outcomes while stressing the scarcity of rigorous empirical data and the confounding of space with pedagogy and technology. Foundational work by Woolner et al. (2012) is relevant here: changing space can act as a lever for changing practice, but only when the process is participatory and challenges teachers' preconceptions about what a classroom affords.

A narrative review covering studies published between 2003 and 2022 reported that flexible classrooms, collaborative spaces and technology-rich environments are associated with interactive and collaborative learning, with higher engagement and active participation, and identified furniture arrangement, lighting and acoustics as factors influencing student enthusiasm (Papaioannou et al., 2023). The same review noted that further research is needed on how specific spatial layouts relate to broader capabilities such as creativity, critical thinking, communication and collaboration.

2.3 Digital, hybrid and online learning spaces

Learning spaces are no longer only physical. Papaioannou et al. (2023) identify challenges in hybrid and remote spaces, including reduced face-to-face interaction and a heightened demand for skilled instructional and technological support. A particularly visible issue in online and hybrid settings is whether students switch their cameras on. In a phenomenographic study of 82 first-year undergraduate and doctoral students, participants associated cameras with social presence, quality of study and the ability to interact, reported feeling less inclined to participate when cameras were off, and also cited multitasking, concern about their background, psychological barriers and poor connections as reasons for switching cameras off (Sederevičiūtė-Pačiauskienė et al., 2022). A cross-sectional study of dental students found that most kept their webcams off, mainly for comfort and to avoid distractions, and that students tended to turn webcams off when they were inattentive (Ahmed et al., 2020; Farid et al., 2022). Evidence on the consequences is mixed: students who used cameras reported more positive outcomes in one study, yet reported no significant difference when their peers' cameras were on or off (Johnson & Knoster, 2023). Taken together, these studies suggest that engagement in online spaces depends on deliberate pedagogical design and transparent norms rather than on camera use alone.

2.4 Rationale for the present project

The literature indicates that space, pedagogy and technology interact, that terminology and measurement are inconsistent, and that evidence from UK further education and from Level 4 HND and DET provision in HEIs is sparse. Practitioners also lack practical, context-specific guidance on how to design and use active learning spaces. Much of the existing evidence also conflates the physical environment with concurrent pedagogical change, making it difficult to determine what practitioners should actually do (Byers et al., 2018; Carlos et al., 2023). This project responds to those gaps through a small-scale, practice-based quality improvement inquiry conducted in a single UK HEI.

3. Aim and Objectives

The project aimed to explore how physical learning environments can optimise student engagement and learning outcomes, while acknowledging the evolving needs of students and contemporary education. Its objectives were to:

1. Investigate student and educator perceptions of active learning spaces.
2. Provide empirical evidence on the efficacy of active learning spaces in UK further and higher education.

3. Offer practical recommendations for optimising active learning space design and utilisation.
4. Contribute to the discourse on effective pedagogy and educational space design.
5. Support the creation of learning environments that address diverse student needs and foster the competencies required in the modern workforce.

4. Methodology

4.1 Design

The project used a mixed-methods quality improvement design to assess the impact of active learning spaces. Pre- and post-implementation interviews were used to gauge changes in engagement and learning outcomes. Qualitative data were collected through focus groups and semi-structured interviews with students and faculty to capture experiences, perceptions and challenges relating to active learning spaces. Participant observation and online surveys complemented these sources. The design reflects the recognition within the learning-spaces literature that environmental effects cannot be meaningfully separated from pedagogy and technology, and that qualitative process data are therefore essential alongside outcome measures (Byers et al., 2018; Carlos et al., 2023).

4.2 Setting and participants

The project was conducted in 2022 in a UK higher education institution delivering Level 4 HND and DET programmes. Purposeful sampling was used to invite 125 participants: 25 teachers and 100 students. Student participants were Level 4 learners enrolled on HND and DET programmes across different disciplines; teacher participants were academic staff teaching on those programmes. This sampling strategy was adopted because the evidence base on active learning spaces is dominated by university and school studies, while Level 4 HND and DET provision in UK HEIs has distinctive learner profiles, programme structures and resourcing. The teacher sample provided a complementary perspective on the same intervention, allowing the project to compare how space was experienced by those learning in it and by those teaching in it.

4.3 Data collection

Data collection took place in 2022 across two phases: a pre-implementation phase and a post-implementation phase following the introduction of the redesigned learning environment and associated active learning strategies. The intervention comprised the reconfiguration of the physical learning environment to support flexible grouping and collaborative work, together with the adoption of active learning approaches in timetabled sessions, including pre-session preparation, group problem-solving, peer discussion and application tasks.

Interviews and focus groups followed a semi-structured schedule covering perceptions of the learning environment, changes in engagement and participation, collaboration and peer support, and challenges encountered. The online survey captured student and teacher perceptions of engagement, participation, collaboration and perceived learning. Participant observation was used to record interaction patterns, grouping and use of the physical environment during sessions.

4.4 Data analysis

Qualitative data were analysed thematically, involving familiarisation with transcripts, initial coding, generation and review of themes, and definition of final themes. Survey data were analysed descriptively to characterise perceptions of engagement, participation and collaboration before and after implementation. Findings from observation, interviews and surveys were integrated through methodological triangulation, in which each source was used to corroborate, refine or challenge the others, strengthening validity.

4.5 Rigour and ethics

Methodologies were planned carefully, using purposeful sampling, standardised research tools and pilot testing. Triangulation of qualitative and quantitative methods was used to improve validity. The project was reviewed and approved by the institution's research ethics committee prior to data collection. Informed consent was obtained from all participants, participation was voluntary, and participants were assured of anonymity and confidentiality. Data were anonymised at the point of transcription and stored securely in accordance with institutional data protection requirements.

5. Findings

The project found consistently positive results across data sources. Three interconnected themes emerged: (1) the learning space as a reason to remain on campus; (2) improved social interaction and use of peer support; and (3) greater engagement and more supportive classrooms as reported by teachers. These themes were corroborated by the quantitative outcome data, which showed an improvement in overall participant results from 68% to 81%.

Table 1. Summary of findings by data source

Data source	Participants	Principal finding
Student focus groups and interviews	100 students (Level 4 HND and DET)	Spaces encouraged more time spent on campus; improved social interaction; peer support utilised
Teacher semi-structured interviews	25 teachers	Greater engagement observed; more supportive classrooms
Participant observation	Sessions observed during implementation	Increased interaction, grouping and collaborative activity

Online survey	Students and teachers	Positive perceptions of engagement, participation and collaboration
Overall participant results	All participants	Improved from 68% to 81% (+13 percentage points)

5.1 Student engagement and participation

Students reported that the purposefully designed learning spaces encouraged them to spend more time on campus. In their accounts, the spaces were experienced not simply as rooms in which teaching happened, but as environments that made staying, talking and working together more likely. This represents a meaningful shift in engagement, since time on campus creates opportunities for informal interaction, access to staff and peer learning that would otherwise be lost.

Students also reported that social interaction improved and that peer support was utilised more effectively. These findings indicate that the redesigned environment and the active strategies used within it created conditions in which learners were more willing and able to work with one another. Teacher participants corroborated these accounts, reporting that they witnessed more engagement and more supportive classrooms.

The quantitative outcome data were consistent with these qualitative reports: overall participant results improved from 68% to 81%, a gain of 13 percentage points. This descriptive comparison should be interpreted alongside the qualitative and observational evidence rather than as proof of a causal effect of space alone. Nevertheless, the convergence of student reports, teacher reports and outcome data strengthens the plausibility that the intervention was associated with improved engagement and participation.

These findings align with evidence that flexible learning spaces support on-task engagement and peer interaction (Kariippanon et al., 2021) and with broader evidence that active learning conditions improve performance and reduce failure (Freeman et al., 2014).

5.2 Critical thinking, collaboration and problem-solving

The strongest direct evidence from this project concerns collaboration and peer support rather than critical thinking or problem-solving as separately measured constructs. Students reported improved social interaction and greater use of peer support, and teachers reported more supportive classrooms. These findings indicate that the spaces and associated active strategies created conditions in which learners were more willing and able to collaborate, explain ideas to one another and draw on peer expertise.

This is consistent with systematic review evidence that spatial arrangements can influence learning outcomes and interaction (Byers et al., 2018) and with mixed-methods evidence that flexible spaces are associated with more collaboration and interaction (Kariippanon et al., 2021; Bhatti et al., 2021). It is also consistent with the argument that changed space can alter practice when it challenges preconceptions about what a classroom affords (Woolner et al., 2012).

Critical thinking and problem-solving should not be overclaimed. The defensible conclusion is that the project produced positive evidence of improved collaboration, social interaction and peer support, which are plausible precursors to critical thinking and problem-solving in active learning environments. The improvement in overall results from 68% to 81% provides corroborating outcome evidence, but it does not by itself demonstrate gains in critical thinking as a discrete capability. This distinction matters because the learning-spaces literature has been criticised for conflating space, pedagogy and technology when attributing outcomes (Carlos et al., 2023; Byers et al., 2018).

5.3 Educator perspectives

The 25 teacher participants reported witnessing more engagement and more supportive classrooms. Their perspective is important because teachers are the key mediators of whether a designed space is used actively or conventionally. The teachers' reports suggest that the spaces were experienced as usable pedagogical environments rather than merely as physical upgrades, and that the change in environment was accompanied by a change in classroom dynamics.

This aligns with evidence that co-creation of value with staff and students helps sustain a shift from lecture-based teaching to active learning pedagogies, and with the finding that participatory redesign processes challenge entrenched preconceptions and alter practice (Woolner et al., 2012). It also supports the implementation conditions identified by Bailey et al. (2023): leadership, teacher engagement, ease of implementation and genuine curriculum integration are decisive for whether active approaches deliver their intended benefits.

The project did not produce quantified data on specific training needs. The practical implication of the educator findings is nonetheless clear: staff development should focus on how to use active learning spaces purposefully, rather than assuming that new furniture or layout will change practice on its own.

5.4 Triangulation of sources

Triangulation showed convergence across data sources. Student reports of spending more time on campus, improved social interaction and greater use of peer support converged with teacher reports of more engagement and supportive classrooms, with observational evidence of increased interaction and collaborative activity, and with the improvement in overall results from 68% to 81%. This convergence strengthens the credibility of the findings and is consistent with the logic of methodological triangulation, in which each source is used to corroborate, refine or challenge the others.

The main limitation of the triangulation is that the project did not identify substantial divergent findings across sources. Where divergence might exist at a finer level of analysis—for example, differences between programmes or between students who were initially reluctant to use the space—this should be reported from the full dataset before publication. On the evidence available, the most defensible synthesis is that the intervention was associated with improved engagement,

social interaction, peer support and overall results, while causality remains uncertain because of the small-scale QIP design and the confounding of space with pedagogy and technology.

6. Discussion

This project set out to examine how active learning strategies, embedded in purposefully designed learning environments, were perceived by educators and students in a UK HEI, and what practical lessons could be drawn for improving teaching quality. The findings indicate that the intervention was associated with improved engagement, social interaction, peer support and overall results, with convergence across student reports, teacher reports and outcome data.

First, the findings should be positioned within the evidence that learning-space design and use may influence engagement and motivation (Papaioannou et al., 2023). The student report that the spaces encouraged them to spend more time on campus is a particularly notable form of engagement, since it extends beyond the timetabled session into the wider campus experience. The broader literature attributes such effects to the combination of flexible space, appropriate technology and interactive pedagogy, rather than to space alone (Carlos et al., 2023). This project is consistent with that interpretation: the improvement from 68% to 81% occurred alongside pedagogical change, and the design does not permit the effects of space to be separated from those of pedagogy. The convergence of teacher and student accounts nonetheless suggests that the environment was experienced as enabling rather than incidental. The implementation conditions identified by Bailey et al. (2023) leadership, teacher engagement, ease of implementation and curriculum integration—are likely to have been important mediators here, and would be expected to determine whether comparable initiatives elsewhere produce similar results.

Second, the findings on social interaction and peer support warrant particular attention. Students reported that peer support was utilised, and teachers reported more supportive classrooms. This is important because peer support is a mechanism through which active learning environments plausibly affect outcomes: when students explain ideas to one another, seek help and collaborate, they engage in the kind of elaborated processing that supports deeper learning. The evidence is consistent with mixed-methods findings that flexible spaces increase collaboration and interaction (Kariippanon et al., 2021; Iqbal et al., 2020) and with the argument that spatial change can challenge and reshape practice when approached participatively (Woolner et al., 2012). At the same time, the caution of Byers et al. (2018) applies: spatial arrangements are associated with outcomes, but the evidence base linking specific layouts to specific learning gains remains limited.

Third, the project's contribution lies in providing practice-based evidence from Level 4 HND and DET programmes in a UK HEI, a setting under-represented in a literature dominated by university and school studies (Khamitova, 2023; Papaioannou et al., 2023). The findings offer a practitioner-facing account of what changes when space and pedagogy are addressed together, and they indicate that benefits are attainable in provision that is often resourced more modestly than traditional undergraduate programmes.

Fourth, although the project did not focus primarily on hybrid and online delivery, the wider literature indicates that digital and hybrid spaces present distinct challenges, including reduced face-to-face interaction and heightened demand for instructional and technological support (Tarar et al., 2021; Papaioannou et al., 2023). Where online sessions form part of active learning provision, transparent and inclusive norms are preferable to blunt mandates, because students link cameras to interaction and participation but also report legitimate barriers relating to privacy, background and connectivity (Farid et al., 2022; Johnson & Knoster, 2023; Sederevičiūtė-Pačiauskienė et al., 2022).

7. Limitations and Delimitations

The sample of 125 participants, while substantial for a practice-based QIP, was drawn from a single UK HEI and from Level 4 HND and DET programmes, which limits generalisability to other institutions, levels and programme types. The self-reported nature of interview and focus-group discourse, together with perception bias and time constraints, may have affected the data. The sample was recruited through purposeful selection, so the findings should be read as context-specific rather than as representative of the wider sector.

These limitations were managed through purposeful sampling, pilot testing, standardisation of research tools and triangulation of qualitative and quantitative methods to improve validity. Nonetheless, the improvement in overall results from 68% to 81% should be treated as a descriptive association within a quality improvement design rather than as a causal estimate. The project did not include a longitudinal follow-up, and the learning-spaces literature suggests that novelty effects may inflate early engagement gains and that sustained change depends on teachers' confidence and continuing use of active strategies. Future research should use larger and more varied samples, multiple institutions and longitudinal designs, and should examine whether gains are sustained beyond the first cycle of implementation.

8. Recommendations

1. **Embed active learning spaces in institutional infrastructure.** Institutions should incorporate active learning spaces to foster interactive and engaging environments, supported by the leadership and curriculum integration highlighted by Bailey et al. (2023), and by evidence that flexible spaces can shift on-task behaviour and peer interaction (Kariippanon et al., 2021).
2. **Design with inclusivity in mind.** Spaces should accommodate diverse learners, including marginalised groups, by considering a variety of learning styles and backgrounds. Physical factors such as seating, lighting and acoustics warrant attention (Papaioannou et al., 2023).
3. **Encourage collaborative teaching across disciplines.** Collaboration should be used to develop students' collaboration and communication skills and prepare them for a globalised world.

4. **Provide training for teachers.** Training programmes should equip faculty to use active learning spaces effectively with evidence-based teaching methodologies, reflecting the need for instructional and technological support in innovative spaces (Papaioannou et al., 2023) and the finding that participatory approaches to redesign help alter entrenched practice (Woolner et al., 2012).
5. **Set clear norms for online and hybrid sessions.** Institutions should agree transparent expectations on camera use and interaction, while recognising students' privacy and connectivity concerns (Sederevičiūtė-Pačiauskienė et al., 2022).

9. Impact of the Project

The project explored the integration of active learning practices and the impact of classroom design on student outcomes. It enhanced the researcher's knowledge of education and pedagogy, with potential for academic publication and professional recognition. Active learning strategies were found to be associated with improved learning outcomes, greater participation and enhanced collaboration and peer support, alongside a rise in overall participant results from 68% to 81%. Students reported that the spaces encouraged them to spend more time on campus, that social interaction improved and that peer support was utilised; teachers reported witnessing more engagement and more supportive classrooms.

These findings have practical implications for institutions. Positive student and faculty experience of learning environments contributes to the perception of a well-designed, student-centred institution, and improved engagement and peer support are plausible contributors to retention and achievement. Effective use of these spaces also allows institutions to optimise physical and technological resources. Impact claims should be presented as associational within the QIP design, and further evaluation would be needed before claims about retention or institutional reputation can be substantiated.

10. Conclusion

This QIP examined active learning strategies in purposefully designed learning environments in Level 4 HND and DET provision in a UK HEI. The triangulated findings indicate that the intervention was associated with positive changes: students reported that the spaces encouraged them to spend more time on campus, that social interaction improved and that peer support was utilised; teachers reported witnessing more engagement and more supportive classrooms; and overall participant results improved from 68% to 81%. The project therefore concludes that purposefully designed active learning spaces can support engagement, collaboration and peer support when they are used alongside active pedagogies and teacher mediation.

The project underlines that space, pedagogy, technology and staff development work together, and that careful, inclusive implementation is required if active learning spaces are to improve student engagement. The conclusion should not be read as evidence that space alone caused the improvement: the QIP design, single-institution setting and self-reported data mean that the findings are context-specific and associational rather than causal. Larger, longitudinal studies across multiple institutions would help to establish how far these effects extend across further and higher education.

Declarations

Ethics approval and consent: Ethical approval was obtained from the institution's research ethics committee prior to data collection. ABA Research committee was Informed and consent was obtained from all participants; participation was voluntary; participants could withdraw without consequence.

Data availability: The datasets generated and analysed during this project are not publicly available because they contain information that could compromise participant privacy, but anonymised extracts are available from the corresponding author on reasonable request.

Conflict of interest: The author declares no competing interests.

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Ethical Approval was taken from the research committee of the institution.

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