Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

From Exposure to Competence: Embedding Sustainability in Interior Design Education

Stelios Stefanos Drousiotis

s.drousiotis@alexander.ac.cy

Alexander College, Larnaca, Cyprus https://orcid.org/0009-0009-8073-3485

Dora Anastasiou

Alexander College, Larnaca, Cyprus https://orcid.org/0009-0003-9696-9704

Stefanos Christodoulides

Alexander College, Larnaca, Cyprus

Giorgos Nicou

Alexander College, Larnaca, Cyprus https://orcid.org/0009-0003-3476-8712

Research Article

Keywords: Sustainability competence, Interior design education, Curriculum integration, Studio-based learning, GreenComp framework, Design pedagogy, Higher education

Posted Date: May 7th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9626149/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: The authors declare no competing interests.

From Exposure to Competence: Embedding Sustainability in Interior Design Education

Stelios Stefanos Drousiotis, Interior Design Programme, Alexander College, Larnaca, Cyprus, s.drousiotis@alexander.ac.cy, https://orcid.org/0009-0009-8073-3485

Dora Anastasiou, Interior Design Programme, Alexander College, Larnaca, Cyprus, dora.anastasiou@alexander.ac.cy, https://orcid.org/0009-0003-9696-9704

Stefanos Christodoulides, Interior Design Programme, Alexander College, Larnaca, Cyprus, stefanos@alexander.ac.cy

Giorgos Nicou, Computer Science with Gaming Development Department, Alexander College, Larnaca, Cyprus, g.nicou@alexander.ac.cy, https://orcid.org/0009-0003-3476-8712

Abstract: This study critically examines how sustainability is integrated and operationalised within interior design education through a sequential explanatory mixed-methods design combining a questionnaire and a focus group with 20 students (Years 1-4) at our institution. The research explored sustainability knowledge, attitudes, confidence and curriculum exposure in relation to international sustainability agendas and European competence frameworks for the green transition. Findings indicate strong student motivation and professional commitment toward sustainable practice, but uneven conceptual understanding, limited confidence in analytical sustainability skills and fragmented curriculum integration across modules. Sustainability is present within the programme yet experienced as inconsistently embedded and insufficiently scaffolded as a cumulative design competence. The study identifies a gap between policy-level sustainability ambitions and pedagogical implementation within studio-based design education. It argues that sustainability learning currently operates through exposure rather than structured competence progression, limiting students' ability to translate awareness into applied design decision-making. By linking student experience with curriculum structures and international competence frameworks, the research provides empirical insight into how sustainability competence is formed, mediated and constrained within interior design education. The findings inform curriculum reform, assessment alignment and experiential learning strategies and offer transferable insight for design programmes operating within small-system and transnational higher-education contexts.

Keywords: Sustainability competence, Interior design education, Curriculum integration, Studio-based learning, GreenComp framework, Design pedagogy, Higher education

1. Introduction

The built environment remains a major lever for climate action: in 2022, buildings accounted for 34% of global energy demand and 37% of energy- and process-related CO_2 emissions, underscoring the need to accelerate low-carbon practices across architecture and interior design education (GlobalABC, 2024). Within design schools, interior design is particularly consequential because it shapes materials selection, fit-out cycles, indoor environmental quality and user behaviour over the life of a space. Embedding sustainability literacy early in professional formation is therefore essential.

At policy level, the UNESCO "Education for Sustainable Development (ESD) for 2030" Roadmap (U.N.E.S.C.O, 2020; Tilbury, 2011) calls for the integration of sustainability across teaching, learning and institutional practice, positioning universities as agents of societal transformation. In Europe, this momentum is reinforced through initiatives such as the EU Council Recommendation on learning for the green transition and sustainable development and competence-based frameworks including GreenComp, which increasingly shape expectations for sustainability integration within higher education design programmes (Council of the European Union, 2022).

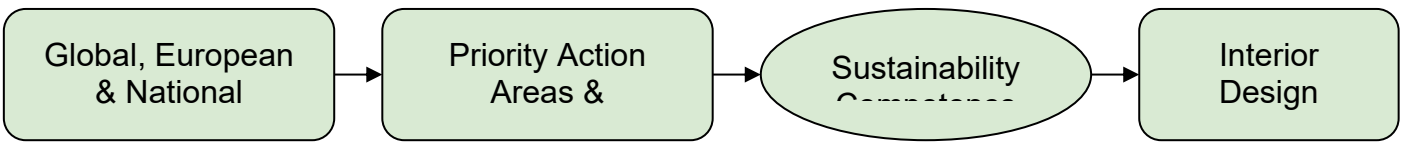


Figure 1: *Policy-to-Curriculum Flow in Sustainability Education for Interior Design.*
Visualising the progression from global policy frameworks to sustainability competences and curricular implementation in design education.

Guidance for higher education has echoed this shift. Education for Sustainable Development guidance promotes programme-wide approaches and authentic assessment compatible with studio-based design learning. Within design scholarship, the Future of Design Education Working Group proposes structural changes for embedding sustainability (Faludi, 2023), while critiques expose the continuing gap between institutional rhetoric and pedagogical implementation (Kuzmina, 2023).

However, much of the discourse remains theoretical rather than empirical. Studies show uneven sustainability literacy among design students and a repeated gap between positive attitudes and applied competence. Sokienah (2024) found that interior design students internationally expressed enthusiasm but lacked consistent application of sustainable principles. Similar barriers in practice, limited training, client priorities and market constraints, have been observed by Kineber et al. (2023), reinforcing the need for pedagogical reform.

To date, no published empirical research has examined how sustainability is taught, perceived, or enacted within interior design education in Cyprus. This gap is significant given the country's obligations under the EU Green Deal and its National Strategy for Education for Sustainable Development (2022-2030), highlighting the need for evidence on student preparedness and curriculum alignment.

Within this context, the institution offers a distinctive case within the Cypriot higher-education landscape. Its Interior Design programme operates under the standards of the Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA), creating an intersection between global, European and national sustainability agendas and their enactment within local curricular practice. This positioning makes the programme an appropriate setting for examining how sustainability competences are understood, interpreted and experienced within a small-system higher-education environment.

The research therefore investigates the extent to which sustainability is embedded in interior design learning in the institution by analysing student knowledge, awareness and engagement across all four years of study. By foregrounding student perspectives as indicators of curricular impact, the research examines whether sustainability is functioning as a core design competency or a peripheral theme. Rather than assuming sustainability has been successfully embedded in design education, this study interrogates how it is actually experienced by learners.

Aim of the Study

The primary aim of this study is to critically examine how sustainability is integrated into interior design education in the institution, by analysing student sustainability literacy, curriculum exposure and the extent to which these correspond with sustainability competences articulated in international frameworks.

Research questions:

1. What is the current level of knowledge and interest in sustainability among interior design students in the institution ?
2. What gaps exist between student perceptions and experienced sustainability content within the curriculum?
3. What recommendations can be developed to strengthen sustainability integration in the Interior Design programme?

The study is guided by the following objectives:

- Measure levels of sustainability awareness, knowledge and interest among students across Years 1-4.
- Examine the extent to which current teaching practices align with sustainability competences articulated in global and EU frameworks.
- Analyse how student perceptions reflect or challenge official curriculum intentions and policy expectations.
- Propose evidence-based recommendations for embedding sustainability more systematically within the programme, aligned with institutional, national and international quality standards.

2. Methodology

This study adopted a sequential explanatory mixed-methods design consisting of two phases. Phase 1 involved a quantitative questionnaire administered to Interior Design students across Years 1-4, providing baseline descriptive evidence of sustainability knowledge, awareness, attitudes and curriculum exposure. Phase 2 employed a qualitative focus group to deepen and contextualise the survey findings by exploring how students interpret sustainability within their learning experiences.

This design captured both (a) broad patterns of sustainability literacy across the student cohort and (b) deeper qualitative insight into how sustainability is experienced, understood and discussed within design education. The sequential structure enabled quantitative patterns to inform the focus group prompts, strengthening the explanatory value of the second phase.

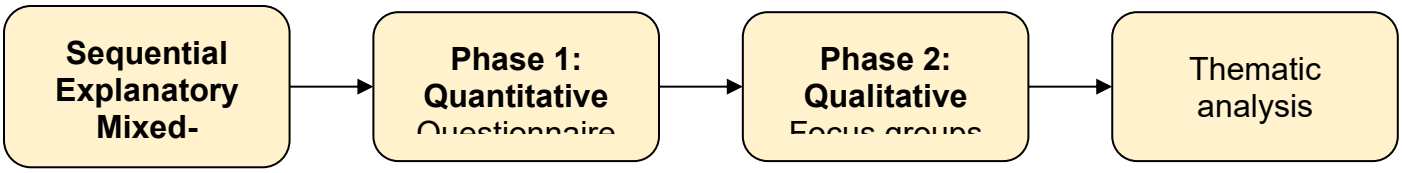


Figure 2: *Sequential explanatory mixed-methods design employed in the study, consisting of a quantitative questionnaire (Phase 1) followed by qualitative focus group (Phase 2) and thematic analysis.*

2.1 Sampling and Participants

A purposive census sampling approach was adopted, inviting all students enrolled in the Interior Design programme during the Winter 2026 semester to participate. Given the relatively small cohort size typical of interior design programmes in Cyprus, the full enrolled student cohort (n = 21) constituted the study population.

The programme comprised a total enrolment of 21 students across Years 1–4, of whom 20 participated in the questionnaire phase (response rate ≈ 95.2%), with representation from all four academic years. Of the students who completed the questionnaire, 16 subsequently participated in the focus group phase after indicating willingness to take part in the qualitative stage of the study.

Students were informed about the study through multiple recruitment channels, including announcements made by lecturers during scheduled class sessions, institutional email invitations, and printed flyers and posters displayed within the Interior Design department.

Participation was voluntary and unrelated to academic assessment (see Section 3).

2.2 Researcher Positionality

As the researchers also hold teaching roles within the Interior Design programme, reflexive consideration was given to their dual position as educators and investigators. Safeguards were implemented to minimise potential power imbalance and response bias during data collection.

Reflexivity was maintained throughout the research process. The researchers acknowledged that their familiarity with the programme context could shape interpretation of the data; therefore, analytic memoing and iterative team discussions were used to critically reflect on assumptions, coding decisions and theme development.

2.3 Survey Instrument (Phase 1: Quantitative)

The Phase 1 research instrument was a self-administered structured questionnaire informed by international sustainability education frameworks, including UNESCO's Education for Sustainable Development (ESD) for 2030 (U.N.E.S.C.O, 2020), and the EU GreenComp Sustainability Competence Framework (Council of the European Union, 2022).

These frameworks guided the conceptual structure of the instrument rather than functioning as direct measurement scales. UNESCO ESD 2030 informed the emphasis on awareness, values and learner engagement. The GreenComp framework supported the inclusion of systems awareness, lifecycle thinking, ethical considerations and action-oriented perspectives.

Together, these frameworks supported a competence-based structure distinguishing knowledge, attitudes, confidence, behaviour and curriculum exposure. The instrument was designed as an exploratory diagnostic tool to map student sustainability literacy across cognitive, affective and practice-oriented dimensions within an interior design education context, rather than as a psychometric scale derived from a single framework.

The questionnaire comprised several sections:

1. Demographic profile (year of study, gender, age, prior sustainability exposure, design experience)
2. Knowledge and awareness of sustainability
3. Attitudes and beliefs regarding sustainability in design
4. Confidence and capability in applying sustainable principles
5. Behavioural intention and practice
6. Institutional exposure and curriculum integration
7. Open-ended reflections on learning environments and sustainability gaps

Most items were measured using a 6-category scale (0 = Not sure/N.A., 1–5 = Strongly disagree → Strongly agree)" to capture uncertainty or lack of exposure. These items assessed students' self-reported cognitive, affective and behavioural dimensions of sustainability competence in alignment with the study's objectives. Open-ended questions were included to support interpretation of quantitative patterns and to inform the development of the focus group discussion guide.

Given the exploratory purpose of the study and the small cohort size, the instrument was not intended for psychometric validation. Internal consistency testing (e.g., Cronbach's alpha) was therefore not undertaken. Instead, clarity and relevance of items were established through review by the research team and academic colleagues with expertise in sustainability and design education, followed by minor refinements to wording and structure prior to administration.

The questionnaire was designed to be completed within approximately 8-10 minutes to minimise participant burden and encourage full cohort participation. The full questionnaire structure and item wording are presented in Appendix A to support transparency and replicability.

2.4 Data Collection and Quantitative Analysis

The questionnaire was administered online using Google Forms during a scheduled class period in the Winter 2026 semester. The session was allocated specifically for research participation and was not part of any assessment activity. Students accessed the survey via a QR code and completed it independently on their own devices without discussion or evaluation.

To ensure anonymity, no identifying information (e.g., name, student number, email address or IP address) was collected. Google Forms settings were configured so that email addresses were not recorded and responses were not linked to identifiable accounts. Survey responses were exported from Google Forms for analysis in IBM SPSS Statistics (Version 28), where descriptive statistics (frequencies, percentages, means and standard deviations) were generated.

Given the small cohort size, inferential statistical testing was not appropriate. Data were therefore analysed descriptively to establish patterns of sustainability awareness, attitudes, confidence and curriculum exposure. Descriptive statistics (frequencies, percentages, means and standard deviations) were presented in tables and bar-chart visualisations. All submitted responses were complete and included in the final dataset.

The questionnaire items and response formats are detailed in Appendix A.

2.5 Focus Group (Phase 2: Qualitative)

To extend and contextualise the quantitative findings, Phase 2 employed a semi-structured focus group guided by thematic prompts exploring students' understanding of sustainability, curriculum experiences, design practices and barriers, teaching and learning approaches, and future professional perspectives.

The focus group included students from Years 1-4 of the programme, enabling representation across stages of study and varying levels of curricular exposure and sustainability literacy.

A total of 16 students participated in the focus group. The session lasted approximately 40-60 minutes and was conducted on campus in a confidential setting.

Guiding questions addressed topics such as:

- Definitions and understanding of sustainable design
- Curriculum experiences and exposure
- Design practice, motivations and barriers
- Teaching approaches and learning environments
- Perceived programme gaps and future needs

The session was audio-recorded with participant consent, transcribed verbatim and anonymised. During transcription, participants were assigned identifiers by year and participant number (e.g., Y1-S1, Y3-S2) to support qualitative analysis. The focus group was facilitated by members of the research team who also serve as lecturers within the programme. Their role was to guide discussion using semi-structured prompts and support participant interaction; they did not contribute their own views or experiences as data during analysis.

Prior to the main data collection phase, the discussion guide was pilot tested with a small number of Interior Design students not included in the final sample to ensure clarity, appropriateness of terminology across levels of study and alignment with the research questions. Minor refinements were subsequently made to wording and sequencing.

Data were analysed using reflexive thematic analysis following (Braun, 2006) six-phase framework. The process involved familiarisation with the data, inductive coding, theme generation, theme review and refinement, and development of an interpretive narrative. Analytic memoing supported reflexivity throughout the process. Coding and theme development were led by the first author and iteratively reviewed by the research team. Themes were constructed as patterns of shared meaning relevant to the research questions rather than being determined by frequency of mention, and an audit trail of coding decisions was maintained.

The full discussion guide is presented in Appendix B, and an illustrative summary of the coding and theme development process is provided in Appendix C. These qualitative procedures enabled deeper interpretation of the descriptive survey findings and informed the integrated mixed-methods analysis presented in Sections 2.6 and 7.

2.6 Integration of Mixed Findings

Integration was conducted at the interpretation stage, consistent with the sequential explanatory design. Quantitative findings were used to identify cohort-level patterns, which were then explained and elaborated through the focus-group themes. The two datasets were integrated through a theme-based joint interpretation, examining areas of convergence, complementarity and divergence between survey trends and qualitative accounts. This integration informed the explanatory mixed-methods narrative presented in Sections 6 and 7.

3. Ethical Considerations

Prior to data collection, ethical approval was obtained from the Institution's Research Centre in accordance with institutional research governance procedures and was additionally approved by the Cyprus National Bioethics Committee. All procedures adhered to the principles of voluntary participation, informed consent and data protection in compliance with the General Data Protection Regulation (GDPR, EU 2016/679). All participants were adults enrolled in higher education and therefore capable of providing informed consent.

Participants received an information sheet outlining the study purpose, procedures and data protection measures and provided written informed consent prior to questionnaire completion and focus group participation. Participation was voluntary, unrelated to assessment or academic standing and no incentives were offered. Given the researchers' teaching roles within the programme, safeguards were implemented to minimise potential power imbalance.

Questionnaire responses were collected anonymously, no identifying information was gathered, and teaching staff had no access to individual responses. Focus group participants were assigned anonymised identifiers to ensure confidentiality. All data was handled securely. Audio recordings were used solely for transcription and deleted after verification. Anonymised questionnaire data and transcripts were stored on encrypted, password-protected institutional servers accessible only to the research team and will be retained for five years before permanent deletion. Only aggregated findings are reported.

The study involved no vulnerable populations, deception or foreseeable risk. Participants could withdraw at any time prior to submission; once anonymous responses were submitted, they could not be individually identified or withdrawn.



Figure 3: *Overview of the ethical safeguards applied throughout the study.*

4. Literature Review

This literature review situates the study within global sustainability education discourse, design pedagogy and interior design scholarship. It examines how sustainability frameworks, learning theories and curriculum practices intersect, before identifying gaps within interior design education and the Cypriot higher-education context. These foundations inform the study's focus on student sustainability literacy and curriculum integration.

4.1 Global Frameworks for Sustainability in Education

The United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) and SDG 12 (Responsible Consumption and Production), position education as a key driver of sustainable development. However, their translation into discipline-specific pedagogies remains uneven. The UNESCO Education for Sustainable Development (ESD) for 2030 Roadmap

calls for curriculum reform, interdisciplinary collaboration and learner empowerment, yet reviews suggest that implementation in professional programmes such as design often remains rhetorical rather than operational (U.N.E.S.C.O, 2020).

A similar pattern is evident across Europe. The Council Recommendation on Learning for the Green Transition and Sustainable Development (Council of the European Union, 2022) advocates systemic sustainability integration, but higher education frequently treats sustainability as an add-on rather than a programme-wide organising principle. The GreenComp framework (Bianchi, 2022) articulates sustainability competences (e.g., values, complexity, futures thinking and action), yet without clear pedagogical translation these can remain aspirational. In parallel, the Ecodesign for Sustainable Products Regulation (ESPR) (European Commission, 2024) signals increasingly concrete competence demands linked to durability, repairability and circularity. Together, these frameworks intensify expectations for higher education while exposing persistent gaps in curriculum enactment.

4.2 Sustainability in Higher Education and Design Pedagogy

Efforts to embed sustainability in higher education continue to reveal tensions between policy ambition and pedagogical implementation, with sustainability often promoted discursively but inconsistently enacted in practice (Kuzmina, 2023).

Within design education, these challenges are particularly visible. Faludi et al. (2023) argue for sustainability to be embedded structurally across curricula rather than treated as an isolated theme, warning that superficial inclusion undermines systemic change. Opara and Doyle (2021) highlight lifecycle thinking and ethics as central pedagogical priorities, yet many graduates still lack competence in applying these principles. In response, recent debates emphasise experiential and technology-enhanced approaches, including design-build studios, community-based projects and digital tools such as BIM and lifecycle assessment platforms. However, such innovations often remain confined to individual modules, limiting their institutional impact and continuity.

Although these discussions have advanced understanding of sustainability in design education broadly, their application within interior design pedagogy remains limited. This gap is significant given the discipline's material, environmental and human-centred focus. Experiential learning theory (Kolb, 2014), with its emphasis on reflection, iteration and real-world engagement, provides a relevant lens for understanding how sustainability competences may be developed within studio-based creative disciplines.

4.3 Theoretical Framework: Learning and Competence in Sustainability Education

Sustainability education in design can be understood through experiential and competence-based learning frameworks. Kolb's Experiential Learning Theory (2014) conceptualises learning as a cyclical process of experience, reflection, conceptualisation and experimentation, which in design studios translates into iterative making, critique and reflection that develop awareness of material, ethical and environmental consequences.

Complementing this, Wiek et al. (2011) identify five core sustainability competences, systems thinking, anticipatory, normative, strategic and interpersonal, describing the integrated capabilities required for sustainable action. These align with the EU GreenComp framework (Bianchi, 2022) and UNESCO's ESD for 2030 Roadmap (2020), emphasising not only knowledge acquisition but its translation into ethical and practical design decisions.

Despite their prominence, such frameworks are rarely operationalised into assessable learning outcomes, studio rubrics or progression models (Rieckmann, 2018; Barth, 2021), creating a gap between theoretical endorsement and measurable student learning. Transformative learning theory (Mezirow, 2009) further highlights the role of critical reflection in reshaping assumptions and values, a key challenge in shifting design education from aesthetic-driven practice toward ecologically responsible decision-making.

Together, these perspectives position sustainability literacy as a developmental, action-oriented process embedded in learning environments, assessment and studio culture. This study therefore draws on experiential, competence-based and transformative learning frameworks to examine whether sustainability is experienced by students as a competence, a value or a discrete topic within interior design education, informing the design of the survey domains and focus-group prompts. These theoretical perspectives provide the analytical lens through which student sustainability competence and curriculum exposure are examined in the present study.

4.4 Interior Design-Specific Research

The gap is particularly evident within interior design, where empirical research on sustainability remains limited compared with architecture. Sokienah (2024) reports that interior design students express strong interest in sustainability but demonstrate inconsistent application in practice, while Kineber et al. (2023) identify persistent professional barriers including limited training, client resistance and market constraints. These findings suggest that educational shortcomings continue to shape professional practice.

Despite its influence on material specification, resource use, indoor environmental quality and user wellbeing, interior design remains under-represented in sustainability education research. Existing studies often prioritise student perceptions rather than examining curriculum structures, assessment practices or competence development. Algers and Silva (2021) note that sustainability is frequently delivered through theory-based modules rather than embedded in studio practice, reinforcing a divide between

conceptual knowledge and applied decision-making. Hussein (2022) further highlights the dominance of Western and architectural perspectives, with limited research emerging from Mediterranean, Middle Eastern and small-system higher-education contexts.

Sustainability in interior design pedagogy therefore remains under-theorised and unevenly implemented, leaving graduates environmentally aware but not always prepared to operationalise sustainable design decisions.

4.5 Sustainability Integration in University Design Curricula

Across progressive design institutions, sustainability is increasingly positioned as a systemic pedagogical principle rather than an elective topic, embedded through competence-based, experiential and transformative learning approaches (Kolb, 2014; Mezirow, 2009; Sterling, 2012). Institutions such as Parsons School of Design (USA) and Rhode Island School of Design (RISD, USA) illustrate how sustainability can be operationalised through curriculum alignment, assessment integration and institutional culture.

At Parsons, sustainability is framed as core design literacy and embedded across studio and theory modules (2022), with assessment criteria evaluating ecological performance and social responsibility in line with constructive alignment principles (Biggs, 2011). Similarly, RISD (2023) integrates sustainability through systems-oriented studio pedagogy, research initiatives and community engagement that encourage critical reflection on material ethics and production networks.

However, the transferability of these models to smaller and resource-constrained institutions remains uncertain, as they are largely derived from well-resourced contexts. Studies of mid-scale programmes indicate more uneven integration, with sustainability often confined to elective modules or individual faculty initiatives rather than embedded programme-wide (Andrews, 2022; Doyle, 2023). This suggests that rhetorical commitment does not automatically translate into curricular coherence.

For smaller institutions, these examples highlight transferable strategies rather than replicable models, including shared studio rubrics incorporating environmental criteria, scaffolded live projects with measurable sustainability indicators and ongoing staff development aligned with accreditation frameworks. These examples foreground a central question: how can sustainability be embedded systematically within resource-constrained and small-system higher education contexts such as Cyprus?

4.6 The Cyprus Context

While global and institutional research provides important insights, national and regional contexts significantly shape how sustainability is enacted within higher education.

Cyprus exemplifies the challenges of translating sustainability policy into pedagogical practice. Although EU directives and the National Strategy for Education for Sustainable Development (2022–2030) provide a strong mandate, implementation within higher education has remained largely compliance-driven rather than transformative (Nicolaou, 2021). In interior design education, sustainability is typically addressed peripherally, with limited evidence of its integration as a core learning outcome.

As a small higher-education system, Cyprus faces structural constraints affecting curriculum development, including limited staffing, restricted resources and reliance on external validation frameworks (Borg, 2022). Comparable dynamics in other small systems, such as Malta and Portugal, demonstrate how centralisation and capacity limitations can hinder pedagogical change. These conditions point not only to scale constraints but also to the absence of curriculum mapping, assessment redesign and educator development focused on sustainability competence.

Within this context, the institution occupies a distinctive position as one of the few Cypriot institutions delivering an Interior Design programme operating within CYQAA quality assurance structures and international academic collaboration. This creates a cross-institutional environment through which sustainability policies, competences and pedagogical expectations intersect.

Examining sustainability integration within this setting provides insight into how small-system and transnational programmes interpret and operationalise global sustainability agendas. In such contexts, institutional agility may enable more responsive curriculum development despite resource constraints

4.7 Research Gap

The literature reveals three key gaps. First, while international sustainability frameworks provide strong policy direction, evidence of their operationalisation within design curricula remains limited. Second, existing scholarship focuses predominantly on architecture, leaving interior design underexplored despite its significant influence on material use, environmental performance and user wellbeing. Third, despite Cyprus's alignment with EU sustainability agendas, empirical research examining how sustainability is integrated within its higher-education design programmes is minimal.

This study addresses these gaps by providing an empirical evaluation of student sustainability literacy, knowledge and engagement within Cypriot interior design education, using the institution as a case study. The programme's dual alignment with CYQAA quality assurance structures offers a distinctive context for examining how global sustainability policies are interpreted and enacted within a small-system higher-education environment.

By analysing student perspectives alongside curriculum structures, the study moves beyond policy discourse to examine sustainability as an educational practice. The findings generate evidence-based insights for curriculum development and contribute a transferable perspective for design programmes operating in similarly resource-constrained or small-system contexts.

The following section presents the empirical findings in line with the sequential explanatory research design: first the descriptive survey results, followed by the focus-group analysis, and finally the integrated mixed-methods interpretation organised by shared themes.

5. Results (Survey - Descriptive Analysis)

5.1 Participant demographics

A total of 20 Interior Design students participated in the questionnaire phase, representing all four years of study within the programme and enabling insight across early- and late-stage learners.

Year distribution indicated representation across all four levels of study, with the largest participation from Year 1 and Year 2 students (n = 7 each, 35% respectively), followed by Year 4 (n = 5, 25%) and Year 3 (n = 1, 5%). The gender distribution reflected patterns commonly observed in interior design education, with female students forming the majority of respondents (n = 13, 65%), followed by male students (n = 6, 30%) and one respondent selecting "prefer not to say" (5%).

The cohort was predominantly undergraduate-aged, with most respondents between 18–20 years old (n = 13, 65%), followed by 21–24 (n = 6, 30%), and only one student aged 25–29 (5%).

Students reported that their primary exposure to sustainability occurred through their current degree programme (n = 15, 75%), followed by independent learning outside university (n = 5, 25%). Notably, two respondents (10%) indicated they had never encountered sustainability prior to the survey. No respondents identified sustainability learning as occurring mainly before university.

These patterns indicate that sustainability awareness within the cohort is largely shaped through programme-based learning experiences.

Table 1. *Participant demographic information (n =20)*

Variable	Category	Frequency	Percentage
Year of study	Year 1	**7**	**35 %**
	Year 2	**7**	**35 %**
	Year 3	**1**	**5 %**
	Year 4	**5**	**25 %**
Gender	Female	**13**	**65 %**
	Male	**6**	**30 %**
	Other / Prefer not to say	**1**	**5 %**
Age	18–20	**13**	**65 %**
	21–24	**6**	**30 %**
	25–29	**1**	**5 %**
	30+	**0**	**-**
Sustainability learning source (Choose more than one)	Mainly before university	**0**	**-**
	Mainly through this degree	**15**	**75 %**
	Mainly outside university (online/self-learning)	**5**	**25 %**
	Never heard of it	**2**	**10 %**

**Note: Responses may exceed 100% as multiple options could be selected; 'Never heard of it' indicates no exposure prior to entering the programme or have not been taught yet.*

5.2 Descriptive statistics of sustainability measures

Table 2*. Descriptive statistics for sustainability awareness, attitudes, confidence, behaviour and curriculum exposure (Likert scale 0–5) Scale: 0 = Not sure/N/A, 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree*

Theme	Item	N	Mean	SD
	I am familiar with the concept of sustainability.	20	**2.60**	**1.47**

B. Sustainability Awareness and Knowledge (Section 5.2)	I understand how sustainability relates to interior design.	20	**3.40**	**1.35**
	I can identify examples of sustainable design practices.	20	**2.75**	**1.41**
	I am aware of the environmental impacts of interior design choices (materials, fit-outs, waste, energy).	20	**3.20**	**1.44**
	I can explain the difference between "sustainability" and "sustainable design".	20	**2.25**	**1.45**
	I am familiar with at least one sustainability framework used in design (e.g., SDGs, GreenComp, LEED, BREEAM).	20	**1.70**	**1.34**
C. Attitudes Toward Sustainability (Section 5.3)	Sustainability can be a relevant consideration within professional design practice.	20	**3.10**	**1.33**
	Design decisions may need to balance environmental, client, and project requirements.	20	**3.25**	**1.33**
	The inclusion of sustainability in design projects may depend on project goals or context.	20	**3.35**	**1.04**
	My studies should play a stronger role in developing sustainability competence.	20	**3.25**	**1.29**
	I consider social and ethical factors as part of sustainable design.	20	**2.90**	**1.65**
	I am interested in learning more about sustainability in interior design.	20	**4.10**	**1.02**
	Sustainability is often discussed more in theory than applied in studio design decisions.	19	**3.32**	**1.42**
	In many interior design projects, applying sustainability meaningfully can be challenging.	20	**3.20**	**1.24**
D. Confidence in Applying Sustainable Design Principles (Section 5.4)	I feel confident selecting materials based on environmental performance information.	20	**3.40**	**0.99**
	I can assess aspects of a design proposal that relate to environmental impact.	20	**2.45**	**1.28**
	I can explain design choices that relate to sustainability to others.	20	**2.75**	**1.29**
	I can incorporate approaches such as reuse, reduced waste, or durability into my design work.	20	**3.00**	**1.30**
	I can explain how material choices relate to environmental impacts across a product life cycle.	20	**2.65**	**1.50**
	When designing, I consider long-term consequences such as maintenance, adaptability and end-of-life reuse.	20	**3.10**	**1.45**
E. Behavioural Intentions and Practices (Section 5.5)	I have included environmental or sustainability considerations in some of my coursework.	20	**2.90**	**1.52**
	I expect to consider sustainability principles in my future professional practice.	20	**3.70**	**1.45**
	I discuss or share sustainability-related ideas with peers during design projects.	20	**2.85**	**1.66**
G. Institutional Exposure and Curriculum Integration (Section 5.7)	My studies include information or discussion about sustainability and sustainable design.	20	**2.85**	**1.35**
	Sustainability-related topics are presented in several modules across the degree.	20	**2.90**	**1.48**
	I have encountered sustainability-related learning through workshops, seminars, or guest lectures.	20	**3.15**	**1.39**
	Lecturers have provided guidance or feedback on how sustainability can be addressed in projects.	20	**3.00**	**1.62**
	The sustainability-related content provided in my studies aligns with what I expected to learn.	20	**3.05**	**1.47**
	Sustainability is assessed or graded explicitly in design studios or modules.	20	**2.75**	**1.37**
	Sustainability content feels consistent and connected across different modules.	20	**2.95**	**1.10**

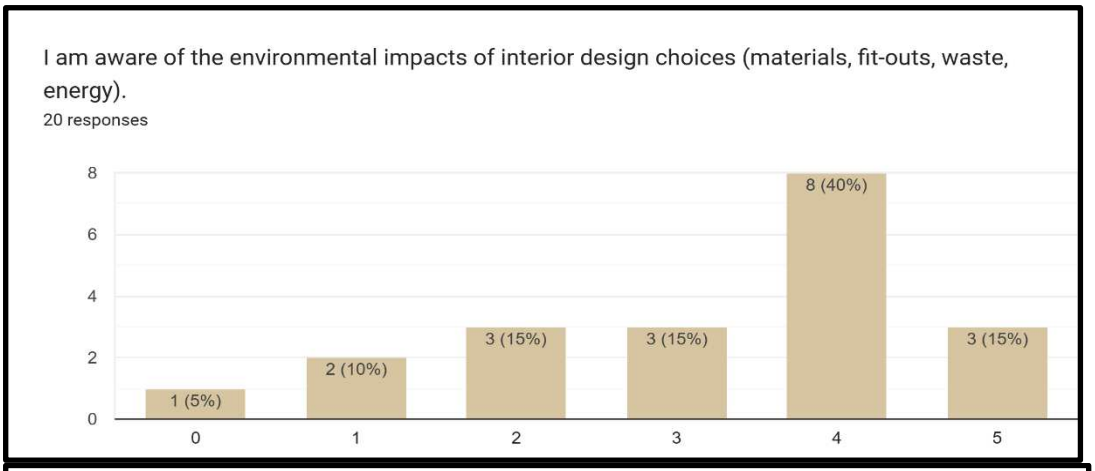
**Note: Mean values closer to 5 indicate stronger agreement and higher perceived competence, while lower mean values indicate uncertainty or limited familiarity. Standard deviation (SD) indicates variation in student responses.*

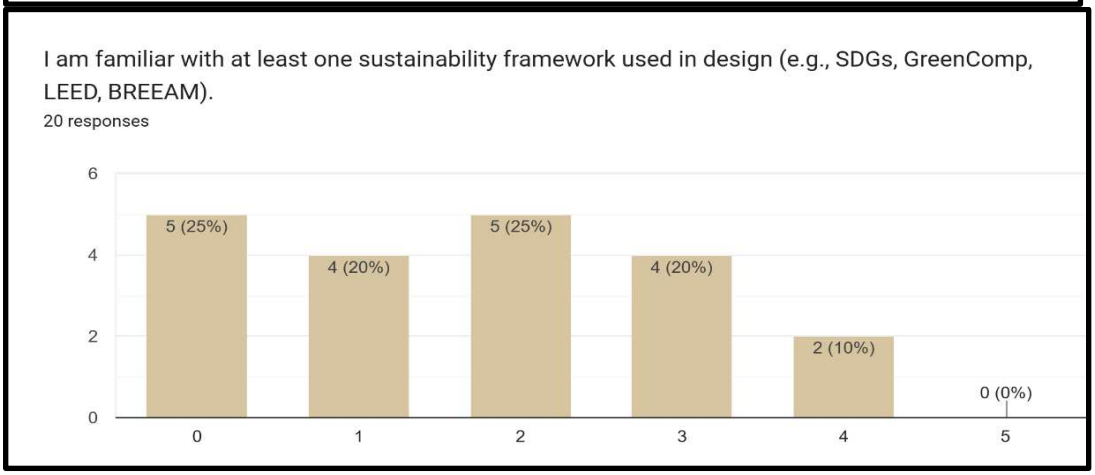
5.2 Sustainability Awareness and Knowledge

Descriptive analysis indicates a developing but uneven understanding of sustainability within interior design education. Familiarity with sustainability was present but not consolidated across the cohort: while 35% of respondents agreed or strongly agreed that they were familiar with the concept, a substantial proportion selected neutral or lower-scale responses (M = 2.60, SD = 1.47), indicating moderate familiarity and considerable variability across students. Understanding of sustainability in relation to interior design was comparatively stronger, with 50% indicating agreement and a higher mean score (M = 3.40, SD = 1.35), suggesting that disciplinary framing supports comprehension more effectively than abstract sustainability discourse.

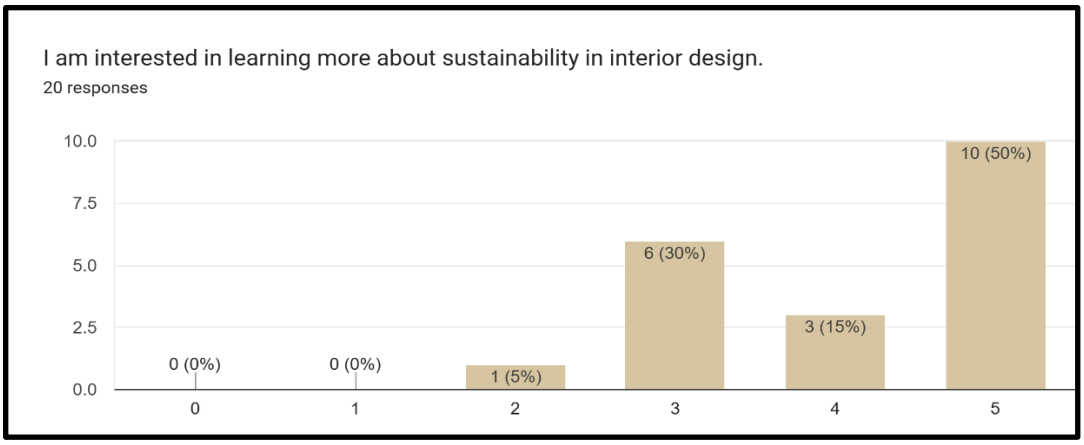
Students demonstrated moderate awareness of the environmental impacts of interior design decisions, particularly in relation to materials, energy use and waste, with 55% agreeing or strongly agreeing (M = 3.20, SD = 1.44). However, conceptual depth remained limited. Only a minority reported confidence in explaining the distinction between "sustainability"and "sustainable design," reflected in a lower mean score (M = 2.25, SD = 1.45), indicating uncertainty and dispersed responses across the cohort.

The most pronounced gap concerned familiarity with formal sustainability frameworks. A majority of respondents expressed uncertainty or disagreement when asked about knowledge of frameworks such as the SDGs, GreenComp, LEED or BREEAM (M = 1.70, SD = 1.34), suggesting that sustainability learning may be occurring primarily at a conceptual level without strong engagement with policy-based or competence-oriented structures.





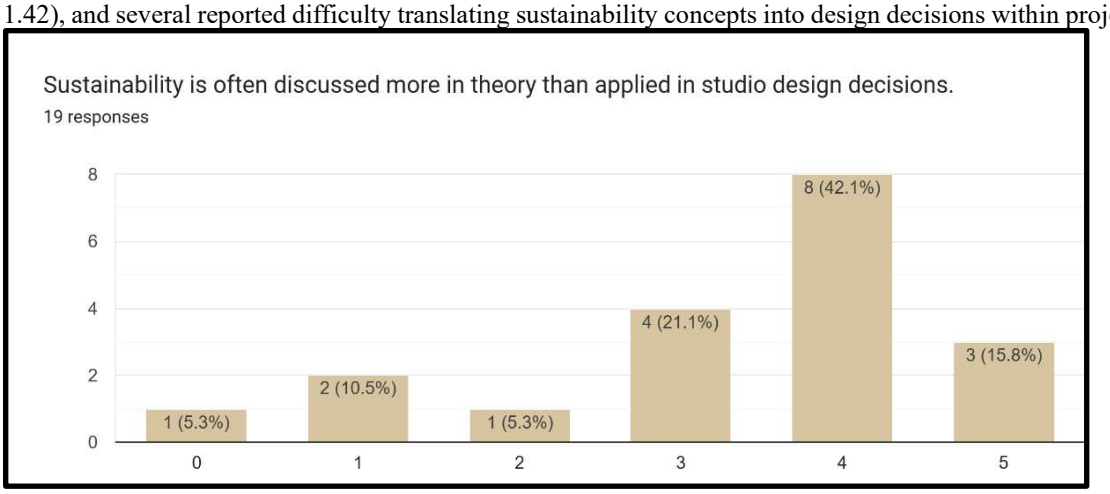
5.3 Attitudes Toward Sustainability



Students demonstrated generally positive yet still developing attitudes toward sustainability within interior design education and professional practice. Interest in further learning was particularly strong, with approximately 65% agreeing or strongly agreeing that they would like to deepen their understanding of sustainability (M = 4.10, SD = 1.02). Sustainability was also recognised as professionally important, although agreement levels were more moderate (around 40%) (M = 3.10, SD = 1.33), accompanied by a substantial proportion of neutral responses.

Students showed emerging awareness of the complexity of sustainable decision-making, acknowledging the need to balance environmental, client and project considerations (M = 3.25, SD = 1.33). At the same time, expectations for stronger curricular integration were evident, with students indicating that their studies should play a more active role in developing sustainability competence (M = 3.25, SD = 1.29). The prevalence of neutral responses suggests variability in perceived curriculum exposure and learning experiences.

Attitudes toward social and ethical dimensions of sustainability were similarly positive but uneven (M = 2.90, SD = 1.65), indicating that issues such as wellbeing, accessibility and responsible sourcing are recognised but not consistently embedded in students' design thinking. Importantly, many students identified a gap between theoretical discussion and practical application. Approximately 58% agreed that sustainability is discussed more frequently in theory than applied in studio work (M = 3.32, SD = 1.42), and several reported difficulty translating sustainability concepts into design decisions within projects (M = 3.20, SD = 1.24).



Overall, students demonstrate supportive and motivated attitudes toward sustainability; however, neutral responses and reported challenges in application indicate variability in how sustainability is understood and enacted within design processes.

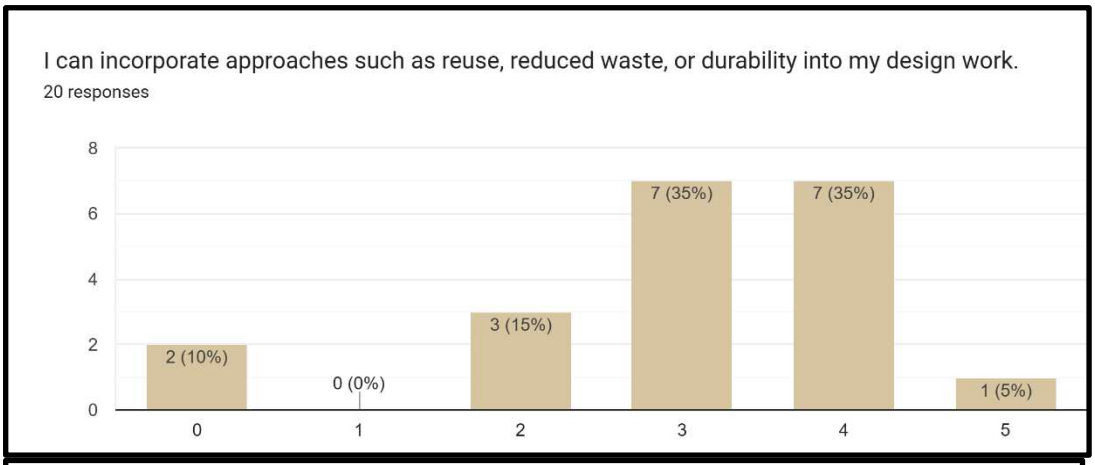
5.4 Confidence in Applying Sustainable Design Principles

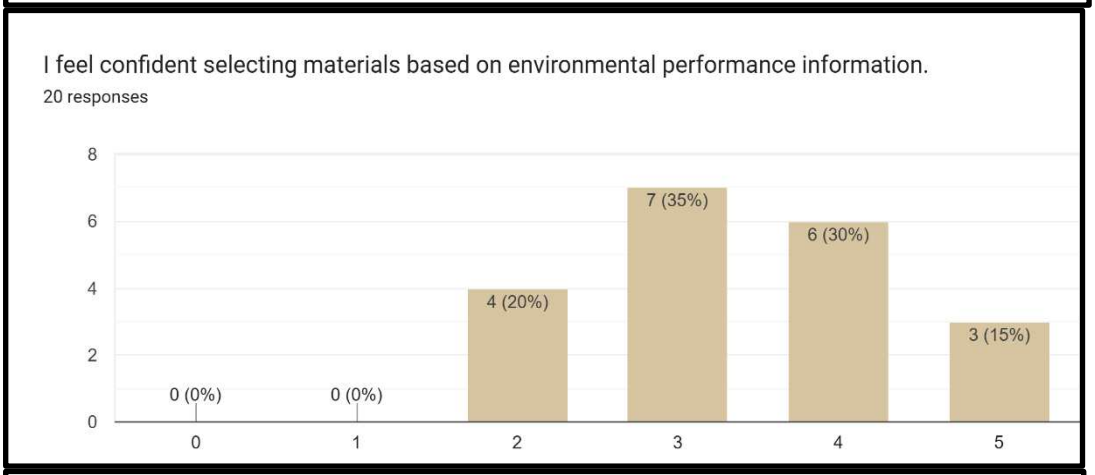
Students reported low to moderate confidence in applying sustainability principles within their design work, with responses clustering around neutral categories. This pattern suggests emerging capability rather than strong or consistent confidence.

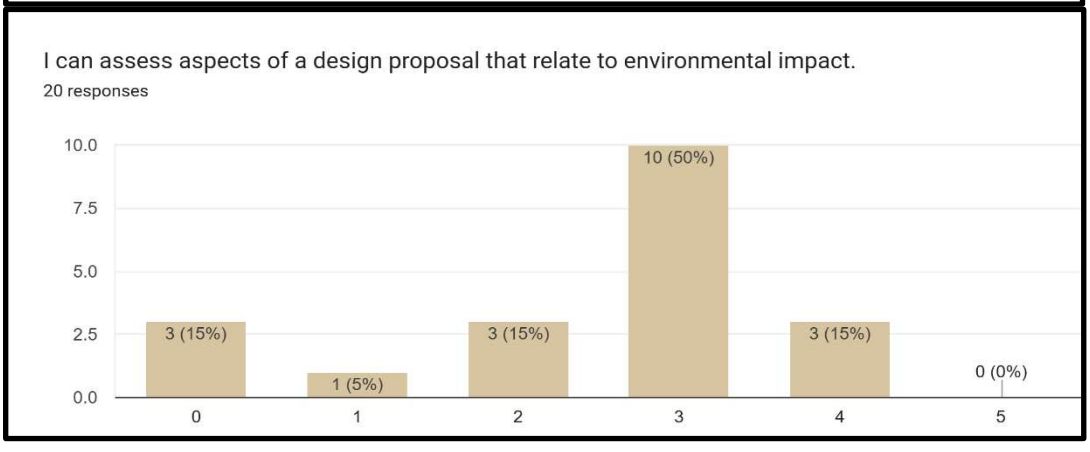
The highest levels of confidence were associated with practical sustainability strategies. Approximately 35% of respondents agreed and 5% strongly agreed that they could integrate approaches such as reuse, reduced waste and durability into their projects, although 35% remained neutral (M = 3.00, SD = 1.30). In contrast, confidence became more varied when sustainability required analytical judgement. Only 30% agreed and 15% strongly agreed that they felt confident selecting materials based on environmental performance information, while 35% selected neutral responses (M = 3.40, SD = 0.99), indicating uncertainty in interpreting and applying environmental data.

Similarly, confidence was limited in evaluation-based competencies. Half of respondents selected neutral responses when asked about assessing environmental aspects of a design proposal (M = 2.45, SD = 1.28), and relatively few indicated agreement. Responses relating to explaining life-cycle implications of material choices (M = 2.65, SD = 1.50) and communicating sustainability decisions (M = 2.75, SD = 1.29) also clustered around neutral categories. Consideration of long-term consequences such as maintenance, adaptability and end-of-life reuse showed moderate but variable confidence (M = 3.10, SD = 1.45).

These patterns suggest awareness of broader sustainability dimensions but limited applied capability in translating them into consistent design decisions.







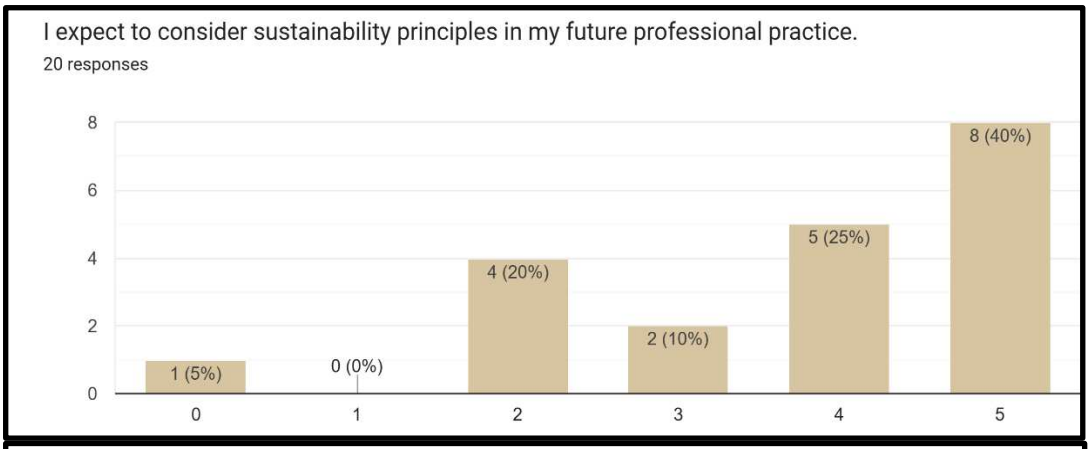
5.5 Behavioural Intentions and Practices

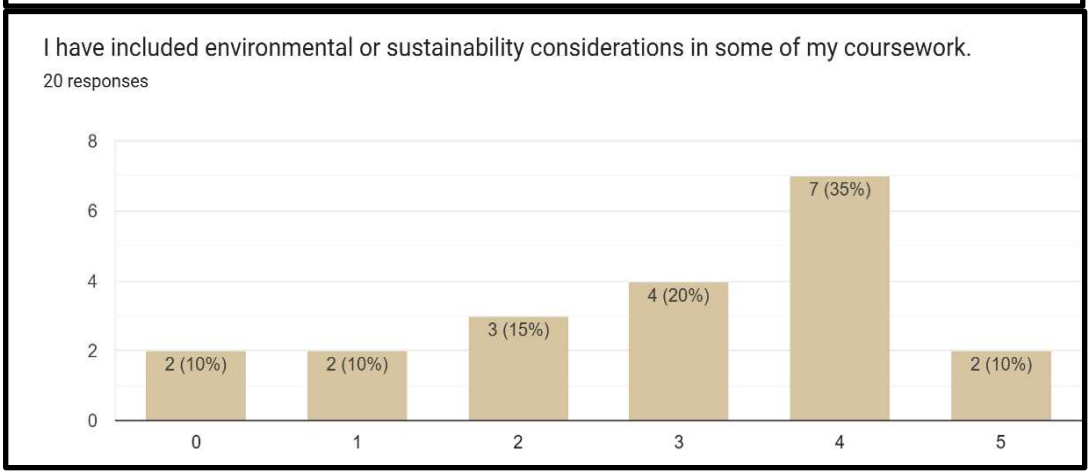
Patterns of behavioural engagement suggest emerging but uneven sustainability practice among students. The strongest finding concerns future professional intention: approximately 70% of respondents agreed or strongly agreed that they expect to incorporate sustainability principles into their future design careers (M = 3.70, SD = 1.45), indicating a clear alignment between sustainability and emerging professional identity.

In contrast, behavioural engagement within current studio contexts was more mixed. Around half of respondents reported discussing sustainability-related ideas during design projects (M = 2.85, SD = 1.66), while a notable proportion selected neutral responses, suggesting that such practices are present but not yet consistently embedded in collaborative learning environments. Inclusion of

sustainability considerations within coursework also reflected moderate engagement (M = 2.90, SD = 1.52), reinforcing the variability of current behavioural application.

Across behavioural items, responses clustered between neutral and agree categories, indicating that while sustainability intentions are forming, they are not yet translating into consistent design behaviours.



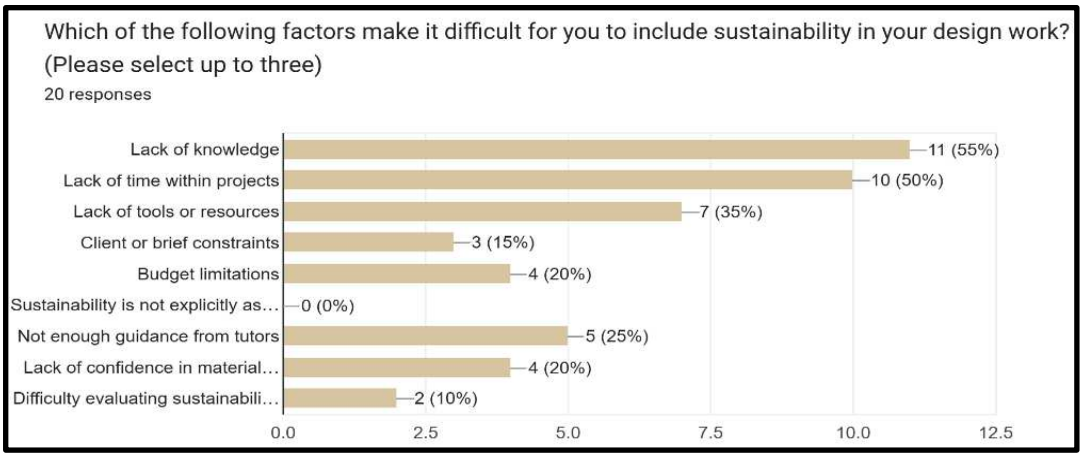


5.6 Barriers to Sustainability Integration

Students identified several structural and educational barriers limiting sustainability integration within their design work. The most frequently reported challenge was lack of knowledge (55%), indicating perceived gaps in understanding necessary for effective application. Time constraints within project work were also significant (50%), suggesting that studio timelines restrict opportunities to research and implement sustainability considerations in depth.

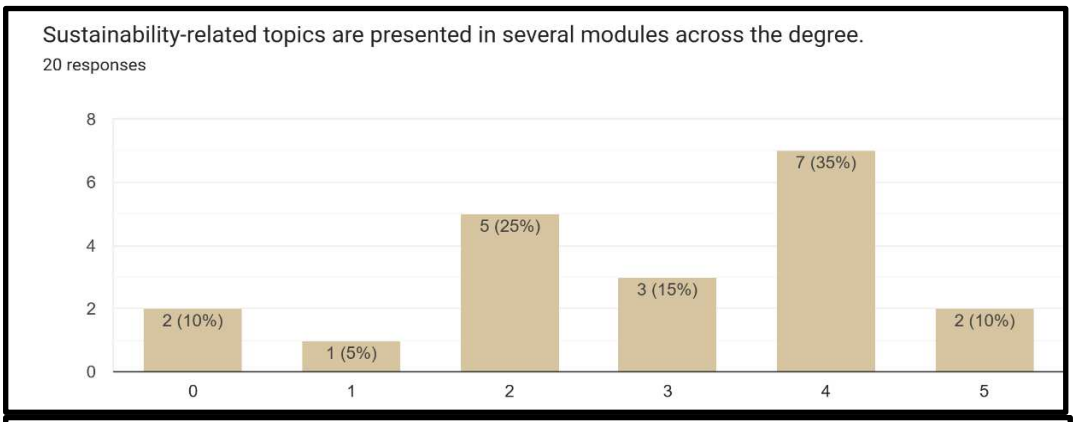
Resource-related limitations were similarly evident. Approximately 35% reported lack of tools or resources, while 25% identified insufficient guidance on how to integrate sustainability within projects, highlighting the need for clearer instructional support and access to applied sustainability methods. Professional constraints were also recognised, including budget limitations (20%) and client or brief requirements (15%), reflecting awareness of real-world pressures shaping sustainable decision-making.

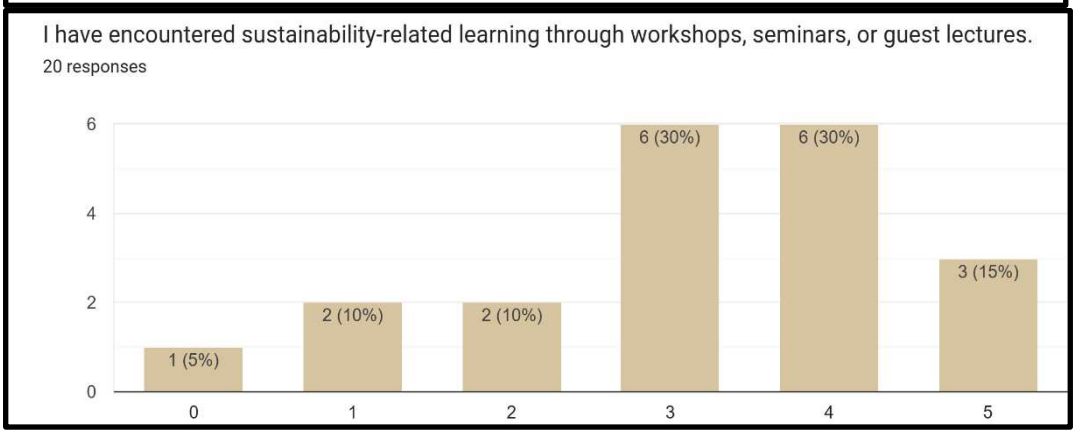
Personal capability was reported less frequently as a barrier, with 20% identifying lack of confidence and 10% difficulty evaluating sustainability. These responses indicate that students perceive both educational and contextual factors as influencing sustainability integration.



5.7 Institutional Exposure and Curriculum Integration

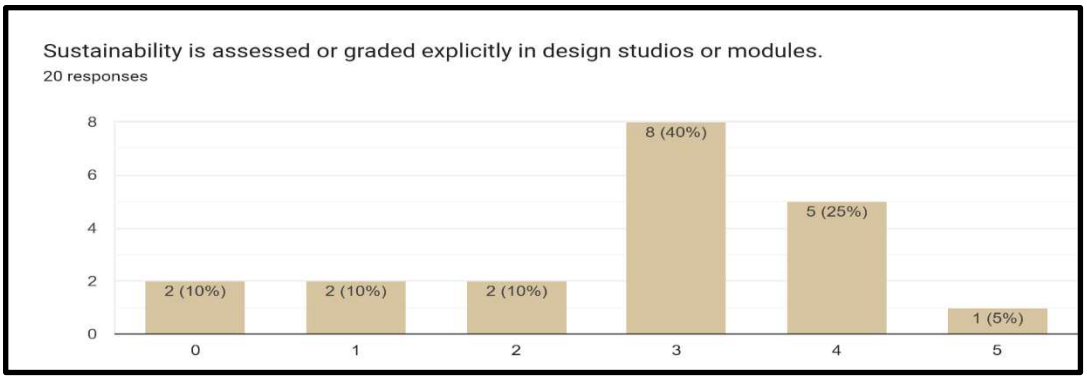
Sustainability appears within the Interior Design programme, though its curricular integration is not consistently structured across modules. Approximately 45% of respondents agreed or strongly agreed that their studies include sustainability-related content (M = 2.85, SD = 1.35), with similar proportions indicating exposure through modules, workshops and guest lectures (M = 3.15, SD = 1.39). These responses show that sustainability features within the programme but the experience is unevenly, with the engagement shaped by specific modules and teaching approaches rather than systematic curriculum design.





Assessment emerged as a key limitation. Only around 30% of respondents agreed that sustainability is explicitly assessed in studio or module work (M = 2.75, SD = 1.37), indicating that while it is discussed, it is not systematically embedded within evaluation and grading processes.

Perceptions of curriculum coherence were also mixed, with fewer than half of students reporting that sustainability content feels consistently aligned across modules (M = 2.95, SD = 1.10). Similarly, responses relating to lecturer guidance (M = 3.00, SD = 1.62) and alignment with expectations (M = 3.05, SD = 1.47) indicate moderate but variable experiences across the cohort.

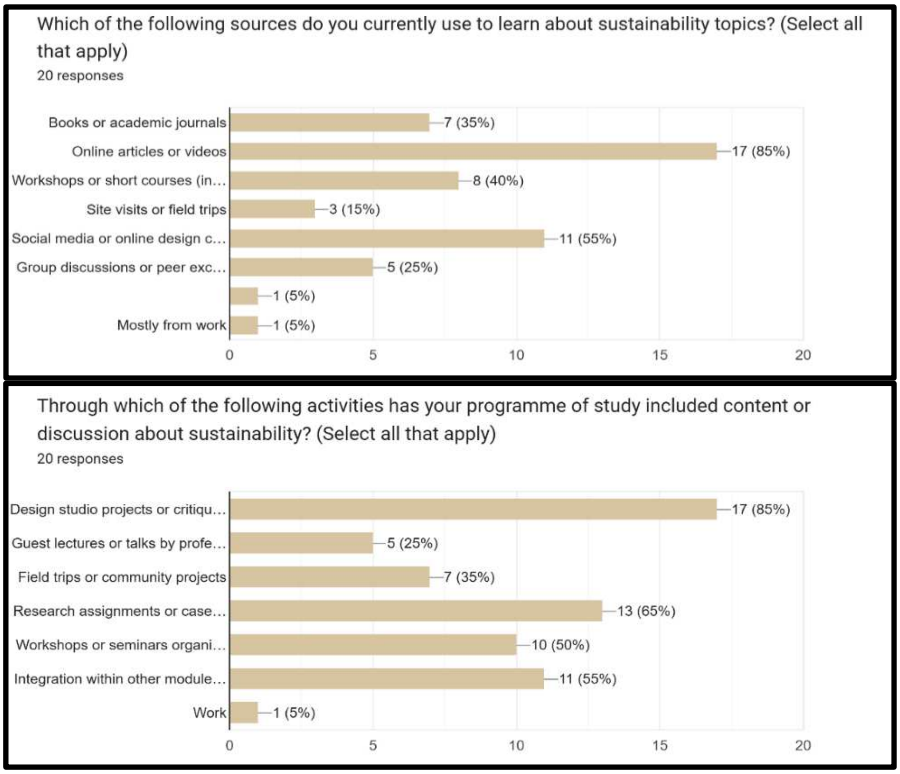


5.8 Resources and Learning Methods

Sustainability learning emerges through a combination of self-directed engagement and programme-based experiences, though the balance between these sources suggests uneven curricular structuring. Independent digital resources dominate students' learning practices: 85% reported using online articles or videos and 55% learning through social media or online design communities. Workshops or short courses were reported by 40% of students, followed by books or academic journals (35%). Peer discussions contributed to learning for 25%, while site visits or field trips were less common (15%) and workplace exposure minimal (5%). This distribution indicates that sustainability knowledge is shaped largely through informal and student-initiated channels rather than systematically embedded academic pathways.

Within the programme itself, studio-based learning represents the primary structured exposure to sustainability. A substantial majority of students (85%) encountered sustainability through design studio projects, followed by research assignments (65%) and integration within other modules (55%). Workshops or seminars organised within the programme were identified by 50% of respondents, while field trips or community-based projects were reported by 35% and guest lectures by 25%. Workplace-related exposure remained limited (5%).

Taken together, these patterns indicate that sustainability learning occurs through a combination of independent engagement and structured programme activities.



5.9 Open-ended Reflections

Students' open-ended responses reinforced and extended the quantitative findings. Thematic coding (Table 3) identified recurring emphases on experiential learning, curriculum-wide integration, material-focused knowledge and, to a lesser extent, immersive and digital technologies.

A dominant theme concerned the need for more structured and continuous integration of sustainability throughout design education. Students repeatedly suggested embedding sustainability across studio projects, teaching activities and assessment rather than confining it to isolated modules, highlighting a perceived gap between theoretical discussion and practical implementation. The importance of applied and experiential learning was also emphasised, including field trips, engagement with sustainable material suppliers, collaboration with professionals and exposure to real projects.

Calls for greater technical depth were also evident, particularly clearer guidance on sustainable materials, life-cycle thinking and environmental performance. Teaching approach emerged as an additional factor, with students favouring interactive and project-based methods over lecture-based delivery.

Responses further revealed uneven curriculum exposure, with sustainability perceived as dependent on specific modules or lecturer initiatives rather than coordinated programme-wide integration. While some students framed sustainability as a design philosophy (e.g., biophilia and environmental responsibility), others emphasised professional collaboration and applied skill development.

Table 3. *Thematic analysis of open-ended responses based on direct coding of student answers*

Open-ended focus	Theme identified	N.	Illustrative example
Programme improvement	Self-directed learning expectations	**4**	"Research and videos."
	Experiential learning (field visits, real projects, suppliers)	**3**	"Visits to eco-friendly buildings…", "Hands-on projects using sustainable materials."
	More formal teaching input	**3**	"More lectures about sustainability."
	Teaching delivery and engagement	**2**	"Explain sustainability… not just slides."
	Curriculum-wide embedding of sustainability	**1**	"Embed sustainability into every studio."
	Immersive / digital learning tools	**1**	"Using immersive technologies such as AI, VR etc."
	Time constraints within studio learning	**1**	"Put time in the programme for students to learn."
Environmental responsibility in design/practice	General environmental awareness	**2**	"Green environmental… biophilia."
	Sustainable materials & energy efficiency	**2**	"More sustainable materials."
	Life-cycle and reuse thinking	**2**	"Teach life-cycle thinking… reusable products."
	Practice-based collaboration	**1**	"Working on real projects with professionals."
	Local context engagement (Cyprus buildings/suppliers)	**1**	"Visits to eco-friendly buildings or suppliers in Cyprus."
Sustainability exposure in modules	Studio design projects	**6**	"Design project 1,2", "Design Futures."
	Materials-related modules	**3**	"Properties of 3D Materials."
	Limited or inconsistent exposure	**2**	"Only talked a bit…", "No."
	Module-specific recall	**2**	"Play module mostly."

6. Results - (Focus Group - Themes)

Qualitative data from the focus-group discussion were analysed using reflexive thematic analysis to extend and contextualise the quantitative findings. The themes presented below represent patterns of shared meaning in how students across Years 1–4 experience and interpret sustainability within the Interior Design programme, particularly in relation to curriculum exposure, design practice, perceived barriers and emerging professional expectations.

Initial coding generated analytical categories such as sustainability understanding, curriculum experience and practice-related challenges. Through iterative refinement, these were developed into higher-level themes representing shared meanings across participants' accounts. Appendix C presents the progression from data extracts and codes to subthemes and final themes.

Theme 1: Material-Centred Sustainability with Emerging Systems Thinking

Students' initial responses framed sustainability primarily through tangible and visible strategies such as recycling, eco-materials, reuse and energy efficiency. This material–recycling framing was repeated by multiple students across year levels, including "eco-friendly products, reusable products, recycling" (Y1-S1) and "recycling to use less waste" (Y3-S1). A similar emphasis on material reuse and energy reduction was also expressed by later-year students, such as "recycled materials, reusable materials… LED lighting… reduce the energy consumption" (Y4-S1). Material choice was frequently positioned as central to sustainable design decisions, with one student describing materials as "the most important part" of interior sustainability (Y1-S1).

Energy and lighting were also identified as early intervention points, and this point was echoed by students in different years, including references to natural light and passive strategies (Y2-S1) and LED use (Y3-S1; Y4-S1). Health and wellbeing emerged as additional considerations, particularly in relation to non-toxic materials and indoor air quality: "chemicals… harmful for our health" (Y1-S1). Students further associated sustainability with comfort, adaptability and long-term benefits for both environment and occupants.

While material-based reasoning dominated, some participants demonstrated conceptual broadening. For example, a Year 4 student emphasised that sustainability extends beyond "green materials," linking it to accessibility, public transport and reduced dependence on unnecessary electronics (Y4-S3). These contributions suggest emerging systems-level awareness, though not consistently articulated across all participants.

Analytical interpretation: Sustainability is primarily understood through material and energy-related strategies, with gradual movement toward broader socio-technical and ethical framings.

Theme 2: Fragmented Curriculum Integration of Sustainability

Students described sustainability exposure as present but uneven across modules. Early encounters were often linked to specific prompts or research tasks, such as "module play… research… biophilia… greenwashing" (Y1-S1), or characterised as "more of a general discussion" (Y1-S2). In later stages of study, sustainability appeared in modules such as Design Futures and studio briefs, yet was frequently introduced through lectures and videos followed by independent research: "go home, research it… put it in your sketchbook" (Y4-S3).

Some students reflected that they had applied sustainability principles in earlier projects without fully understanding them, indicating that conceptual clarity developed progressively. At the same time, sustainability integration was repeatedly described as dependent on individual tutors, and this was stated consistently by students across more than one year level: "it depends on the lecturer" (Y1-S1) and sustainability was similarly described as "dependent on the lecturer" (Y4-S3; Y2-S1). Year 2 students noted that sustainability was sometimes "discuss[ed]… briefly instead of going further into discussion" (Y2-S1).

Participants across year levels indicated that sustainability engagement intensifies in later years, yet early-stage students reported limited opportunities for applied practice: "we don't have this type of projects yet" (Y1-S1).

Analytical interpretation: Sustainability is encountered across the curriculum but experienced as lecturer-dependent and unevenly scaffolded rather than systematically embedded.

Theme 3: Theory–Practice Translation Gap

Across the discussion, students expressed positive attitudes toward sustainability but described difficulty translating awareness into design decisions. Early-stage students reported uncertainty due to limited technical knowledge: "we haven't done… what materials we have to put in our project… we don't know" (Y1-S2). More advanced students articulated concerns regarding authenticity and feasibility: "I know about sustainability… but can I apply it in my designs?… it will be half done… like greenwashing mostly… it felt… kind of fake" (Y4-S3).

Client priorities were frequently cited as influencing sustainable choices. A Year 3 student noted that when collaborating with others, it may become necessary to "find another material… cheaper" (Y3-S1). Confidence varied across participants: some described feeling "a bit comfortable" applying sustainability (Y4-S3), while others acknowledged low confidence "at the moment" (Y2-S1). Together, these accounts show the same theme expressed across year levels: sustainability is valued, but consistent application is constrained by confidence, guidance and project realities.

Without clear guidance or assessment reinforcement, sustainability was sometimes perceived as an additional or performative layer rather than an integrated design parameter.

Analytical interpretation: The gap between sustainability knowledge and applied competence is experienced as both a skills issue and an authenticity issue, shaped by technical uncertainty, project conditions and client constraints.

Theme 4: Structural and Contextual Barriers to Sustainability Learning

Students identified multiple structural constraints affecting sustainability integration. Cost and availability of materials were repeatedly mentioned, and this constraint was echoed by students from different years: "cost… hard to find… need to order… more time consuming" (Y3-S1) and "it's an island… bring products… more expensive" (Y1-S1). Sustainable materials were also described as "pricey" (Y4-S3). Time pressures and cognitive load were noted, with sustainability described as requiring substantial effort in "researching [and] understanding" (Y4-S3).

Perceptions of the Cypriot context varied. Some students viewed sustainability implementation as limited or characterised by "greenwashing" (Y4-S3), while others referenced regulatory requirements and professional obligations to adopt sustainable principles (Y4-S1; Y2-S1). These contrasting accounts reflect differing experiences of how sustainability operates within local professional and policy environments.

Participants emphasised the need for experiential and collaborative learning approaches, including case studies, site visits, workshops and collective discussions: "let's all sit together and discuss it… not be one-on-one" (Y4-S3).

Analytical interpretation: Barriers to sustainability engagement are shaped by educational conditions, market realities and local professional contexts rather than solely by individual knowledge deficits.

Theme 5: Sustainability as Future Professional Identity

Students consistently framed sustainability as central to future professional practice. It was described as "the future" (Y2-S1) and as something that "should be treated more importantly… that's our future" (Y1-S1), indicating shared values-driven positioning across year levels.

However, professional identity was described as negotiated within client relationships: "it will mostly depend on the client… ultimately I will go with his opinion" (Y1-S4). Assessment structures were also identified as influential. Students argued that sustainability should be embedded in grading criteria, and this point was expressed strongly by more than one participant: "there should be an extra point… include sustainability… it will make you want to use [it] more" (Y1-S3) and "if it's not mentioned, I'm not going to do it… if it's not graded I'm not going to do it" (Y4-S3).

Participants further suggested that sustainability should be introduced earlier and progressively scaffolded to avoid overload: "introduced from the first year… small projects… easier to understand… not overwhelmed" (Y4-S1).

Analytical interpretation: Sustainability is recognised as integral to emerging professional identity, yet its consistent enactment is perceived as strongly shaped by assessment structures, curriculum sequencing and client negotiation.

7. Integrated Findings (Mixed Interpretation by Theme)

The integration of quantitative survey findings and qualitative focus-group data provides a comprehensive understanding of how sustainability is experienced within the Interior Design programme. This section synthesises statistical patterns and narrative accounts to identify areas of convergence and contrast across five themes, focusing on how students understand sustainability, how it is encountered within the curriculum, and how it is applied within design learning contexts.

Theme 1: Material-Centred Sustainability with Emerging Systems Thinking

Across datasets, sustainability is widely recognised but commonly interpreted through tangible design strategies. Survey findings indicate moderate familiarity with sustainability and strong acknowledgement of its relevance to interior design and environmental impacts, alongside lower conceptual clarity and limited familiarity with formal frameworks. Students also reported difficulty distinguishing between "sustainability" and "sustainable design," indicating variability in conceptual understanding.

Qualitative accounts reinforce this pattern. Sustainability is frequently framed through visible strategies such as material selection, recycling and energy efficiency. Later-year participants extend this understanding to include accessibility, behavioural change and social responsibility; however, these perspectives appear less consistently articulated across the cohort.

Material-focused interpretations therefore appear to form an accessible entry point for sustainability learning, while broader systems-oriented perspectives develop more gradually.

Theme 2: Fragmented Curriculum Integration of Sustainability

Students encounter sustainability across modules and studio activities, though experiences vary in emphasis and continuity. Survey responses indicate exposure through multiple learning contexts, alongside more moderate perceptions of assessment integration and programme-level coherence.

Focus-group narratives further illustrate this variability. Sustainability is frequently described as shaped by individual modules, lecturer emphasis or project briefs rather than structured progression across the programme. Although engagement appears to

increase in later years, students do not consistently describe a sequenced pathway linking foundational understanding with advanced application.

These findings suggest that sustainability is present across the curriculum but experienced unevenly across modules and stages of study.

Theme 3: The Theory–Practice Translation Gap

A distinction emerges between sustainability awareness and its application within studio contexts. Survey data indicate strong interest in sustainability and future professional intention, alongside more moderate confidence in analytical competencies such as environmental assessment, lifecycle reasoning and performance-informed material selection.

Focus-group discussions provide further insight. Early-year students describe uncertainty linked to limited technical knowledge and application opportunities, while later-year students demonstrate greater familiarity but note challenges in applying sustainability consistently within projects.

Across year levels, sustainability is therefore recognised as relevant and valuable, yet its translation into studio-based design decisions varies depending on knowledge, project context and available guidance.

Theme 4: Structural and Contextual Barriers to Sustainability Learning

Survey findings identify knowledge gaps, time pressures and limited resources as commonly reported challenges influencing sustainability engagement. These factors are described as affecting the ability to research, interpret and apply sustainability considerations within project work.

Qualitative accounts situate these constraints within broader educational and professional contexts. Students refer to cost, material availability, client expectations and local professional conditions as shaping design decisions. Earlier-year students focus on access and understanding, while later-year participants describe more complex considerations linked to professional practice.

Sustainability challenges are therefore experienced as shaped by both educational conditions and external contextual factors.

Theme 5: Sustainability as Future Professional Identity

Across datasets, sustainability is positioned as relevant to students' future professional roles. Survey results indicate strong intention to incorporate sustainability principles into professional practice.

Focus-group discussions further suggest that sustainability is viewed as an ethical and professional consideration rather than a temporary trend. At the same time, students describe its application as influenced by project requirements, client priorities and assessment expectations. Engagement appears more likely when sustainability is explicitly embedded within evaluation structures.

Sustainability is thus recognised as part of emerging professional identity, while its consistent application remains shaped by learning and project contexts.

Integrated Interpretation

The mixed-methods integration indicates that sustainability learning is present across the programme but develops unevenly as a cumulative design competence. While students demonstrate awareness, interest and professional motivation, applied confidence, curricular coherence and assessment integration remain inconsistent across year levels and learning contexts. Sustainability therefore operates less as a structured pedagogical progression and more as an exposure-driven component shaped by studio practices, assessment signals and contextual constraints.

8. Discussion

This study examined how sustainability is understood, experienced and enacted within an Interior Design programme operating in a small-system, transnational higher-education context. The findings show that sustainability is valued and visible across learning activities, yet students do not consistently experience it as a progressively developed competence. In practice, sustainability learning appears to depend on where and how it is signalled within modules, studios and assessment.

A recurring pattern concerns the relationship between awareness and application. Students demonstrate interest, motivation and professional commitment toward sustainable practice; however, this does not consistently translate into design decision-making. This gap appears linked not to lack of motivation but to limited opportunities for structured application, where conceptual understanding is not systematically reinforced through studio-based experimentation, evaluation and feedback.

Sustainability is frequently interpreted through visible and material-oriented strategies such as recycling, energy efficiency and product selection. While these approaches provide accessible entry points, broader competences such as systems thinking, lifecycle reasoning and socio-ecological awareness appear less consistently developed. Sustainability therefore tends to be encountered as a set of design considerations rather than as a systemic framework embedded within studio pedagogy and assessment structures.

Structural influences play a significant role in shaping sustainability engagement. Students consistently describe sustainability as more likely to be prioritised when embedded within briefs, grading criteria and studio feedback. Where it is not positioned as an explicit evaluative parameter, its application becomes more variable. Competence development is therefore influenced not only by student motivation but also by curriculum organisation, instructional practices and assessment signals.

These dynamics reflect a broader policy–practice relationship. International frameworks such as UNESCO Education for Sustainable Development and the European GreenComp framework advocate competence-based sustainability education; however, student experiences suggest that integration within studio-based design learning remains uneven. Alignment at policy level does not automatically translate into pedagogical continuity without curriculum mapping, scaffolded progression and assessment integration.

The small-system Cypriot context further shapes these conditions. Factors such as resource availability, material sourcing, market conditions and professional expectations influence how sustainability is interpreted and applied within design education. These contextual dimensions do not simply constrain implementation; they shape how sustainability competence is negotiated within institutional and professional environments.

Taken together, the findings position sustainability in interior design education as an educational process rather than a discrete content area. Competence appears to emerge through the interaction of curriculum design, studio culture, assessment practices and professional expectations. Where these elements are not fully aligned, sustainability may remain present in discourse yet unevenly integrated into design practice.

8.1 Pedagogical implications for curriculum design

The findings suggest that sustainability benefits from being positioned as a structured educational competence rather than treated as an additional topic within design education. While students demonstrate strong interest and engagement, experiences across year levels indicate variability in how sustainability is introduced, reinforced and applied.

Conceptual clarity appears to be an important starting point. Students' difficulty distinguishing sustainability as a socio-ecological framework from sustainable design as its disciplinary application highlights the need for early framing supported by applied examples and reflective learning activities.

Students' reliance on material-based reasoning further emphasises the importance of progression toward lifecycle thinking, systems awareness and evidence-informed decision-making. Studio learning becomes particularly influential when sustainability is embedded within briefs, critique and assessment processes, positioning it as part of core design practice.

Experiential learning environments also support this transition. Engagement with real projects, site visits, material exploration and collaboration with practitioners enables movement from conceptual awareness toward applied competence.

8.2 Policy-practice tensions

The findings reveal a tension between sustainability as a policy ambition and sustainability as an educational experience. International frameworks such as UNESCO Education for Sustainable Development (ESD) for 2030 and the European GreenComp framework advocate systemic integration and competence development; however, student accounts indicate that sustainability is experienced as unevenly embedded across modules.

Although sustainability is encountered throughout the programme, it is not consistently experienced as a coherent and progressively scaffolded design competence. Values-oriented awareness and professional motivation appear relatively well developed, yet applied analytical competences, particularly systems thinking and lifecycle reasoning, remain less consistently supported.

Student experiences further suggest that sustainability becomes prioritised when embedded within briefs and assessment expectations, indicating that its enactment is mediated by programme structures rather than fully internalised within design practice.

The Cypriot context further shapes this dynamic. Constraints related to cost, material availability, professional expectations and client priorities influence how sustainability is interpreted and applied within studio learning.

8.3 Alignment of student sustainability competence with international frameworks

To examine how sustainability is operationalised within the programme, the findings were interpreted in relation to competence domains articulated in the European GreenComp framework. GreenComp was used as an analytical lens rather than a direct measurement tool, enabling comparison between expected sustainability competences and student-reported knowledge, confidence, behaviours and curriculum experiences.

While GreenComp provides structured competence domains, UNESCO Education for Sustainable Development (ESD) for 2030 frames sustainability integration at the level of transformative pedagogy and institutional practice. The findings suggest partial alignment with ESD principles in terms of student engagement and value formation; however, the absence of programme-wide scaffolding and systematic assessment integration indicates incomplete operationalisation within studio-based interior design education.

Table 4. *Alignment between sustainability competence expectations and student learning evidence*

Sustainability competence domain (GreenComp)	**Framework expectation**	**Evidence from survey findings**	**Evidence from focus group**	**Curriculum interpretation (based on student-reported experience)**	**Alignment level**
Systems thinking	Understanding interconnections between environmental, social and lifecycle dimensions	Low familiarity with sustainability frameworks. moderate awareness of environmental impacts	Sustainability mainly interpreted through materials and energy; limited systemic framing	Systemic reasoning not consistently scaffolded across studio learning	Weak
Values and responsibility	Ethical and environmental responsibility in design decisions	Strong positive attitudes and professional intention	Sustainability framed as moral responsibility and future obligation	Values recognised but not consistently embedded in assessment structures	Partial
Action competence	Ability to apply sustainability principles in practice	Low confidence in environmental evaluation and lifecycle assessment	Difficulty translating theory into project application	Sustainability applied mainly when required in briefs	Weak
Futures thinking	Consideration of long-term and adaptive consequences	Moderate attention to durability and adaptability	Sustainability linked to future professional role	Emerging but not systematically embedded across early curriculum stages	Partial

Source: Synthesised by authors based on survey results, focus-group themes and GreenComp competence domains.

The analysis indicates uneven competence development across domains. Ethical awareness and professional motivation are relatively established, while systems thinking and action-oriented capability remain less consistently supported. Sustainability currently operates more strongly as a value orientation than as an integrated, evidence-based design capability.

8.4 Original Contribution of the Study

This study provides empirical insight into how sustainability is understood and operationalised within interior design education in a small higher-education context. While existing scholarship has focused largely on architecture or large institutional systems, the findings illustrate how sustainability competences develop within studio-based design education and how they are shaped by curriculum organisation, assessment expectations and teaching practices.

By linking student perspectives with curriculum experience and pedagogical implementation, the study distinguishes between sustainability exposure and sustainability competence development. It highlights the importance of structured progression linking awareness, application and evaluation within studio-based learning.

Conceptually, the research positions sustainability competence as an educational process shaped by the interaction of curriculum design, studio culture and professional expectations rather than by curriculum content alone. Practically, it offers an evidence base to inform curriculum development and pedagogical alignment within interior design education.

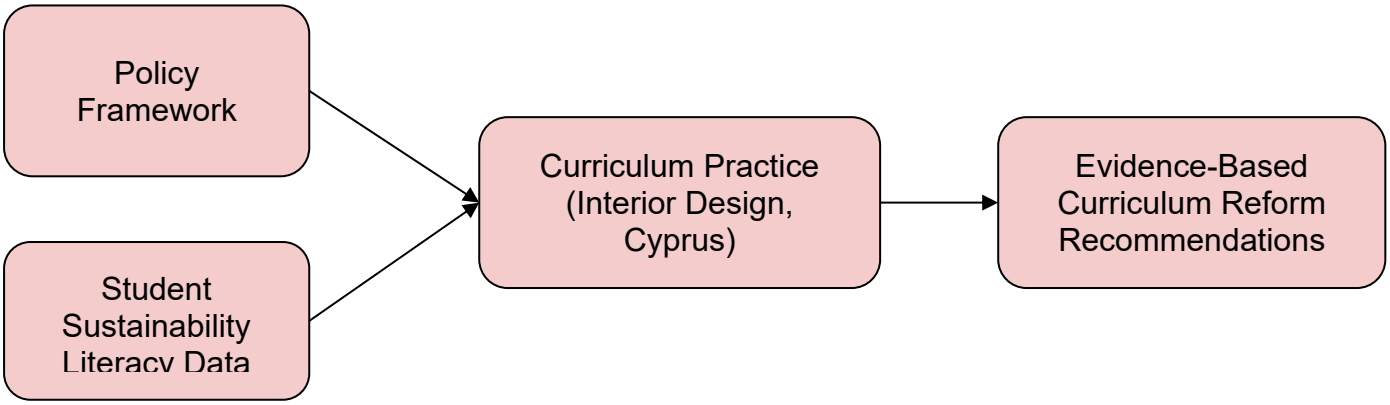


***Figure 4**: Conceptual model linking policy frameworks, student sustainability literacy data, and curriculum reform in interior design education.*

9. Limitations

9.1 Methodological Limitations

This study adopted a sequential explanatory mixed-methods design combining descriptive survey analysis and qualitative focus groups within a single programme context. While this approach enabled both breadth and depth of insight, several methodological constraints are acknowledged.

First, the research relied on self-reported questionnaire data, which capture perceived understanding rather than demonstrated competence. Responses may therefore reflect intentions or expectations rather than actual design performance. Future research could incorporate performance-based assessment, portfolio analysis or studio project evaluation to examine how sustainability literacy translates into applied practice.

Second, the study involved a small cohort (n = 20 survey participants; n = 16 focus-group participants) representing one Interior Design programme. Although this near-census approach strengthens contextual relevance, it limits statistical generalisability. Accordingly, descriptive rather than inferential statistical analysis was employed. Larger multi-institutional studies would strengthen external validity.

Third, the research was cross-sectional, capturing perceptions at a single point in time. As sustainability competence develops progressively, longitudinal research tracking cohorts or evaluating curriculum reform would provide stronger evidence of developmental change.

Finally, while the questionnaire was informed by international frameworks (UNESCO ESD, GreenComp), it was not designed as a psychometrically validated instrument for measuring competence attainment. The frameworks guided interpretation rather than serving as direct assessment tools.

9.2 Focus Group and Participation Limitations

The qualitative phase is subject to limitations associated with group dynamics and variation in participation depth. While engagement was high, some students contributed more extensively than others, potentially shaping thematic emphasis. Conceptual uncertainty, particularly regarding distinctions between sustainability and sustainable design, may reflect both developmental literacy and communicative constraints. As English was not the first language for many participants, articulation of abstract concepts may have been affected. These factors do not negate the credibility of the findings but may have influenced the depth and precision of some accounts.

9.3 Researcher Positionality and Data Interpretation

The study was conducted within the researchers' own teaching context, and the insider–researcher position may have influenced interaction and interpretation. Although participation was voluntary and confidential, perceived academic relationships could not be entirely excluded. Reflexive strategies, including anonymised data collection, memoing and collaborative theme review, were employed to mitigate bias; however, interpretive influence remains possible, as in all qualitative research.

9.4 Contextual Limitations

The study is situated within a specific transnational higher-education setting in Cyprus. Institutional scale, staffing capacity and local professional conditions shape sustainability teaching and practice. Market constraints, material availability and client expectations further influence how sustainability is interpreted and applied.

Findings should therefore be interpreted as analytically transferable rather than statistically generalisable, while offering insight for similarly structured programmes operating in small or resource-constrained higher-education contexts.

10. Recommendation & Suggestions

The findings indicate that sustainability integration within interior design education currently operates primarily through exposure rather than structured competence development. While students demonstrate strong ethical commitment and professional intention, applied capability, curricular coherence and assessment integration remain uneven. The recommendations below translate the empirical findings into programme-level actions aligned with competence-based sustainability education and international frameworks such as GreenComp and Education for Sustainable Development (ESD).

10.1 Establish a scaffolded programme-wide sustainability pathway

Student responses reveal uneven conceptual clarity and limited cumulative development across year levels, indicating the absence of a clearly articulated sustainability progression model. A programme-wide sustainability competence framework is therefore required to ensure vertical and horizontal alignment.
This should include:

- systematic mapping of modules against sustainability competences and programme learning outcomes
- identification of gaps and redundancies within the existing curriculum structure
- explicit definition of progression from awareness → application → evaluation across studio and theory modules
- early introduction of conceptual clarity, including differentiation between sustainability as a socio-ecological framework and sustainable design as disciplinary enactment
- progressive development of analytical competencies such as lifecycle reasoning, environmental evaluation and ethical decision-making
- consolidation of applied competence in later years through integrative studio projects requiring explicit sustainability justification

A scaffolded pathway transforms sustainability from episodic exposure into cumulative competence development.

10.2 Embed sustainability within studio briefs and assessment frameworks

Findings demonstrate that sustainability becomes prioritised when structurally embedded within briefs and grading criteria. Constructive alignment between learning outcomes, studio processes and assessment frameworks is therefore essential.

Programme-level action should include:

- embedding sustainability criteria within studio briefs and project expectations
- aligning sustainability learning outcomes explicitly with assessment rubrics
- developing shared evaluation frameworks assessing environmental reasoning, lifecycle awareness, ethical sourcing and material justification
- requiring sustainability rationale statements within submissions and portfolio documentation
- ensuring critique and feedback processes explicitly address environmental decision-making

Assessment alignment is a decisive mechanism for transforming sustainability from aspirational value to operational design competence.

10.3 Strengthen experiential and practice-based learning environments

Findings indicate limited opportunities for applied sustainability decision-making within studio conditions, particularly where sustainability expectations are not made explicit through briefs, feedback and assessment

Programmatic integration should include:

- structured site visits to sustainable buildings and renovation projects
- engagement with material suppliers and environmental practitioners
- live or community-based briefs requiring environmental justification
- interdisciplinary collaboration with engineering, environmental or digital programmes
- applied case-study integration within studio teaching

Experiential learning strengthens the translation of conceptual awareness into professional capability.

10.4 Develop technical and analytical sustainability literacy

Survey and focus-group findings reveal weaker confidence in analytical sustainability competencies. Structured development of technical literacy is therefore necessary to support evidence-based design decision-making.

Curriculum enhancement should include:

- introduction of lifecycle thinking appropriate to interior-scale interventions
- instruction in interpreting environmental product declarations and material performance data
- integration of circular design principles, durability and reuse strategies within studio projects
- structured engagement with environmental reasoning tools
- reinforcement of evidence-based material justification rather than intuition-driven selection

Analytical competence development is central to bridging awareness and applied sustainability capability.

10.5 Align institutional strategy and staff development

Variability in sustainability integration reflects lecturer-dependent implementation. Institutional coordination is therefore required to reduce fragmentation and ensure pedagogical coherence.

Institutional measures should include:

- establishment of a shared sustainability curriculum framework at programme level
- structured staff development aligned with sustainability pedagogy and competence frameworks
- collaborative studio planning across modules
- embedding sustainability language within programme specifications and validation documentation
- alignment with international guidance such as GreenComp and ESD for 2030

Institutional alignment positions sustainability as a collective academic responsibility rather than an individual initiative.

10.6 Engage with professional frameworks and industry expectations

Limited student familiarity with formal sustainability frameworks suggests a disconnect between academic learning and professional reference systems. Sustainability competence must therefore be linked explicitly to professional identity formation.

Programme integration should include:

- structured introduction to global frameworks such as the SDGs and GreenComp
- contextualisation of built-environment certification systems (e.g., LEED, BREEAM)
- case-based examination of ethical challenges including greenwashing
- explicit positioning of sustainability within professional portfolio narratives
- structured reflection on negotiation between client expectations and environmental responsibility

Professional alignment strengthens the legitimacy and applicability of sustainability competence.

10.7 Consider dedicated sustainability learning structures

The dispersed nature of sustainability exposure indicates the need for formalised structural mechanisms enabling continuity and monitoring of competence development.

Possible structural mechanisms include:

- a dedicated sustainability-focused module
- vertically integrated sustainability themes across studios
- cross-year thematic workshops
- interdisciplinary sustainability studios
- longitudinal sustainability portfolios or reflective journals

Formalisation enables measurable progression rather than incidental exposure.

10.8 Support contextual and locally relevant sustainability learning

Students emphasised contextual constraints including cost, availability and market conditions. Sustainability education must therefore engage directly with real professional environments rather than abstract frameworks.

Curriculum development should incorporate:

- local case studies from Cyprus and the Mediterranean region
- cost-aware sustainability exercises
- negotiation simulations reflecting client priorities
- collaboration with regional suppliers and practitioners
- integration with institutional sustainability initiatives

Contextual grounding enhances the transferability of sustainability competence into professional practice.

Concluding position of the recommendations
Taken together, these recommendations reposition sustainability as a structured, assessable and progressively developed design competence embedded within curriculum architecture, studio pedagogy and institutional strategy. Competence formation requires deliberate alignment rather than thematic inclusion. In small and transnational higher-education contexts, scaffolded progression, assessment integration, experiential engagement and coordinated staff development emerge as key mechanisms for transforming sustainability from aspiration into operational design capability.

11. Future Research

This study provides baseline empirical insight into sustainability literacy within interior design education in Cyprus and highlights the need for continued investigation into curriculum design, pedagogy and competence development. Building on the findings and identified limitations, the following research directions are proposed:

- **Mixed-methods pedagogical studies**
  Further research combining quantitative and qualitative approaches is needed to examine how sustainability competence develops within studio learning, design decision-making and reflective practice.

- **Comparative institutional research**
  Studies across other Cypriot HEIs and comparable small-system contexts (e.g., Malta, Portugal, Greece) could identify structural patterns, shared barriers and transferable pedagogical strategies.

- **Longitudinal tracking of competence development**
  Following cohorts across multiple years, or evaluating the impact of curriculum reforms and sustainability-focused modules, would clarify how awareness translates into applied competence over time.

- **Development of sustainability assessment tools (SAM)**
  Future research could focus on the creation and validation of structured assessment tools to measure sustainability knowledge and competence among students and lecturers, and to support reflective design decision-making.

- **Curriculum mapping and assessment alignment research**
  Systematic investigation of how sustainability is embedded across module descriptions, briefs, learning outcomes and assessment structures, alongside the development of aligned evaluation frameworks and studio rubrics to support measurable competence progression.

- **Educator capacity and professional development**
  Research examining sustainability literacy among design educators and the impact of training initiatives could explain programme-level variation and strengthen pedagogical implementation.

- **Practice-based and community-linked studies**
  Case studies involving live projects, municipalities, industry partners and material suppliers could explore how sustainability competences transfer into real-world design contexts.

- **Digital and immersive sustainability pedagogy**
  Future work may evaluate how VR, simulation tools and digital visualisation platforms support understanding of lifecycle thinking, environmental performance and spatial sustainability decisions.

Together, these research directions extend the baseline established in this study and support the continued development of sustainability competence within interior design education, particularly in small-system and transnational higher-education contexts.

12. Conclusion

This study provides empirical insight into how sustainability is experienced within interior design education in a small-system higher-education context, highlighting a distinction between sustainability exposure and sustainability competence. While students demonstrate strong motivation, ethical commitment and professional intention, sustainability learning is not consistently scaffolded as a cumulative design capability across the curriculum.

The findings indicate that sustainability integration currently occurs through episodic encounters rather than structured progression linking awareness, application and evaluation. Conceptual familiarity develops unevenly, applied confidence remains variable and

systems-level thinking is not consistently embedded within studio learning. These patterns reflect structural misalignment between policy ambitions, curriculum architecture and pedagogical enactment.

The study therefore challenges the assumption that the presence of sustainability discourse within design education equates to competence formation. Exposure alone does not produce operational capability. Sustainability becomes educationally meaningful when embedded within studio briefs, assessment criteria, curriculum mapping and experiential learning environments that position it as a core design parameter.

By situating student experience alongside curriculum structures and international competence frameworks, the research contributes an empirically grounded understanding of how sustainability competence is formed, mediated and constrained within interior design education. It demonstrates that competence development is not an automatic outcome of curriculum inclusion, but a developmental process requiring intentional pedagogical design, institutional alignment and applied learning opportunities.

For interior design education, the implication is clear: sustainability must shift from being an aspirational value to a structured, assessable and progressively developed design capability. Without deliberate integration across curriculum progression, studio pedagogy and assessment architecture, sustainability risks remaining rhetorically present yet operationally marginal within design education.

References

Algers, A., & Silva, C. (2021). Embedding sustainability in interior design studio education: Challenges and opportunities for transformative practice. Journal of Interior Design Education, 46(2), 145-162,. https://doi.org/10.1111/jide.12241.

Andrews, T. (2022). Sustainability adoption in U.S. art and design schools: Barriers, frameworks and institutional responses. International Journal of Art & Design Education, 41(3), 512-528.

Barth, M., & Rieckmann, M. (2021). State of the art in research on higher education for sustainable development. Sustainability, 13(6), 3416,. https://doi.org/10.3390/su1306341.

Bianchi, G., Pisiotis, U., & Cabrera Giraldez, M. G. (2022). The European sustainability competence framework. Publications Office of the European Union. https://publications.jrc.ec.europa.eu/repository/handle/JRC128040.

Biggs, J., & Tang, C. (2011). Teaching for quality learning at university (4th ed.). Open University Press.

Borg, C. (2020). Tertiary education in small states: Planning in the context of globalisation. Palgrave Macmillan.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

Council of the European Union. Council Recommendation on learning for the green transition and sustainable development. (2022). Official Journal of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:C:2022:243:TOC.

Doyle, L. (2023). From elective to essential: The uneven integration of sustainability in American design curricula. Design Studies, 85, 101-118.

European Commission, (2024). Regulation (EU) 2024/1781 establishing a framework for the setting of ecodesign requirements for sustainable products (ESPR. Official Journal of the European Union. https://eur-lex.europa.eu/eli/reg/2024/1781/oj.

Faludi, J., Acaroglu, L., Gardien, P., Rapela, A., Sumter, D., & Cooper, C. (2023). Sustainability in the future of design education. She Ji: The Journal of Design, Economics, and Innovation, 9(2), 157-178,. https://doi.org/10.1016/j.sheji.2023.04.004.

Global Alliance for Buildings and Construction (GlobalABC), and United Nations Environment Programme (UNEP), Global status report for buildings and construction 2024/2025. (2024). UNEP. https://www.unep.org/resources/report/global-status-report-buildings-and-construction-20242025.

Hussein, R. (2022). Sustainability in interior design education: A systematic review of global and regional pedagogical approaches. International Journal of Design Pedagogy, 9(1), 34-52,. https://doi.org/10.18848/2325-128X/CGP/v09i01/34-52.

Kineber, A. F., Abdelkader, E. M., Othman, A. R., & Olawumi, T. O. (2023). Barriers to implementing sustainable interior design practice in the construction industry: A stakeholder perspective. Sustainable Cities and Society, 92, 104512,. https://doi.org/10.1016/j.scs.2023.104512.

Kineber, A. F., Mohamed, A. H., & Hamed, M. M. (2023). Exploring sustainable interior design implementation barriers: A partial least squares structural equation modeling approach. Sustainability, 15(5), 4663,. https://doi.org/10.3390/su15054663.

Kolb, D. A. (2014). Experiential learning: Experience as the source of learning and development (2nd ed.). Pearson Education.

Kuzmina, K., & Lofthouse, V. (2023). Sustainable design education in higher education and implementation. Sustainability, 15(6), 5002,. https://doi.org/10.3390/su15065002.

Mezirow, J. (2009). Transformative learning theory. In J. Mezirow & E. W. Taylor (Eds.), Transformative learning in practice: Insights from community, workplace, and higher education. Jossey-Bass, 18-31.

Nicolaou, C., & Theodoro, N. (2021). Higher education and the challenge of sustainability integration: The case of Cyprus. International Journal of Sustainability in Higher Education, 22(7), 1392-1408,. https://doi.org/10.1108/IJSHE-03-2020-0112.

Opara, E. U., & Doyle, S. (2021). Sustainability in design pedagogy: A review of emerging practices. Design Journal, 24(5), 721-738,. https://doi.org/10.1080/14606925.2021.1932345.

Parsons School of Design. School of Constructed Environments: Sustainability Framework. (2022). The New School.

Rhode Island School of Design (RISD). Nature–Culture–Sustainability Studies: Institutional Strategy. (2023). RISD Press.

Rieckmann, M. (2018). Learning to transform the world: Key competencies in Education for Sustainable Development. In A. Leicht (Ed.), Issues and trends in Education for Sustainable Development, 39-59. UNESCO.

Sokienah, N. (2024). Sustainability awareness and application among interior design students in Jordanian higher education. International Journal of Sustainable Design Studies, 12(1), 55-7,. https://doi.org/10.1080/ids.2024.0012.

Sokienah, Y. (2024). Behind the designs: An exploration of sustainability attitudes among interior design students in Jordan and the Middle East Region. Heliyon, 10(17), 24747,. https://doi.org/10.1016/j.heliyon.2024.e24747.

Sterling, S. (2012). The future fit framework: An introductory guide to teaching and learning for sustainability. Higher Education Academy.

Tilbury, D. (2011). Education for sustainable development: An expert review of processes and learning. UNESCO.

U.N.E.S.C.O. (2020). Education for sustainable development: A roadmap (ESD for 2030. UNESCO Publishing. https://unesdoc.unesco.org/ark:/48223/pf0000374802.

Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competences in sustainability: A reference framework for academic program development. Sustainability Science, 6(2), 203-218,. https://doi.org/10.1007/s11625-011-0132-6.

Funding
This research received no external funding. The study was conducted as part of an ongoing institutional agenda to strengthen sustainability integration in design education.

Institutional Review Board Statement
The study was conducted in accordance with the principles of the Declaration of Helsinki and complied with the General Data Protection Regulation (GDPR, EU 2016/679). Project approval was granted by the Research Centre of the Institution through the institutional research governance process. The study was additionally reviewed and approved by the Cyprus National Bioethics Committee prior to the commencement of data collection.

Informed Consent Statement
All participants were provided with an information sheet outlining the purpose, procedures and voluntary nature of the study. Written informed consent was obtained from all students prior to participation. Participants were informed that their involvement was anonymous, unrelated to academic assessment and that they could withdraw at any stage without penalty. Consent was also obtained for the audio-recording of focus group discussions for transcription purposes.

Data Availability Statement
The dataset generated during this study is not publicly available due to the small cohort size and institutional GDPR requirements. Aggregated and anonymised data supporting the findings of this article are available from the corresponding author upon reasonable request, subject to ethical approval conditions and participant confidentiality protections.

Acknowledgments
The authors would like to express their sincere gratitude to the Interior Design students of the Institution, for their voluntary participation and thoughtful engagement throughout the questionnaire and focus group phases. The authors also acknowledge the

support of the Institution's Research Centre in facilitating the ethical review process and promoting research aligned with sustainability and curriculum development. Appreciation is also extended to a university that we have collaboration with from the UK, for the program's validation framework, which contributes to ongoing quality enhancement and international alignment in design education.

Author Contributions

Conceptualisation, Stelios Stefanos Drousiotis., methodology, Stelios Stefanos Drousiotis, questionnaire design, Stelios Stefanos Drousiotis, data collection, Stelios Stefanos Drousiotis with support from Dora Anastasiou, Stefanos Christodoulides and Giorgos Nicou, quantitative analysis, Stelios Stefanos Drousiotis, qualitative focus group facilitation and thematic analysis, Stelios Stefanos Drousiotis, writing - original draft preparation, Stelios Stefanos Drousiotis, writing - review and editing, Stelios Stefanos Drousiotis, Dora Anastasiou, Stefanos Christodoulides and Giorgos Nicou, supervision and academic oversight, Dora Anastasiou, Stefanos Christodoulides and Giorgos Nicou.

All authors have read and agreed to the published version of the manuscript.

This article forms part of the corresponding author's doctoral research (PhD) at the University of Portsmouth, UK.

Supplementary Materials

The full research instruments used in this study are provided in the Appendices. Appendix A includes the structured questionnaire administered to Interior Design students. Appendix B contains the semi-structured focus group discussion guide used to explore student experiences of sustainability integration within the curriculum. These materials are included to support transparency, replicability and future comparative research in sustainability education.

Appendices

Appendix A: Student Questionnaire Instrument

QUESTIONNAIRE

'Student Perceptions of Sustainability and Sustainable Design in Interior Design Education'

Introductory Note

This anonymous questionnaire aims to explore students' perceptions, awareness and engagement with sustainability and sustainable design within Interior Design education. The collected data will be used solely for academic research purposes. Participation is voluntary and all responses will remain confidential.

Estimated time: **8 – 10 minutes.**

By completing this questionnaire, you confirm that you have read the participant information provided, understand the purpose of the study, and voluntarily agree to participate. You may stop at any time before submission. Responses are anonymous and will be used for academic research only.

Section A: Demographic Information

1. Year of Study:

☐ 1st Year ☐ 2nd Year ☐ 3rd Year ☐ 4th Year

2. Gender:

☐ Female ☐ Male ☐ Other ☐ Prefer not to say

3. Age:

☐ 18 - 20 ☐ 21 - 24 ☐ 25 - 29 ☐ 30+

4. Where have you learned primarily about sustainability? (multiple selection)

☐ Mainly before university

☐ Mainly through this degree

☐ Mainly outside university (online/self-learning)
☐ Never heard of it

Section B: Awareness and Knowledge of Sustainability
0: Not sure / N/A, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

1. I am familiar with the concept of sustainability.
2. I understand how sustainability relates to interior design.
3. I can identify examples of sustainable design practices.
4. I am aware of the environmental impacts of interior design choices (materials, fit-outs, waste, energy).
5. I can explain the difference between "sustainability" and "sustainable design".
6. I am familiar with at least one sustainability framework used in design (e.g., SDGs, GreenComp, LEED, BREEAM).

Section C: Attitudes and Beliefs toward Sustainability
0: Not sure / N/A, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

1. Sustainability can be a relevant consideration within professional design practice.
2. Design decisions may need to balance environmental, client, and project requirements.
3. The inclusion of sustainability in design projects may depend on project goals or context.
4. My studies should play a stronger role in developing sustainability competence.
5. I consider social and ethical factors (e.g., wellbeing, accessibility, labor conditions) as part of sustainable design.
6. I am interested in learning more about sustainability in interior design.
7. Sustainability is often discussed more in theory than applied in studio design decisions.
8. In many interior design projects, applying sustainability in a meaningful way can be challenging.

Section D: Confidence in Applying Sustainable Design Principles
0: Not sure / N/A, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

1. I feel confident selecting materials based on environmental performance information.
2. I can assess aspects of a design proposal that relate to environmental impact.
3. I can explain design choices that relate to sustainability to others.
4. I can incorporate approaches such as reuse, reduced waste, or durability into my design work.
5. I can explain how material choices relate to environmental impacts across a product's life cycle (e.g., extraction, manufacturing, use, disposal).
6. When designing, I consider long-term consequences such as maintenance, adaptability, end-of-life, and circular reuse.

Section E: Behavioral Intentions and Practices
0: Not sure / N/A, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

1. I have included environmental or sustainability considerations in some of my coursework.
2. I expect to consider sustainability principles in my future professional practice.
3. I discuss or share sustainability-related ideas with peers during design projects.

Section F: Barriers to Sustainability Integration
Which of the following factors make it difficult for you to include sustainability in your design work? *(Please select up to THREE)*

☐ Lack of knowledge
☐ Lack of time within projects
☐ Lack of tools or resources
☐ Client or brief constraints
☐ Budget limitations
☐ Sustainability is not explicitly assessed or graded
☐ Not enough guidance from tutors
☐ Lack of confidence in material selection
☐ Difficulty evaluating sustainability claims (greenwashing)
☐ Other (please specify): _____

Section G: Institutional Exposure and Curriculum Integration
0: Not sure / N/A, 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree

1. My studies include information or discussion about sustainability and sustainable design.
2. Sustainability-related topics are presented in several modules across the degree.
3. I have encountered sustainability-related learning through workshops, seminars, or guest lectures.
4. Lecturers have provided guidance or feedback on how sustainability can be addressed in projects.
5. The sustainability-related content provided in my studies aligns with what I expected to learn.

6. Sustainability is assessed or graded explicitly in design studios or modules.
7. Sustainability content feels consistent and connected across different modules.

Section H: Resources and Learning Methods

1. Which of the following sources do you currently use to learn about sustainability topics? *(Select all that apply)*

☐ Books or academic journals
☐ Online articles or videos
☐ Workshops or short courses (in-person or online)
☐ Site visits or field trips
☐ Social media or online design communities
☐ Group discussions or peer exchanges
☐ Other: _____

2. Through which of the following activities has your programme of study included content or discussion about sustainability? *(Select all that apply)*

☐ Design studio projects or critiques
☐ Guest lectures or talks by professionals
☐ Field trips or community projects
☐ Research assignments or case studies
☐ Workshops or seminars organized by the department
☐ Integration within other modules (e.g., history, materials, or technology)
☐ Other: _____

Section I: Open-ended Reflections

1. In your opinion, how could the university or department further develop or improve learning opportunities related to sustainability in the Interior Design programme?

.....

2. From your experience, what aspects of interior design education, professional practice or daily life could better reflect environmental responsibility?

.....

3. Can you recall any project, assignment, or class discussion where sustainability topics were mentioned or explored? Please describe briefly.

.....

4. Please indicate any modules in which you remember sustainability being discussed or included. *(You may tick the relevant modules or list them below.)*

Year 1 – Semester A ☐ Play ☐ Design Method ☐ Design Communication 1 ☐ History of Art & Design 1 ☐ English 1 **Year 1 – Semester B** ☐ English 2 ☐ Design Communication 2 ☐ Theory and Practice in Design 1 ☐ Make ☐ Design and Function	**Year 2 – Semester A** ☐ Properties of 3D Materials ☐ Computer Applications in Design 1 ☐ Creative Studio 1 ☐ History of Art & Design 2 ☐ Academic English **Year 2 – Semester B** ☐ Theory and Practice in Design 2 ☐ Computer Applications in Design 2 ☐ Creative Studio 2 ☐ 3D Technology & Processes ☐ Exhibition & Retail Design
Year 3 – Semester A ☐ Media Production ☐ Critical Studies ☐ Professional Studio 1 ☐ Visual & Personal Presentation ☐ Professional Practice **Year 3 – Semester B**	**Year 4 – Semester A** ☐ Contemporary Topics in Interior Design ☐ Design Futures ☐ Advanced Theory of Design ☐ Communicating Design ☐ Sustainability in the Design Disciplines ☐ Design Project 1

☐ Portfolio Development 1 ☐ Independent Research in Design ☐ Professional Studio 2 ☐ Self-directed Brief ☐ Decorative Textiles & Fabrics	**Year 4 – Semester B** ☐ Portfolio Development 2 ☐ Ethics, Values & Sustainability ☐ Design Project 2 ☐ General Elective

Appendix B: Focus Group Discussion Guide (Questions)

FOCUS GROUP QUESTIONS

This focus group forms part of an academic research study exploring sustainability in interior design education.

The discussion is semi-structured and organised around a number of themes. The questions are used as prompts to guide conversation rather than as a fixed interview, so please feel free to speak openly and respond to one another.

There are no right or wrong answers. We are interested in your honest experiences and perspectives, including any areas where sustainability could be better supported within the programme. This is not a class discussion and it has no impact on your grades.

Participation is voluntary and all responses will remain confidential. The session will be audio recorded for transcription purposes only. Recordings will be anonymised, securely stored and used solely for research analysis. You may choose not to answer any question and you may withdraw at any time.

To support transcription, I will ask each of you to briefly state your year of study at the beginning. After that, please speak naturally, there is no need to repeat it each time you contribute.

Open question – warm up

1. **When you hear sustainability in design, what is the first thing that comes to mind?**

   Prompts:
   - If you had to explain it to a first-year student, what would you say?
   - What makes a design decision 'sustainable' for you?

Theme 1: Understanding of Sustainability in Interior Design
(Conceptual awareness & meaning)

1. **How would you describe "sustainable design" in your own words in the context of interior design?**
   Prompts:
   - If you had to explain it to a first-year student, what would you say?
   - What makes a design decision 'sustainable' for you?

2. **When you hear 'sustainable interior design', what design decisions come to mind first? (materials, lighting, reuse, wellbeing, etc.)**
   Prompts:
   - Which decisions do you think have the biggest impact: materials, energy, waste, wellbeing?
   - What would you change first in a typical project to make it more sustainable?

3. **Has your understanding of sustainability changed since you started the degree? How?**
   Prompts:
   - Was there a moment or project that changed how you think?
   - What do you know now that you didn't know in Year 1?

Theme 2: Curriculum Experience and Exposure
(Where and how sustainability appears)

1. **Can you remember any projects or modules where sustainability was discussed or used?**

Prompts:
- What was the project brief, and what did sustainability mean in that context?
- Was it a main part of the task, or just mentioned?

2. **How was sustainability introduced in those experiences?**
   Prompts:
   - Did you learn through lectures, examples, or feedback during studio work?
   - Did you have to research materials/standards, or was it a more general discussion?

3. **Is sustainability treated as an important design priority, or more like an extra topic?**
   Prompts:
   - What makes you feel it's a priority (or not)? Assessment? brief wording? tutor feedback?
   - If you removed sustainability from your projects, would anything change in grading or feedback?

4. **Describe a project where sustainability felt well integrated into your design work?**
   Prompts:
   - What specific decision did you make because of sustainability?
   - Did it affect the final concept, materials, layout, or technical choices?

5. **Give an example when it felt separate or not really connected to your design work?**
   Prompts:
   - Was sustainability discussed, but not required to show it in the design outcome?
   - Did you feel you were 'ticking a box' rather than designing differently?

6. **Based on these experiences, how confident do you feel applying sustainability in your own design work?**
   Prompts:
   - What do you feel confident about (e.g., choosing materials) and what do you feel unsure about (e.g., measuring impact)?
   - What would help you feel more confident quickly?

Theme 3: Design Practice, Competence and Barriers
(Application, confidence, challenges)

1. **When you design, do you try to include sustainability? Why or why not?**
   Prompts:
   - In your last project, what did you actually do (or not do) related to sustainability?
   - Was it your choice, the brief, or the lecturer that influenced it most?

2. **What motivates you to apply sustainable ideas in your projects?**
   Prompts:
   - Is it personal values, lecturer expectations, trends, or career reasons?
   - Do you feel sustainability makes your design better or harder?

3. **What makes it difficult to apply sustainability in your design process?**
   Prompts:
   - Is the biggest challenge knowledge, time, cost, or availability of materials in Cyprus?
   - Do you feel you lack tools (e.g., material databases, guidance, examples)?

4. **A situation where you wanted to include sustainability but couldn't—what prevented it?**
   Prompts:
   - What exactly did you want to do, and what blocked you?
   - If you repeated that project, what would you change to make it possible?

5. **Have your sustainability skills developed during your studies? What contributed?**
   Prompts:
   - Which year/module helped most, and why?
   - Was it learning content, doing projects, or getting feedback that helped most?

6. **Are there factors specific to Cyprus (market, materials, clients, suppliers) that influence sustainable design choices?**
   Prompts:
   - Are certain sustainable materials harder to find or more expensive locally?
   - Do local clients/companies care about sustainability, in your experience or opinion?

Theme 4: Teaching, Assessment and Learning Environments
(Pedagogy & leverage points)

1. **What teaching approaches help you understand sustainability most effectively?**
   Prompts:
   - Do you learn better through real case studies, site visits, studio projects, or lectures?
   - Would you prefer more examples, more practice, or more guidance tools?

2. **How do studio briefs influence whether you include sustainability in your projects?**
   Prompts:
   - If the brief doesn't mention sustainability, do you still include it?
   - What wording in a brief would make you take it seriously?
3. **Do tutors encourage sustainability when giving feedback? In what ways?**
   Prompts:
   - Can you remember a comment a tutor made that pushed you toward sustainability?
   - Do tutors focus more on aesthetics/function than sustainability?

4. **Is sustainability expected, optional, or dependent on the lecturer?**
   Prompts:
   - Does it change across modules or across tutors?
   - Do you feel there is a consistent message across the programme?

5. **Should sustainability be considered in project assessment or grading?**
   Prompts:
   - If yes, what should be graded: process, material choices, or impact evidence?
   - Would grading sustainability motivate you, or create pressure without support?

6. **What support would make it easier for you to integrate sustainability into your design work?**
   Prompts:
   - Would a checklist/rubric help? Or workshops on materials and lifecycle thinking?
   - Would you want digital tools, supplier lists, or example projects?

Theme 5: Professional Identity and Future Orientation
(Futures thinking & career relevance)

1. **Will sustainability be important in your future career as an interior designer? Why?**
   Prompts:
   - Do you see it as essential, or just a 'nice to have'?
   - Do you think it will affect employability or reputation?

2. **Do clients and companies currently expect sustainable design?**
   Prompts:
   - Have you seen evidence of this in Cyprus (market, trends, pricing)?
   - Do clients ask for sustainability, or do designers have to introduce it?

3. **What sustainability skills do you believe are essential for future designers?**
   Prompts:
   - Is it mainly material knowledge, regulations, ethics, or the ability to measure impact?
   - What skills do you wish you had right now?

4. **Are your studies preparing you for this? Why or why not?**
   Prompts:
   - What is missing: practice, technical tools, clear assessment, or industry exposure?
   - What would make you feel genuinely prepared by graduation?

5. **If you could change one thing in the programme to improve sustainability learning, what would it be?**
   Prompts:
   - If you could add one activity: a module, workshop, studio rule, or grading criterion, what would it be?
   - What change would have the biggest impact for first-year students?

Closing question

1. **Is there anything else about sustainability in your studies that we didn't discuss but you think is important?**
   Prompts:
   - Is there something you wish lecturers understood about how students experience sustainability?
   - Any suggestions that would make sustainability feel more realistic and applicable?

Thank-you paragraph
Thank you for sharing your experiences and perspectives. Your contributions are valuable for understanding how sustainability is taught and experienced within the programme and will help inform future curriculum development. If you have any questions after the session or wish to withdraw your contribution, you may contact the research team.

Facilitator prompts (used only if needed):
- Can anyone relate to that or have a different experience?
- Can you tell me a specific example?
- What would have helped in that situation?

Appendix C – Thematic Analysis Process

Appendix C presents illustrative examples of the thematic development process, demonstrating how selected transcript extracts were coded and grouped into subthemes and final themes. The table is intended to provide transparency in the analytic process rather than represent an exhaustive coding of the dataset.

The examples below draw from the single cross-year focus-group dataset (Years 1–4). Using Braun and Clarke's reflexive thematic analysis approach, extracts were coded inductively (close-to-data), then grouped into subthemes and mapped to the final interpretive themes reported in Section 6.

Table C1. Focus Group (Year 1 - Year 4)

Data Extract / Example Quote (from transcript)	Initial Codes (in vivo / close-to-data)	Subthemes (clustered meaning)	Analytical Category (coding stage)	Final interpretive theme
"Eco-friendly products, reusable products, recycling." (Y1-S1)	eco-friendly, reusable, recycling	Recycling + reuse as sustainability	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
"recycling to use less waste" (Y3-S1)	Recycling, less waste	Waste reduction framing	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
"the first thing… is materials… most important" (Y1-S1)	materials first, priority	Material-first sustainability	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
"light… bigger windows… LED lights" (Y3-S1)	natural light; windows, LED	Energy saving through design	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
"chemicals… harmful for our health" (Y1-S1)	health impacts; toxins; materials	Health/wellbeing rationale	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking

“recycled materials, reusable materials, modular furnishings… natural lighting… LED lighting… reduce the energy consumption” (Y4-S1)	recycled materials, reusable materials, modular furnishings, natural lighting, LED lighting, reduce energy consumption	Circularity and energy efficiency	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“eco-friendly materials and green use to appliances” (Y4-S2)	eco-friendly materials, green appliance use	Eco-materials and resource-conscious choices	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“produce less waste… not buying new materials… recycling furniture… long lasting materials… wood or metal… refurnished later” (Y4-S3)	less waste, recycling furniture, durable materials, reuse, refurbishment	Durability, reuse and waste reduction	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“using the sources that you have around you… materials in your own country and local areas” (Y4-S3)	local materials, local sourcing, regional resources	Local sourcing awareness	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“think of the environment… air circulation… materials… do not be toxic” (Y4-S1)	air circulation, non-toxic materials, environmental concern	Indoor environmental quality	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“make a space that the inhabitants feel nice and comfortable” (Y4-S1)	wellbeing, comfort, user experience	Wellbeing as sustainability outcome	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“lighting and using more natural light… Cyprus… sun all year long… save up energy and electricity… using big windows” (Y2-S1)	natural light, energy saving, climate context, passive design	Energy strategies in local climate	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“we focus mostly on the materials… sustainability can be way more than that… accessibility” (Y4-S3)	beyond materials, accessibility awareness	Expanded sustainability framing	Sustainability understanding	Material-Centred Sustainability with Emerging Systems Thinking
“module play… research… biophilia… greenwashing” (Y1-S1)	module-based exposure, research task	Lecturer-prompted introduction	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“more of a general discussion” (Y1-S2)	general talk, not structured	Low scaffolding	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“we don’t have this type of projects yet” (Y1-S1)	limited projects, early years	Limited early application	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“it depends on the lecturer” (Y1-S1)	lecturer-dependent	Inconsistent integration	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“It was introduced through lectures… the theoretical part… we watched videos” (Y4-S1)	lectures, theory delivery, videos	Theory-led introduction	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“we didn’t have any [guest lecturers]… maybe… have a professional interior designer… using sustainable design in practice” (Y4-S1)	lack of industry input, absence of guest speakers, practice exposure	Limited professional engagement	Curriculum exposure	Fragmented Curriculum Integration of Sustainability

“go home, research it… find information… put it in your sketchbook” (Y4-S3)	independent research, self-learning, sketchbook tasks	Self-directed learning expectations	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“even though I used it without understanding” (Y4-S1)	application before understanding, gradual learning	Incremental knowledge development	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“Dependent on the lecturer… we just discuss it briefly” (Y4-S3 / Y2-S1)	lecturer-dependent teaching, brief discussion	Inconsistent implementation across modules	Curriculum exposure	Fragmented Curriculum Integration of Sustainability
“people… don’t care… find another material… cheaper” (Y3-S1)	client priorities, cheaper materials	Sustainability compromised in practice	Theory–practice gap	Theory–Practice Translation Gap
“we haven’t done… what materials… we don’t know” (Y1-S2)	not taught specifics, uncertainty	Low practical confidence	Theory–practice gap	Theory–Practice Translation Gap
“It didn’t feel like… how do I apply this information… But how do we apply them in the design?” (Y4-S3)	knowledge without application, uncertainty in design translation	Knowledge–action gap	Theory–practice gap	Theory–Practice Translation Gap
“I know about sustainability. But can I apply it… it will be half done… like greenwashing mostly” (Y4-S3)	application difficulty, greenwashing concerns	Application uncertainty and authenticity issues	Theory–practice gap	Theory–Practice Translation Gap
“It felt… kind of fake… pretending like I know what sustainability is” (Y4-S3)	lack of confidence, performative sustainability	Legitimacy and confidence concerns	Theory–practice gap	Theory–Practice Translation Gap
“it’s cost… hard to find in Cyprus… order… time consuming” (Y3-S1)	cost, availability, ordering, time	Cost/supply barriers	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“island… bring products… more expensive” (Y1-S1)	island logistics, import costs	Local market constraints	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“I don’t think eco-friendly is developed in Cyprus” (Y1-S2)	underdeveloped market	Weak local eco ecosystem	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“It does feel like a burden… takes a lot of energy… researching… and also the cost” (Y4-S3)	workload, effort, cost	Time and cost pressures	Practice barriers & constraints	Structural and Contextual Barriers to Sustainability Learning
“depends where you live… budget… client wants… time to finish project” (Y4-S1)	budget limitations, client priorities, deadlines	Real-world project constraints	Practice barriers & constraints	Structural and Contextual Barriers to Sustainability Learning
“I don’t think Cyprus is anywhere near sustainable… mostly greenwashing” (Y4-S3)	weak sustainability culture, greenwashing context	Local sustainability ecosystem limitations	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“the budget is a big constraint… price issue” (Y4-S1)	financial limitations, material cost	Financial barriers	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“government does the bare minimum… forced by the EU” (Y2-S1)	policy pressure, minimal compliance	Regulatory compliance perceptions	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“to have the licenses… by law… adopt sustainable principles” (Y4-S1)	regulation, legal compliance	Regulatory drivers	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning

“the constructor doesn’t choose the materials… written down in advance from the architect/interior designer” (Y4-S1)	designer responsibility, specification control	Professional responsibility in sustainability decisions	Structural & contextual barriers	Structural and Contextual Barriers to Sustainability Learning
“site visits… workshops… hands-on” (Y1-S4 / Y1-S1)	visits, workshops, hands-on	Experiential learning demand	Pedagogical drivers	Sustainability as Future Professional Identity
“I would love… case studies… visit… see it working… ask questions” (Y4-S1)	case studies, site visits, real examples	Experiential learning demand	Pedagogical drivers	Sustainability as Future Professional Identity
“not be one-on-one… let’s all sit together and discuss it” (Y4-S3)	collaborative learning, discussion	Collective learning environments	Pedagogical drivers of sustainability engagement	Sustainability as Future Professional Identity
“that’s our future… important topic” (Y1-S1)	future, importance	Sustainability as professional norm	Professional identity	Sustainability as Future Professional Identity
“sustainability will always be important… students will always need to know about it” (Y4-S3)	future relevance, professional importance	Sustainability as professional norm	Professional identity	Sustainability as Future Professional Identity
“depend on the client… ultimately…” (Y1-S4)	client power, negotiation	Client-mediated identity	Professional identity	Sustainability as Future Professional Identity
“include sustainability in grading… makes you want to use [it] more” (Y1-S3)	grading, incentive	Assessment-driven engagement	Pedagogical drivers	Sustainability as Future Professional Identity
“if it’s not mentioned… I’m not going to do it… if it’s not graded I’m not going to do it” (Y4-S3)	assessment dependency, grading motivation	Assessment-driven engagement	Pedagogical drivers of sustainability engagement	Sustainability as Future Professional Identity
“it should have been included way earlier… so students don’t feel overwhelmed” (Y4-S3)	early introduction, curriculum sequencing	Early scaffolding across years	Professional identity & curriculum transformation	Sustainability as Future Professional Identity
“if sustainability is introduced from the first year… small project… easier to understand… I have to apply” (Y4-S1)	first-year integration, small projects, practice-first learning	Structured curriculum embedding	Professional identity & curriculum transformation	Sustainability as Future Professional Identity