Environmental awareness and competence in amelioration of the architectural design studios in Kenya.

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Abstract

The paper examined environmental psychology as a field that is focused on interactions between human beings and their environments. It emphasized how people modify their surroundings and how those surroundings influence behaviour. The paper highlighted the importance of environmental awareness in developing the competence needed to address human-environment challenges in designed spaces. Using case studies of architectural design studios at the University of Nairobi (UON), Technical University of Kenya (TUK), and Jomo Kenyatta University of Agriculture and Technology (JKUAT), the study identified mismatches between user needs and design solutions that were provided by built-environment professionals. The paper established patterns of user behaviour in these design studios based on spatial survey, participant observation and observation of physical traces. The data revealed several indicators that guided the interaction of space and the users. These included space, staffing and object inadequacies, and use of the environment for prescribed activities. Also tagged were flawed design of space and objects in space, space modification and manipulation, and space abandonment. Space and object abuse as well as behaviour modification & afforded behaviours were also identified as critical indicators. On the basis of these findings the study developed an appropriate framework for the application of data on environmental psychology. Such applications would in effect guide the amelioration of the functionality of architectural design spaces (studios) and the built environment at large.

Key Words: *Environmental awareness, competence, psychology, environmental psychology indicators.*

1.0. Introduction

Environmental psychology examines the dynamic interplay between individuals (or groups) and their environments, considering how built environments both influence human behaviour and are, in turn, shaped by users over time groups (Gifford, 2012; Mosharraf & Tabaeian, 2014; Steg et al., 2019; Kopek, 2020).

In the context of architectural environments, these interactions mean that users transform spaces to suit their needs, and that their behaviour and experiences change accordingly (Gifford, 2011 and 2014; (Ng et al., 2019).

Traditionally, architectural design has followed a professional-led model in which architects produce designs based on a client's brief, environmental constraints, technical knowledge, applicable laws, and minimal design standards (Gifford, 2012; Sabry et al., 2016; Kar & Sarkar, 2017). In this paradigm, the majority of actual end-users, who are typically non-architect clients, are seldom involved in the design process (Horayangkura, 2012; Mahmoud, 2019). This lack of substantive user participation often results in a divergence between the solutions envisioned by design professionals and the lived realities and expectations of users (Kar & Sarkar, 2017).

To examine these shortcomings, this study drew on environment-behaviour research mixed methodological approach that employs post-occupancy evaluation research scope to establish spatial purpose fit (space/utilisation) (Kar & Sarkar, 2017); and behavioural scope that asses actions and intentional responses (Fischl, 2004).

It employed behavioural observation, trace analysis, and interviews techniques (Fischl, 2004; Zeisel, 1984, 2007 & 2016; Steg et al., 2019; Novrial & Marina, 2019; Ng et al., 2019; Norris & Baker, 2019).

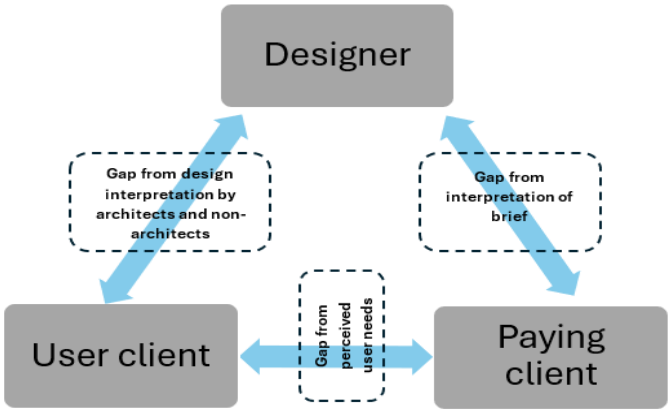

Figure. 1: Judy Kebenei 2025. Illustration of design gaps- Adopted from 1984l's User needs gap model, 1984, 2007, 2016.

It employed behavioural observation, trace analysis, and interviews techniques (Fischl, 2004; Zeisel, 1984, 2007 & 2016; Steg et al., 2019; Novrial & Marina, 2019; Ng et al., 2019; Norris & Baker, 2019). One of the proposals by critics of environmental psychology is the improvement of methods to conduct more meaningful and impact based research (Van der Linden & Goldberg, 2020; Kühn & Bobeth, 2022). Ng et al., (2019) suggests use of multiple processes to gain comprehensive understanding of situation under study.

Table 1: Proposed mixed methodological approach to be adopted in conducting environmental psychology based Research.

Research Scope	Post-occupancy evaluation to establish purpose fit (space/Utilitas) (Kar & Sarkar, 2017) Behavioural scope (actions and intentional responses) - impact of human behaviour on space; Impact of space on human behaviour)– (space, users and, activities of interest/target behaviours and) (Fischl, 2004)
Research type	Descriptive – describe space, user and, activities of interest/target behaviours (Fischl, 2004; Zeisel, 1984 & 2007) Evaluative – POE (Fischl, 2004)
Research methods	Case study (Use of selected spaces), Survey (Zeisel, 1984 & 2007; Steg et al., 2019)
Research Techniques	Spatial survey Naturalistic/systematic observation of human behaviour (Fischl, 2004; Zeisel, 1984, 2007 & 2016; Steg et al., 2019; Novrial & Marina, 2019) Observation of physical traces (Fischl, 2004; Zeisel, 1984 & 2007; Ng et al., 2019; Norris & Baker, 2019) Behaviour mapping (Ng et al., 2019; Norris & Baker, 2019) Focused Interviews (Zeisel, 1984, 2007) Structured questionnaires (Zeisel, 1984, 2007)
Settings	Natural (Zeisel, 1984, 2007, 2016; ; Steg et al., 2019)

Source: Judy Kebenei, 2025.

Central to this approach are the concepts of environmental awareness and environmental competence. Environmental awareness refers to the capacity of users to critically analyse spatial contexts and understand how environment relates to human beings (Martin, 2004; Tariq, 2013; Mosharraf & Tabaeian, 2014). Environmental competence is the ability to leverage this awareness to identify problems within a setting and to propose purposeful changes that enhance functionality, usability, and user satisfaction (Mosharraf & Tabaeian, 2014).

By integrating such participatory and evaluative methods, the environmental psychology and environment-behaviour research framework offers a robust foundation for aligning architectural design with the actual needs, behaviours, and experiences of users, thereby reducing the common disjunction between professional design intent and user reality.

2.0. Problem statement

Formal architectural design often fails to meet actual user client needs because end users are frequently unknown during design, and paying clients may not represent them. Existing behavioural research is context-specific, statistical, or conducted in controlled settings, limiting its practical applicability. As a result, there is a gap in generating actionable, context-sensitive insights that can inform user-centered design.

3.0.Aims and objectives

This paper aimed to:

1. To identify gaps between the needs of users and the solutions provided by design professionals in architectural studio using environmental psychology based research.
2. To propose design interventions that enhance the functionality and usability of architectural design studios.
3. To develop a framework for applying environmental psychology data to improve the performance and user-centered design of the architectural design studios.

4.0.Methods

The conduct of this study was guided by the environmental behaviour methodology with an inclination towards inductive research in the sense of making specific observations, identifying patterns, but stopped short of developing broader theories or generalization. To this extent, it embraced the qualitative phenomenological research approach, calling into play the case study and observation research methods, working in complementation. For these case studies, studio spaces in departments of architecture in three premier universities in Kenya were selected.

From the five universities accredited to offer degrees in architecture, the three were purposively selected because they had run architecture programs for more than 10 years at the time of the study and would offer traces of use over time. They were accessible and deemed to be able to provide rich, holistic, and contextual information of architectural design learning environments. The three universities selected were, the University of Nairobi (UON), Technical University of Kenya (TUK), and Jomo Kenyatta University of Agriculture and Technology (JKUAT). The techniques of direct and indirect participant observation and tracer surveys of after use were applied. Data collection used the pre-coded checklists, sketches and photographs to capture onsite data.

The study used multiple analytical approaches to interpret the collected data. Micro analysis summarized observed behaviour and field notes, while thematic analysis organized the data according to key indicators of environmental psychology. Spatial analysis assessed studio adequacy and instructor-to-student

ratios, linking space metrics to observed behaviour. Intra-sessional analysis examined data within single observation sessions over seven days, and intersessional analysis compared behaviour across all sessions to identify patterns and variations. Additionally comparative analysis was applied to synthesize findings and draw conclusions about user interactions within architectural learning spaces.

5.0. Analysis and results

5.1 Significant space indicators of environmental psychology

Analysis of the findings revealed several key indicators of the interactions between users and architectural studio spaces:

1. *Spatial, staffing, and object inadequacies:* Deficiencies in the size, layout, availability of instructors, and objects within the studio spaces.
2. *Use of space for prescribed functions:* Spaces were primarily used for their intended activities in spite of their shortcomings.
3. *Flawed design of building elements and objects:* Poorly designed walls, floors, windows, furniture, and equipment affected functionality and user experience.
4. *Spatial modification and manipulation:* Users adapted or modified spaces and objects to better suit their needs.
5. *Space abandonment:* Some areas were underutilized or entirely avoided due to design shortcomings.
6. *Space and object abuse:* Misuse or damage of spaces and objects occurred, often as a response to inadequacies.
7. *Behaviour modification, afforded behaviours, functions, and users:* Certain spatial configurations and objects facilitated or constrained specific user behaviours and activities; users altered their behaviour to accommodate or compensate for limitations in the environment.

5.2 Spatial, staffing and object in space inadequacies

This study documented the spatial, staffing and objects in space inadequacies. The results are as per the tables below.

Table 2: Summary of findings of spatial, staffing and objects in space inadequacies.

University	Student-Spatial Provision Adequacy	Instructor-Student Ratio Adequacy	Objects Adequacy	Key Observation
UON	Inadequate for Years I–III, Adequate for Years IV–VI	Inadequate for Years I–III, Adequate for Years IV–VI	Inadequate	Spaces and staffing insufficient in early years.
TUK	Mixed (some studios adequate, some inadequate)	Adequate for Years II–IV, Inadequate for Years I & V	Inadequate	Variation across years; some studios fully functional.
JKUAT	Inadequate across all years	Inadequate across all years	Inadequate	Consistent shortage of space, staff, and objects.

Source: Judy Kebenei, 2025.

The study revealed significant inadequacies across studio spaces at the UON, TUK, and JKUAT.

- Spatial inadequacies: In all three universities, the allocated studio areas were generally insufficient for the student populations, with student-to-space ratios falling below recommended standards. The UON and JKUAT studios showed consistent under-provision per student, while the TUK had mixed results with some studios meeting adequacy standards.

- Staffing inadequacies: Instructor-to-student ratios were often below the ideal levels. The UON and JKUAT had insufficient instructors across most years, while the TUK met adequacy standards for some years but was under-staffed for others.
- Objects in space: Across all studios, essential objects such as drawing tables, chairs, plan chests, pin-up boards, and whiteboards were insufficient in number to meet student needs. Users had to share or adapt objects, indicating a mismatch between resources and user demand.
- Overall, these findings indicate that the studio environments are undersized, under-resourced, and inadequately staffed, which likely affects user behaviours, learning efficiency, and interaction with the built environment.

5.3 Use of space for prescribed functions

The study, using structured observation, and observation of physical traces documented the manifesting behaviours in the architectural studios at the universities under study. The study tabulated the prescribed activities and behaviours as per table 3 below.

Table 3: Behaviour manifested in the various studios under study.

Activity / Behaviour	UON	TUK	JKUAT	Observation Summary
Theory instruction	×	√	√	UON showed little theory activity; TUK and JKUAT engaged in theory-based learning
Studio instruction	√	×	√	UON and JKUAT engaged in studio tasks; TUK largely did not
Individual theoretical tasks	√	×	√	Consistent with above
Individual studio tasks	√	√	×	Studio activities were strong at UON, moderate at TUK, mixed at JKUAT
Instructor–student and student–student interactions	√	√	√	Present across all sites
Display, presentation, critique	√	√	√	Present across all sites
Desk-to-desk crits	√	×	√	Limited at TUK
Movement and spatial manipulation	√	√	√	Present in all studios
Group discussions and studio work examination	√	×	√	Limited at TUK

Source: Kebenei, 2025.

Legend:

- √ - *Behaviour was manifested in the studio*
- X – *Behaviour was not manifested in the studio*

The researcher observed that the users of studios at the UON exhibited activities consistent with studio learning, users of studios at the TUK exhibited behaviours consistent with theory learning and very limited activities consistent with studio instruction and, the users of the studios at the JKUAT exhibited behaviours consistent with both theory and studio instruction.

The study's observations of trace evidence in the architectural studios revealed distinct patterns of space use across the three universities. At the UON, studio activities were strongly evidenced through models on

plan chests, drawings on pin-up boards, student bags, personalized storage, and the arrangement of pin-up boards, while no traces of theory-based activities were observed. In contrast, the TUK studios exhibited minimal studio activity, with traces primarily indicating theory instruction, such as chair arrangements and whiteboard use, and only a single model on a desk representing studio work. At the JKUAT, both studio and theory activities were actively manifested, as shown by furniture manipulation, drawings on desks and floors, wastepaper, models, taped drawings, and notes on whiteboards. These findings suggest that the UON studios primarily support practical studio learning, the TUK studios emphasize theory-based learning, and the JKUAT studios effectively accommodate a combination of both theory and studio activities.

Figure 2: Illustration of drawings on pin-up boards and drawing tables at the UON. Source: Kebenei, 2025.

Figure 3: Illustration of trace cut papers, models and carry bag at the UON. Source: Kebenei, 2025.

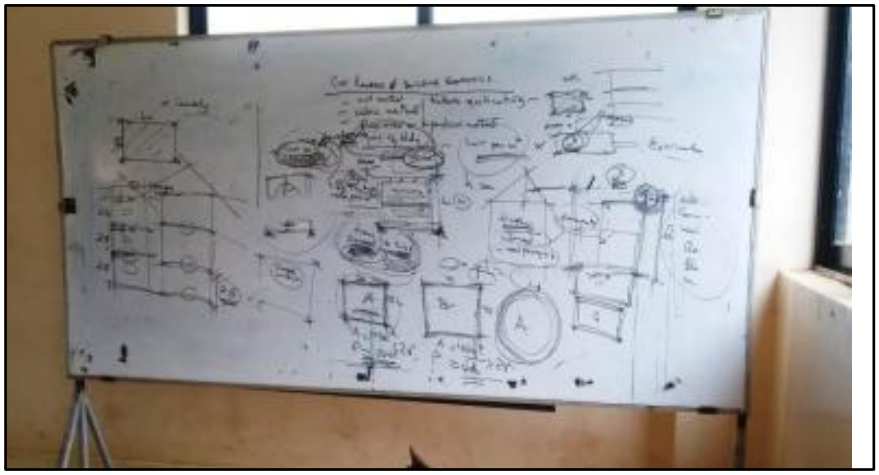

Figure 4: Illustration of previous instruction notes on a white board in the TUK. Source: Kebenei, 2025.

5.4 Flawed design of building elements and objects in space

Significant design flaws in the architectural studios were identified through traces of damage to both the spaces and objects, indicating that the design did not accommodate the prescribed activities. At the UON, evidence included scuff marks on walls and floors, chipped column edges, dirt marks along walls, cut marks on drawing tables, peeling parquet flooring, broken windowpanes, falling trunking, and plan chests with missing drawer faces, reflecting inappropriate materials, finishes, and insufficient accommodation for model-making activities. The TUK studios exhibited broken window frames, damaged chairs, and scuffmarks on walls, highlighting similar design inadequacies. At the JKUAT, flawed design was evidenced by broken door glass panes, peeling and damaged floor tiles, deteriorating trunking, missing or loose socket covers, scuffed and cut drawing boards, detached drawer frames, dirt-marked walls, and peeling pin-up boards. These findings indicate that in all three universities, the studio environments contained elements that were not resilient to the typical activities of architectural learning, demonstrating significant shortcomings in the design and durability of the spaces and objects.

Figure 5: Illustration of cut and scuff marks on a drawing tables at the TUK. Source: Kebenei, 2025.

Figure 6: Illustration of broken plan chest and plan chests with missing drawers at the JKUAT. Source: Kebenei, 2025.

5.5 Space modification and manipulation

Traces of spatial enhancement or modification were observed in the studios at the UON and JKUAT but not at TUK. At the UON, students used pin-up board separations to create privacy, personalize their workspaces, and support audio-visual activities. In contrast, TUK studios showed no evidence of spatial modifications. At the JKUAT, spatial enhancements were evident through the strategic placement of objects, such as pin-up boards, to delineate activity zones and separate storage areas from instructional spaces, demonstrating user-driven adaptation of the environment to better support learning activities.

5.6 Space abandonment

Traces of space abandonment were identified as the absence of expected behaviours within the studio environments, reflecting a psychological response in which users perceive the space as failing to meet their needs. This was inferred from missing activity traces. Significant abandonment was observed across all studio spaces, evidenced by minimal activity during the observation period and occasional use of studios by students from other departments, despite the study taking place during the academic session. The research also noted that studios were heavily used during scheduled class hours, indicating that formal schedules dictated primary space use. Outside these hours, students' utilization of studio spaces was guided by how well the environments, other studios, or their residential spaces supported their architectural learning activities.

5.7 Space and object abuse

Traces of space abuse were identified when spaces or objects were used for purposes for which they were not designed, often in violation of institutional regulations. Indicators of such abuse observed in the study included graffiti on window panes and other building elements, holes in pin-up boards, unauthorized posting of sales and event posters on studio walls, and spray painting on plan chests. These activities demonstrate misuse of both the physical environment and its furnishings.

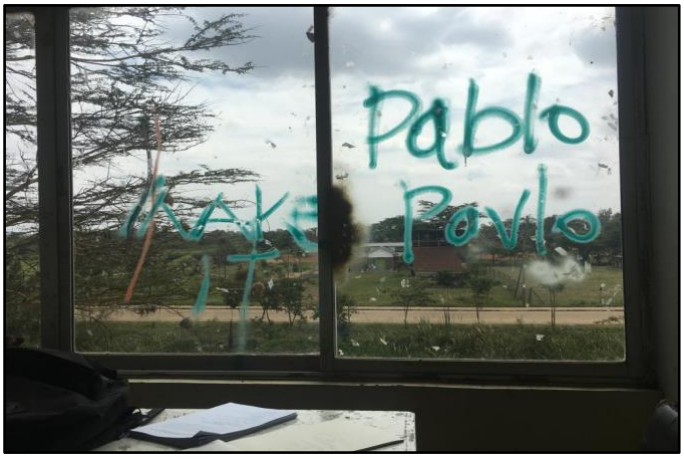

Figure 7: Illustration of graffiti on windowpane at the JKUAT. Source: Kebenei, 2025.

Figure 8: Illustration of a hole through and, scuff marks on a pin-up board at the UON. Source: Kebenei, 2025.

5.8 Behaviour modification and afforded behaviour

Behaviour modification in the studios was strongly influenced by class sizes, spatial organisation, and resource availability, leading both instructors and students to employ coping mechanisms. Instructors adapted their teaching style from individual apprenticeships to small- and large-group instruction to increase interaction time per student. Students modified their learning behaviours by shifting from desk-to-desk crits to email or WhatsApp feedback, engaging in more independent research, and listening in on other students' crits rather than waiting for individual attention.

Large class sizes also prompted practical adaptations such as studio sharing, standing during instruction, and restricted studio access during assessments. Spatial organisation affected movement patterns, as empty pathways facilitated circulation while random or clustered layouts hindered activities requiring mobility, such as desk-to-desk crits. The location of objects influenced the type of behaviours possible within a space—for example, linear pin-up board arrangements supported presentations, examinations, and social interaction, while sitting arrangements guided student interactions. Labels, bay identifications, and resource availability, such as electrical sockets, further shaped user behaviours and prompted modifications like bringing extension cords when necessary.

The study identified two types of afforded behaviours: appropriate and inappropriate. Appropriate behaviours were new activities necessary for the functioning of the studio

but not initially anticipated in the design, such as using audio speakers for extended work hours, displaying communication notes on pin-up boards, and placing food or drinks on tables. Inappropriate behaviours arose from unmet needs or misuse, such as graffiti on pin-up boards and walls, cut marks on drawing tables, and the presence of wildlife in studios. These behaviours highlighted gaps in the design, including insufficient pin-up surfaces, tracing surfaces, and spaces for self-expression, demonstrating how users adapted the environment to fulfil learning and social needs.

At the TUK, inappropriate behaviours included pencil markings on walls, reflecting students' use of walls for self-expression, and cut marks on drawing boards. At the JKUAT, inappropriate behaviours were evidenced by graffiti on windows, columns, and pin-up boards, as well as the placement of instruction notes on pin-up boards. Many of these behaviours were responses to the absence of appropriate objects in the studios to support necessary activities. For example, masking tape on walls indicated insufficient pin-up surfaces, masking tape on windows reflected the need for tracing surfaces, and graffiti highlighted a lack of designated spaces for self-expression. These traces demonstrate how users adapted the environment to meet unfulfilled needs.

5.9 Discussion of results

The findings of this study highlighting spatial inadequacies, object and staffing shortages, user-driven space modifications, and behaviour adaptations in architectural studios reflect a broader pattern of how the physical environment influences learning, user behaviours and social dynamics in educational settings (Knight, 2025; Zhang, 2024). These findings are consistent with EP literature, which emphasizes that overcrowded or poorly scaled spaces inhibit optimal learning, reduce interaction quality, and increase behavioural adjustments (Barrett et al., 2015). The study highlights the importance of aligning spatial and staffing provisions with user requirements to support effective architectural pedagogy (Kansal & Bassi, 2023; Ogunbiyi et al., 2025). The variation in studio use suggests that user behaviour is contingent not only on space and object availability but also on institutional culture and scheduling constraint. This argument is supported by Kansal & Bassi (2023) and Ogunbiyi et al. (2025). For instance, scheduled class hours dictated peak usage, while after-hours use depended on how well the studio accommodated learning needs. This counters studies that claim studios are in continuous use for 24 hours (Lueth, 2008; Shanti et al., 2020; Soliman, 2017). Baker's Behaviour settings theory posits that environmental design should accommodate anticipated behaviours; when it does not, users either adapt creatively or engage in maladaptive behaviours that can compromise the built environment (Gifford & Nilsson, 2014) The observed traces of space abuse and modification demonstrate that students are actively negotiating the constraints of their environment, reflecting both unmet needs and resilience. User adaptations are consistent with Affordance theory (Maier & Fadel, 2009).

Class size, spatial organization, and resource placement were key determinants of behaviour modification. Overcrowding and irregular layouts constrained movement and social interaction, while adequate layout planning facilitated effective desk-to-desk crits, group discussions, and peer learning. The findings reinforce the EP principle that the physical environment strongly influences behavioural patterns, social interactions, and learning outcomes (Sommer, 1969; Gifford, 2011, 2014; Gifford et al., 2011; Gifford & Nilsson, 2014; Hutchison, 2012; Novrial & Marina, 2019).

In practical terms, the study implies that architectural studio spaces must be

sufficiently sized, well-resourced, and resilient to the activities they are intended to support. Flexibility in spatial layout and furniture arrangement enhances user agency and facilitates both individual and collaborative learning. Moreover, principles of environmental psychology such as affordances, person-environment fit, and behavioural adaptation should guide design strategies, and draw from research to ensure that studios not only accommodate but actively promote the desired learning behaviours (Knight, 2025; Ogunbiyi et al., 2025; Kansal & Bassi, 2023; Zhang, 2024).

5.9.1 Design interventions toward improvement architectural design studios

Data from environmental psychology research can be used to improve the spaces so that they satisfy the needs of the users better. The arising recommendations would thereby enhance the teaching and learning process in architectural design studios in Kenya.

5.9.1.1 Designing for spatial inadequacies

Learning environments ought to be planned, constructed and re-invented to ensure the needs of the learners and instructors are met (Carpenter et al., 2015). With data illustrating the glaring inadequacies, university administrations can address spatial, staffing and objects in space inadequacies through: -

1. Optimization of studio occupancy by limiting student numbers according to space capacity.
2. Periodically assessing and adjusting staffing to maintain appropriate instructor-to-student ratios.
3. Provide sufficient objects and equipment to meet user needs.

5.9.1.2 Designing for prescribed behaviour

In enhancing prescribed behaviour to promote sustainable architectural learning, universities offering programs of Architecture should: -

1. Ensure spaces support both theory-based joint instruction and hands-on studio apprenticeship.
2. Use flexible furniture and collapsible partitions to create adaptable spaces for group and individual learning while allowing for display and desk-to-desk crits.

5.9.1.3 Designing for significant flawed design

Evaluation of the indicators of flawed design and the perceived causes of the indicators has the potential to immensely improve the quality of spaces. In addressing these flaws, there ought to be: -

1. Selection of durable materials and finishes resistant to typical studio activities (e.g., column casings, semi-gloss or vinyl walls, high-traffic flooring).
2. Designing or innovation of robust furniture, such as drawing tables with tempered glass surfaces and integrated pin-up boards, to studio activities such as tracing, cutting, and model-making.
3. Ensuring professional supervision and adherence to construction standards to prevent premature deterioration.

5.9.1.4 Designing for Space modification

Traces of enhancement are indicators of the spaces not satisfying user requirements as-are. Since the enhancements increase user experiences, trace indicators can be used to develop the design brief for space enhancement, that is;

1. Incorporation of student-driven enhancements observed in traces (e.g., zones, partitions, props) into the permanent design.
2. Provision of built-in audio systems for instruction and recreational use.

5.9.1.5 Designing for Space abandonment

Abandonment of space is an indicator that the space no longer serves the purpose of the user. The reason for the choices of the

spaces students used off instruction and studio hours revealed the affordances students were looking for in those particular alternative spaces. Studios should be designed with affordances that promote sustained engagement, such as comfortable seating, spaces for interaction across learning levels, and support for master-apprentice instruction.

5.9.1.6 Designing for space and object abuse

Space abuse indicates a frustration of unmet need. Thus, it is important to:

1. Use participatory design to involve students, faculty, and staff in identifying frustrations and co-developing solutions.
2. Incorporate user feedback in design briefs, specifications, and implementation to reduce misuse and increase satisfaction.

5.9.1.7 Design for behaviour modifications and afforded behaviour

Designing for behaviour modification would involve

1. Resolving behaviour adaptations from spatial or resource inadequacies by adjusting capacity, layouts, and staffing.
2. Providing facilities that afford desired behaviours, such as refreshment areas, communal spaces, and adequate access to resources.

Overall, the interventions emphasize flexibility, durability, user participation, and alignment with EP principles to ensure architectural studios actively support learning, social interaction, and student activities. Additionally, the paper supports evidence based design interventions in improving user experiences (Knight, 2025; Ogunbiyi et al., 2025; Shi, 2024).

5.9.1.8 Framework for Application of environmental psychology data

This paper proposes a framework to enhance the application of environmental psychology research outcomes in post-occupancy evaluation to improve the functionality of architectural spaces.

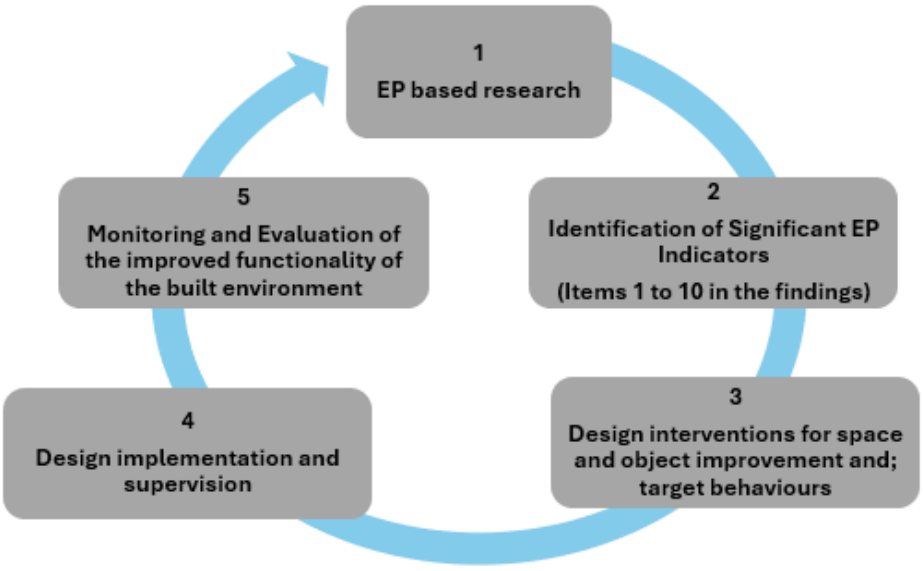

Figure 9: Framework for improving functionality of the built environment. Source: Kebenei, 2025.

The framework follows a sequential process that entails:

1. *Environmental psychology research* – This involves conducting environmental psychology based post-occupancy studies to identify designer user gaps.
2. Indicator identification - this entails documentation of significant

indicators of environmental psychology.

3. *Design interventions* – This involves proposing design, spatial and user interventions to address the identified indicators of environmental psychology.
4. *Design implementation and supervision* – This involves development of building operation and maintenance briefs, design specifications, and material schedules incorporating spatial and behavioural targets, supervision of the implementation in the construction phase and, ensuring professional involvement and adherence to design and construction standards to prevent deterioration and maintain functional integrity.
5. *Monitoring and Evaluation (M&E)* – This entails continuously assessing the effectiveness of interventions using the indicators of environmental psychology and target behaviours identified in the design brief. Feedback from M&E informs further modifications, creating an iterative improvement cycle. Integration with International Quality Management Standards (ISO QMS) can guide systematic assessment and performance monitoring of improvements in spatial use, instructional practices, user engagement, and learning outcomes.

The framework emphasizes a cyclical, evidence-based approach where research informs design interventions, implementation ensures professional and material standards, and monitoring evaluates whether spaces truly support desired behaviours and learning outcomes. By incorporating indicators of environmental psychology and behavioural data, universities can create studios that are functional, adaptable, and responsive to user needs, while providing a mechanism for continual improvement.

6.0 Conclusions, recommendations and implications

6.1 Conclusions

The study shows that architectural design studios are significantly affected by spatial, staffing, and resource inadequacies, as well as flawed furniture and design, which influence learning, social interaction, and user activities and interactions. Observed adaptations, modifications, and misuse of spaces reflect the reciprocal relationship between users and their environment, consistent with principles of environmental psychology such as affordances and person-environment fit. Design interventions and a proposed environmental psychology-based framework emphasize flexible, resilient, and user-centered studios, incorporating professional implementation and systematic monitoring. Applying this approach enables continuous improvement, ensuring studios not only meet instructional needs but also foster creativity, engagement, and effective learning.

6.2 Implications

This study has several important implications for architectural education, design practice, and institutional policy. It demonstrates that the physical environment of architectural studios significantly affects learning process, student engagement, social interaction, and creative behaviours. The findings highlight the need for universities to align studio capacity, staffing, resources, and furniture with pedagogical requirements, while encouraging participatory design processes to capture user needs and frustrations. For architects and designers, the research teases out the importance of applying principles of environmental psychology such as affordances, person-environment fit, and behavioural adaptation in creating resilient, flexible, and user-centered learning spaces. Additionally, the study provides a practical framework for using environmental

psychology research outputs in post-occupancy evaluation, informing iterative improvements, and supporting evidence-based design. Beyond architectural studios, these insights offer guidance for designing educational environments that optimize learning and collaboration across disciplines.

6.3 Recommendations

This paper recommends the following:

1. Implementation of the suggested design interventions in the improvement of the functionality of the architectural design studios by the institutions offering the programs of architecture in Kenya
2. Testing of the framework during implementation of the design interventions
3. Monitor and evaluate the impact of the design interventions.
4. Integration of environmental psychology into design practice.

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