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Research Article

Experiential Learning Through Gamification in Interior Architecture and Design

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Abstract

Millennials and post-millennials demand alternative educational models, leading educators to adopt Experiential Learning (ExL) theory, which acknowledges ludicity in learning spaces. ExL is the subject of a growing body of research to date. Gamification is recognized to enhance student engagement and academic success. This research aims to investigate gamified activities tailored to Interior Architecture and Design (IAD) education. An exploratory approach is used to review the potential of gamification as a tool to achieve ExL contributing to students' learning experience. A literature review lays a foundation for ExL theory and gamification. Pilot ExL-based gamified activities conducted on year 1 IAD students at Coventry University - Egypt, are documented using thick description based on participant observations, which inform the potential and drawbacks of each gamified activity. Thematic analysis is conducted to attain the research findings. The findings are reviewed by two methods, superimposing the pilot gamified activities collectively on the ExL cycle to confirm students interacted with the four modes of the cycle. Second is by assessing the activities according to their design considerations including educational, time-related, collaboration-setting, and operational considerations. Findings subsequently yield guidelines for educators supporting the design of gamified activities. This is to aid IAD educators in establishing ExL by infusing their curricula with gamified activities matching the educational expectations and needs of today's students, without diverting from desired content. Results reveal that there is a direct correlation between the effective planning of a gamified activity following the derived design considerations and the completion of the ExL cycle.

Keywords

Interior Architecture Education, Interior Design Education, Experiential Learning, Gamification, Gamified Activities

1. Introduction

The purpose of higher education is to provide students with the knowledge, problem-solving, analytical, and critical thinking abilities required to enter the workforce. IAD Educators of this generation face challenges with transforming academic content and pedagogies to cope with students' learning needs [1, 2]. At present, teaching and learning IAD are increasingly active beyond typical classroom settings, as there is a substantial need for non-conventional pedagogies that are more driven by encouraging participation and engagement of students [3]. This is to lower pre-existent communication impediments between the educator and the students, which are also impediments to learning [4]. The col-

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laboration between students, their peers, and educators is necessary to develop transferable skills required in today's professions [5]. Therefore, substantial research has encouraged educators to employ ExL theory and transform their students' learning experience [6-10]. It is important to expand on current insights into the applications of ExL theory along with gamification as a tool to achieve it. The integration of game mechanics and the concept of playing into the design of the learning process has the potential to engage students in the learning experience productively [11]. Consequently, gamification has proven potential in IAD education, contributing to an ExL environment [12-14].

1.1. Problem Statement

Research suggests weak academic performance is directly related to student disengagement [15]. The attributions of an educator to the teaching and learning processes are significant. The educator's role is to enrich students' educational experience. The expectations and needs of millennials and post-millennials concerning their educational experience; mandated educators to deter from traditional educational models [3]. ExL can be considered an effective alternative [16]. ExL theory acknowledges ludicity as a component of learning spaces [17]. Gamification has emerged as a powerful tool in response to the demand for ludic educational activities. Research indicates that student engagement and academic success can improve with the exploitation of gamification [11]. However, research is limited concerning translating it into actions within higher educational settings [18], especially in IAD. According to Babacan Çörekci [19], there is still a need to expand on the gamification approach in design studio courses, as well as theoretical ones to better comprehend its impact and potential in IAD education. The main problem is the shortage of clear and easy-to-follow guidelines for educators to design gamified activities deduced from the consolidation of pilot activities in the field of IAD [11, 20].

1.2. Aims & Objectives

This paper aims to aid IAD educators in motivating students to engage in the learning process, enhancing students' learning experiences through ExL. This is achieved by investigating the effectiveness of gamified activities to employ ExL, tailored to the IAD field. Accordingly, the objectives are threefold. The first is to document and evaluate pilot gamified activities in IAD aiming to achieve ExL. Secondly, is to deduce design considerations based on the potential and drawbacks of the pilot gamified activities. Finally, propose guidelines on the design of gamified activities for the field of IAD.

2. Experiential Learning Theory

ExL theory draws heavily on the research of notable theorists from Dewey to Freire. It gained recognition as a useful tool to improve teaching and learning processes in higher education [21]. A supportive learning space is required to host ExL, encompassing the diverse dimensions of learning. The physical, cultural, institutional, social, and psychological dimensions are fused into the student's experience [17]. ExL theory identifies six characteristics to achieve an ExL space; hospitable, learner-centered, ludic, conversational, reflective, and conducive to deep learning. Safe, supportive, and challenging learning spaces promote reflection, critical thinking, and active student engagement [22]. These are crucial aspects of ExL, which Kolb [23] translated into a cyclic process, denoting the organic manner of engaging in life experiences, frequently without realizing one's learning. The two sets of opposing cycle modes are prehension and transformation. The former refers to absorbing information through experiencing and thinking, while the latter refers to turning it into knowledge by acting and reflecting. ExL is adapted into curricula design to actively engage students as an alternative to the traditional models of information transmission [10].

2.1. Experiential Learning Cycle

The ExL cycle can begin with a student's Concrete Experience which could be either discovering new knowledge or approaching existing knowledge differently. Experiencing can occur in different contexts that arouse interest, curiosity or perplexity, provoking reflection; a lecture, work problem or conversation [24]. Reflective Observation is a vital part of the cycle. In the reflecting mode, students take time to consider what transpired or to see their peers engaging in similar behavior and consider what happened, by understanding key aspects of the experience. Abstract Conceptualization is an analytical practice of interpreting reflections on concrete experiences, enabling the formulation of new concepts or modifying pre-existing notions. Simply, thinking to reach conclusions and assess decision choices. Finally, Active Experimentation tests new concepts through the application of knowledge acquired. As a result, students attain a new concrete experience, reiterating the ExL cycle. This cycle allows students to assess their knowledge in a practical manner, ensuring higher information retention [9, 10]. Deep learning ensues when students intentionally interact with each of the four ExL cycle modes, which requires the support of the educator [10].

2.2. Educator Role Profiles

Educators are crucial in creating ExL spaces, by adopting different roles in support of students engaging in deep learning [17]. According to Kolb & Kolb [22], there are four educator profiles namely Facilitator, Expert, Evaluator and Coach. A facilitator assists students to connect with their personal experiences and reflect on them. An expert adopts a more authoritative role, enabling students to relate their reflections to subject knowledge. The evaluator or standard

setter aids students to develop the required knowledge and skills. This profile is objective and result-oriented enabling effective performance. Lastly, the coach applies a collaborative approach to empower students to use their acquired knowledge to achieve their goals, facilitating personal growth. The choice of profile depends on the students' needs and the support necessary to guide them through completing the ExL cycle [22]. A vital aspect of this is 'Debriefing', which is a procedure that follows an ExL activity, enabling Reflective Observation [6].

3. Gamification

Gamification is the process of infusing game-like elements into content delivery to encourage participation [25]. Generally known to be implemented in digital or non-digital contexts. However, mixed gamification can provide a balance between doable implementation for educators and an engaging experience for students [26]. Gamification increases students' knowledge acquisition, engagement, and dedicated attention to learning. Furthermore, it helps in developing self-guided learning, using participatory skills, and sustaining a positive attitude towards learning [27, 28]. As gamification rewards the efforts not the winning; the concept of graceful failure arises. This allows for better learning in relaxed environments where students are encouraged to try without resentment [29]. Therefore, gamification can be considered an effective tool to engage IAD students in a fun experience, which leads to the achievement of ExL.

3.1. Experiential Learning and Gamification

ExL enactment is related to the notion of "letting students do the learning" by relying on the knowledge that resides in students, and within resulting interactions. It acknowledges that people can learn through play without concrete realization, making gamification an effective tool for ExL [30]. As games foster motivation in people; they host experiences of challenge and curiosity [31]. This results in experiences that prioritize learning through association rather than direct knowledge [32]. Therefore, a direct relationship between ExL as a theory and gamification as a tool is conveyed within experience creation. As ExL is proven to be pertinent in academic endeavors in design education [33]; the connection between ExL and the IAD profession becomes prominent. Therefore, there is a key potential to involve students in gamified activities that are based on action, experience, and teamwork to convey ExL in IAD.

3.2. ExL-Based Gamified Activity Design Considerations

Gamified activities involve three main terms that determine their design: dynamics, mechanics, and components. Dynamics are concepts that edict the game, including constraints, emotions, narrative, and relationships. Mechanics are rules that govern the game, including challenges, competition, cooperation, resource acquisition and feedback. While components refer to game stimuli encompassing game achievements, avatars, badges, gifting, leaderboards, levels, and points. These activities can be designed to suit interactions in course-related matters, projects or tests [11]. Gamified activities require cooperation and participation with a structure that is complex enough to attain curiosity whether through reading, experimenting, role-playing, or discussions [34, 35]. According to Finckenhagen [36], considering context is crucial while tailoring gamified activities to fit different topics. Educators are challenged to design activities that are appropriate for realizing the learning outcomes of their courses [37]. Students must be provided with time to prepare, interact and complete the activities to psychologically grasp that their dedicated time is directly related to their effective learning [38]. Allocating students in individual and small groups is ideal for gamified environments as they become responsible for their individual efforts as well as for the group's [39]. Educators spend a lot of time and energy on planning those activities while constantly shifting their roles. They also get consumed in progress monitoring, learning interventions, briefing, in-activity feedback, debriefing, and reflection.

4. Methodology

An interpretive paradigm is followed in this qualitative research pursuing an exploratory investigation of seven pilot ExL-based gamified activities, as illustrated in Figure 1. The thorough literature review provides the foundation for ExL-based gamified activities in IAD. The achievement of the research objectives relies on the documentation of the pilot gamified activities, via thick descriptions for a deeper understanding [40]. Participant observations provide an interpretation of the overall experiences [41], noting that the authors are a complete participant [42]. Authors' perceptions as educators and mediators of the gamified activities are recorded, while potential and drawbacks are deduced. Thematic analysis is conducted to attain the research findings and recommendations.

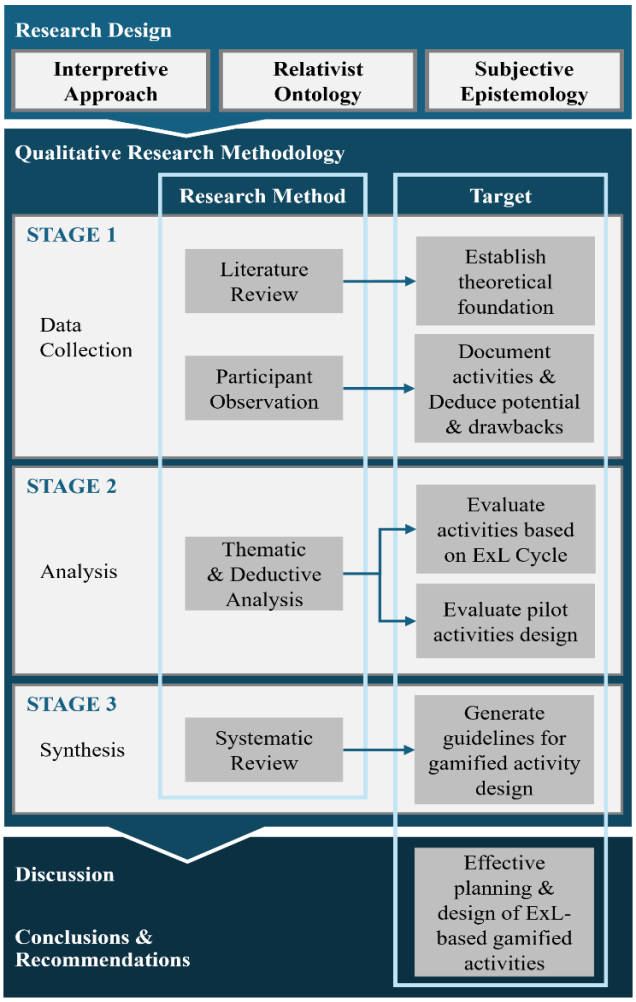

Figure 1. *Research Methodology (Source: Authors).*

4.1. Scope & Limitations

This paper reviews pilot ExL-based gamified activities conducted over a semester in two different courses for entry-level students. As the objective of this paper is to evaluate the effectiveness of gamified activities, the authors confined the discussion to activities that can be classified under the umbrella of gamification. Learning styles are not investigated in the scope of this study; future studies may review the concept of individualizing gamification based on different learning styles [43]. Lastly, as the scope is limited to aiding educators in the design of gamified activities, specific student insights were not within the bounds of the findings.

4.2. Procedure

The empirical research begins with the documentation of the seven pilot activities. The activity design considerations are divided into four primary aspects further itemized as outlined in Table 1. The operational considerations as unstructured data are recorded textually along with the correlation of the ExL cycle's four modes within the activity and its context. While the three other aspects are detailed collectively in a tabular format. A timeline of each activity illustrates its sequential proceedings, divided into the circumstances before and after. The core of the activity itself is labelled as play which proceeds the setup phase and concludes with a cooldown phase. The theoretical background prompted the use of the ExL cycle as an analytical tool to assess the effectiveness of the gamified activities by superimposing them on the cycle to discern three pivotal aspects. Since ExL is a recursive cycle [21] with a spiral perpetual nature, the mode where an activity starts is identified, and the educator's roles are defined. Lastly, the affirmance of successful ExL within an activity is determined by highlighting the progress of said activity along the four modes analyzing the actual experience, not the educators' intended plan. Deductive analysis of the design considerations is applied in due course. The knowledge gained from the theoretical background and the analytical exploration reveals the potential and drawbacks of the gamified activities, and in hand, informs guidelines for educators.

5. Exploration of Pilot Gamified Activities

Coventry University Egypt advertises 'learning-by-doing' as its main educational strategy to attract students to an engaging learning experience. The first semester for year 1 IAD students includes three courses, Language of Space (LoS), Creative Exploration (CrE), and Drawing and Making Spaces. The pilot gamified activities were designed under the first two courses, as allocated on the timeline illustrated in Figure 2. LoS is the students' first encounter with history and theory themes and a design project situated in a historical context.

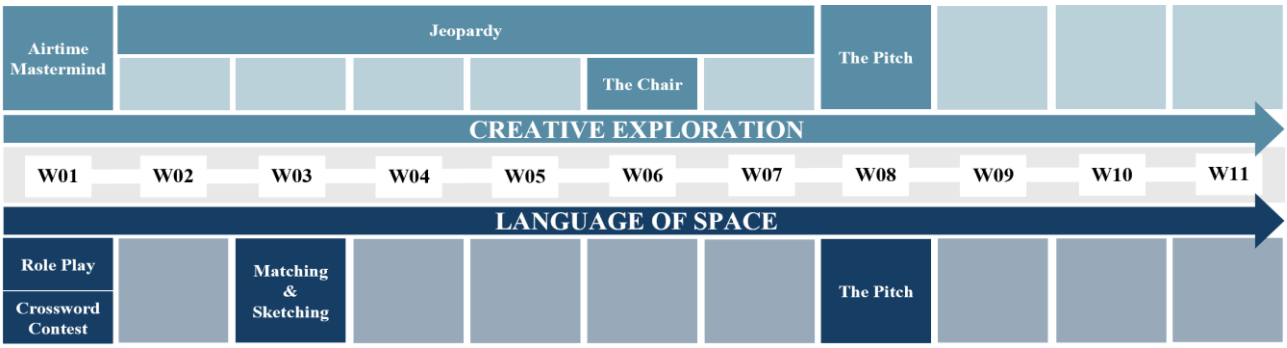

Figure 2. *Timeline of ExL Gamified Activities across Courses (Source: Authors).*

Table 1. *Breakdown of ExL-based Gamified Activity Design Considerations (Source: Authors).*

Theme / Topic	Activity	Educational Considerations		Time-related Considerations			Collaboration-settings Considerations		
		Learning outcome	Purpose	Preparation	Duration	Timeframe	Location	Participants	Activity Mode
Principle educational premise	Name of ExL-based gamified activity	Students' measurable achievements	Educator's Academic intention	Average time for students to prepare	Time (mins) of activity itself	The period within which the activity occurred	The setting where activity occurred	Total number of students in the activity	The mode of engagement in the activity
		Operational Considerations							
		Prerequisites	Planning	Briefing	Dynamics	Mechanics	Components	Debriefing	
Subject matter of activity		Conditional requirements for participation	Preparation by educator(s)	Information provided to students	Concept of the activity	Rules & regulations of activity	Activity stimuli	Manner of review upon completion	

Table 2. *Design Considerations of Pilot ExL-based Gamified Activities (Source: Authors).*

Theme / Topic	Activity	Educational		Time-related			Collaboration-setting		
		Learning Outcome	Purpose	Preparation	Duration (mins)	Timeframe	Location	Participants	Activity Mode
Design: Design Problem	Airtime Mastermind	Define a design problem & propose a solution	Icebreaker	50 mins	60	Half session	Studio	≈35	Individual
Theories: Introduction to Language of Space	Role Play	Understand the language of space	Engage students & break the monotony of lecture dynamics	none	5	Transitory (within Lecture)	Auditorium	≈160	Individual
History: Analyse a Building	Crossword Contest	Review and analyse a case study	Enhance research skills	60 mins	60	Full session	Studio	≈35	Group 5-6 students
Communication: Knowledge	Jeopardy	Gain knowledge of the main con-	Assess student learning	30-60 mins	15-20	Semester (6 rounds onset of	Auditorium	≈70	Group 5-7

Theme / Topic	Activity	Educational		Time-related			Collaboration-setting		
		Learning Outcome	Purpose	Preparation	Duration (mins)	Timeframe	Location	Participants	Activity Mode
Acquisition		cepts of the course				Lecture)			students
Design: Design Proposal	The Chair	Ideation & conceptual design	Encourage teamwork & improve time management	none	240	Full session	Studio	≈35	Group 3 students
History: 2D & 3D Literacy	Matching & Sketching	Learn to relate plans to images & recognize Islamic architectural eras	Prepare students for the site visit	none	120	Full session	Studio	≈35	Group 2 students
Design: Design Proposal	Pitch	Prepare proposal & practice oral presentation	Assess project proposal	1 week	10	Full session	Studio	4-6 as per group	Group 4-6 students

CrE involves ideation and concept generation processes regardless of the design brief. The intention of infusing LoS with gamified activities is to break the monotony of historical and theoretical themes so as not to lose the students amidst the semester. As for CrE, the intent is to train students to ideate without overthinking to reduce anxiety which sometimes can be crippling.

Table 2 documents the seven pilot activities. Each activity design shows a tailored approach according to its specific context, intention, and situation within its course. The gamified activities are designed in a cooperative setup, even the individual activity modes require student collaboration.

5.1. Pilot Activity 1 - Airtime Mastermind [CrE]

Figure 3. *Components of Airtime Mastermind (Source: Authors).*

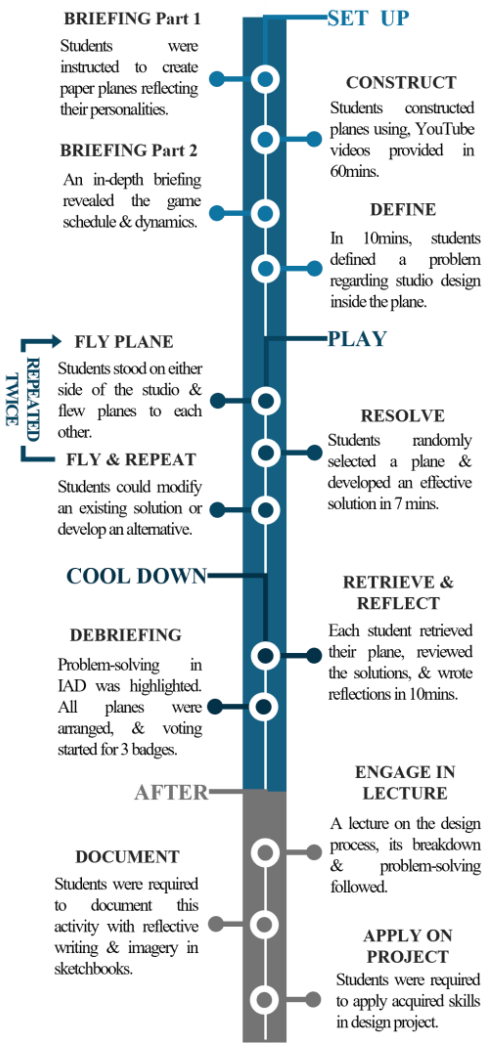

Figure 4. *Pilot Activity 1 Timeline (Source: Authors).*

This activity was adapted from Game Storming [44], with no prerequisites. The educators prepared slides for the briefing to outline the activity dynamics and mechanics. The dynamics required each student to observe their studio's design and identify a design flaw that negatively impacts their productivity. Mechanics included rules of cooperation and peer feedback. The components were buzzers for time management and two sets of three badges: the best-flying plane, the coolest plane, and the sorriest-looking plane, Figure 3. Airtime Mastermind itself represented the concrete experience, while reflective observation occurred during the debriefing as outlined in Figure 4, where the educators were facilitators. In the abstract conceptualization stage, students engaged in a lecture on the design process. Active experimentation occurred throughout the course when students defined their design problems in their different projects.

Potential and Drawbacks

This activity was successful as an icebreaker. It was evident that the learning outcome was achieved when students were able to define design problems and propose solutions during the activity. The time allocated for the activity and its location was suitable and enabled the game. The activity mode where students worked as individuals while exchanging planes every round allowed for collaboration. The activity stimulated good relationships between educators and students, as well as students and their peers.

Although students engaged in the lecture on the design process, they may not have related it to the activity. The problem definition was not verbally linked by the educator to the activity's intention which resulted in an incomplete abstract conceptualization stage. Therefore, students were not able to easily define design problems in future endeavors. Due to time constraints during the debriefing and self-reflection, students were provided with a limited opportunity to reflect on their design problem and the proposed solutions. As a result, students regarded the gamified activity as an icebreaker but not as educational content that they could use in different scenarios. Another apparent drawback during the implementation was that the Sorriest-looking plane badge gave way to minor incidents of bullying.

5.2. Pilot Activity 2 - Roleplay [LoS]

The concrete experience was this transitionary activity within the happening of the LoS introductory session. It conveyed different types of languages to highlight the meaning of language of space in a subtle and fun manner by the facilitator. The educator planned a scenario for silent acting. The dynamics were announced within the session without revealing the acting plot. The narrative was briefed to the volunteers, the mechanics mandated that the audience guess the plot from the actors' body language. Reflective observation ensued with probing open-ended questions as seen in Figure 5, followed by abstract conceptualization with the continuation of the lecture by the expert. This included the collective analysis of the language of diverse spaces. Finally, a studio task facilitated the active experimentation directly after the lecture, involving their analysis of the case studies reviewed, as outlined in Figure 6.

Figure 5. *Educator reflecting on Roleplay (Source: Authors).*

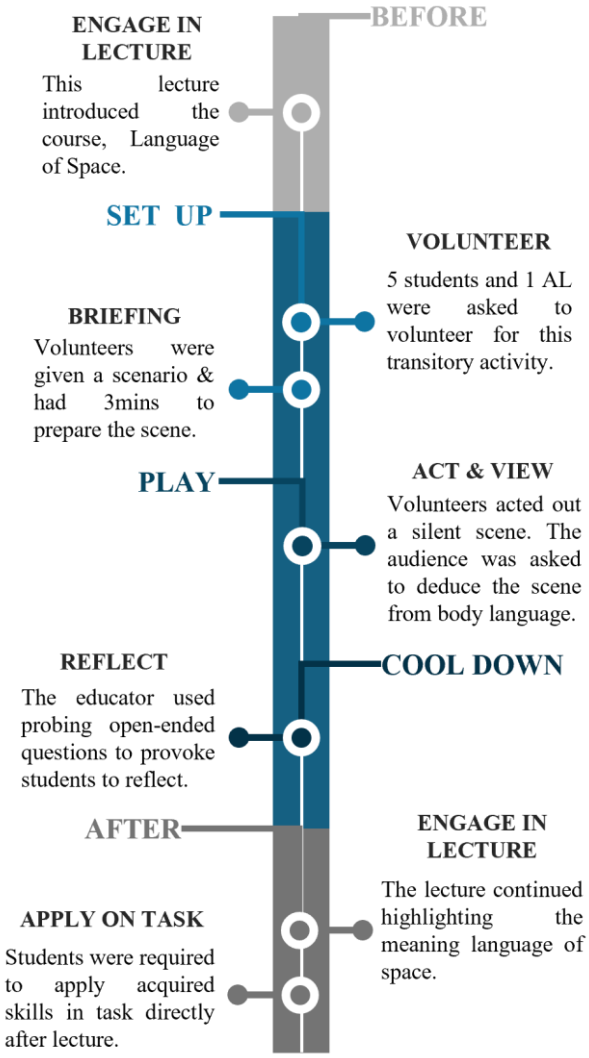

Figure 6. *Pilot Activity 2 Timeline (Source: Authors).*

Potential and Drawbacks

The activity matched the theme of the lecture. The relation between the learning outcome and the gamified activity was easily grasped by the students. The activity contributed to the interactivity of the lecture and to breaking the monotony, which was its intention.

The students were reluctant to volunteer and come onto the stage due to the large number of attendees. It was clear that they just wanted to finish the activity and return to their seats, which negatively impacted the role-playing. This was due to the scale of the auditorium and its stage which led to stage fright. It was also obvious that the ratio of the audience to volunteers was too large and therefore lacked inclusion. There were no components whatsoever that affected its engagement as a gamified activity.

5.3. Pilot Activity 3 - Crossword Contest [LoS]

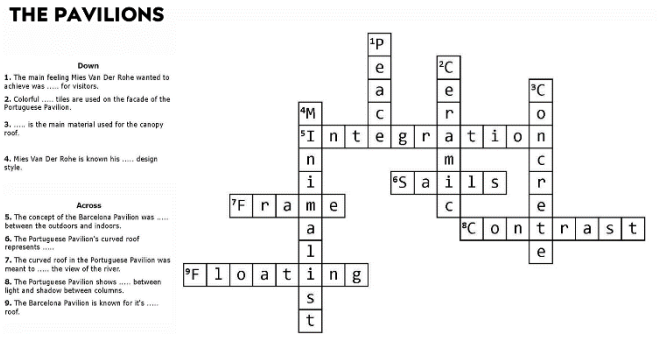

Figure 7. *Example of Crossword (Source: Authors).*

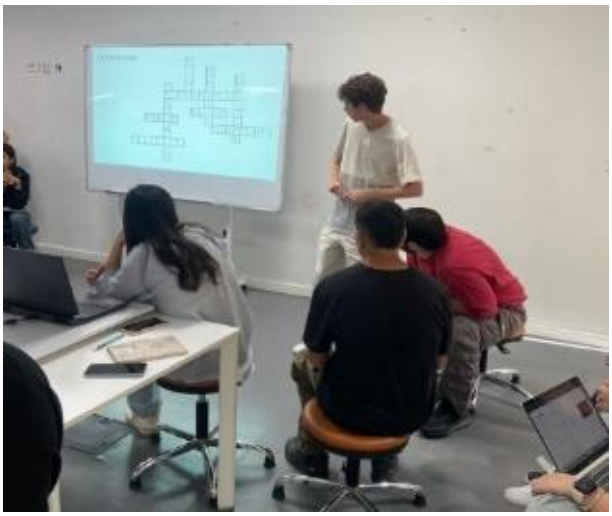

Figure 8. *Students Engaging in Crossword Context (Source: Authors).*

This activity proceeded pilot activity 2, where the expert provided a concrete experience by explaining different case studies and engaging students in the analysis of their design language. Students were coached through reflective observation and abstract conceptualization stages which occurred during the activity setup. The former was the research conducted individually, while the latter was achieved through team discussion. The game was governed by the evaluator in the active experimentation stage as teams competed against each other. The activity dynamics involved testing research and analytical skills with three separate crosswords, each for a building typology. The mechanics were achieved through a representative answering on behalf of their team a question about their case study, as seen in Figures 7 and 8. The components included a point system with deductions for extra hints governed by a manually drafted leaderboard. The timeline in Figure 9 outlines the activity proceedings.

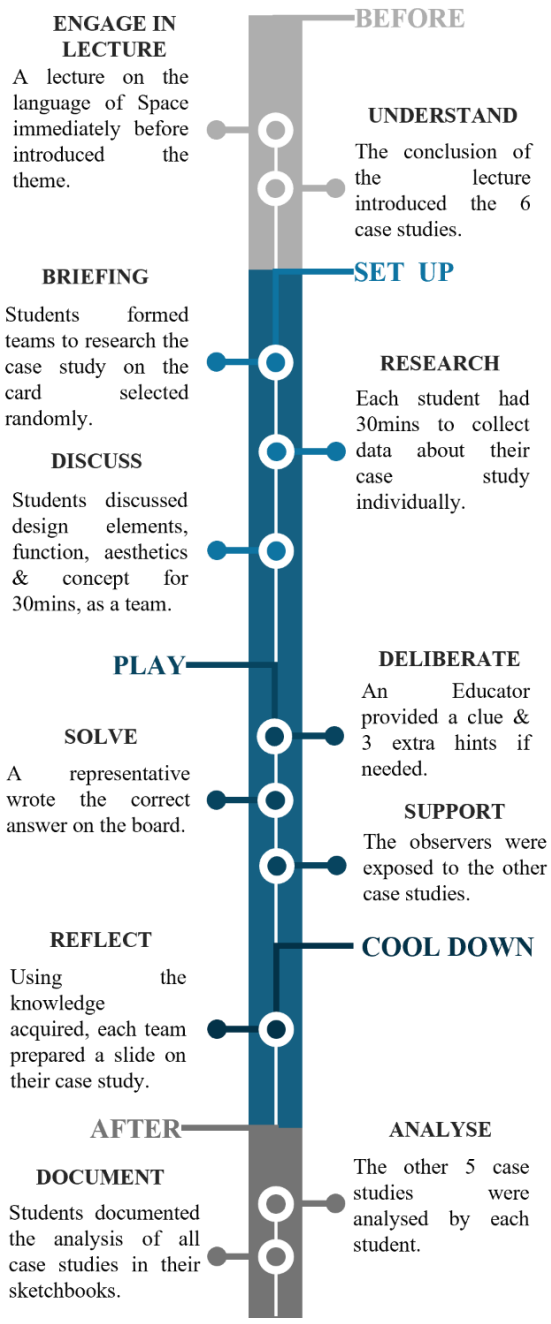

Figure 9. *Pilot Activity 3 Timeline (Source: Authors).*

Potential and Drawbacks

The activity engaged the students and motivated them to enhance their research and analytical skills. Students were engaged throughout the allocated time of the activity, whether in their preparation or game time. The studio suited the engagement of the participants. The group size was appropriate for the activity where every student had an internal task to do to achieve collective research. During the contests, observing students were engaged and cheered for their peers.

An additional part of this activity was planned in which each group presented their research findings in two minutes on a slide as a way to let all groups get exposed to all provided case studies. Due to a shortage of time, this part was modified to be completed in their sketchbooks during self-guided time along with their original task of documenting and reflecting on all case studies. Additionally, this activity needed a preplanned leaderboard and gadgets to document points increasing the engagement and consistency of rounds.

5.4. Pilot Activity 4 - Jeopardy [CrE]

The concrete experience was provided by experts via engaging content delivery. The dynamics were to assess student learning, timely attendance and to encourage review of course content, which represented reflective observation. The pilot activity and knowledge application were evaluated throughout the semester in the active experimentation stage. The mechanics mediating this activity involved a single educator presenting questions divided into themes with three levels of difficulty, as shown in Figure 10. A bonus question for double points was added to the third round for novelty. The primary rule was any group member must raise their paddle to answer a question. The components included a paddle designed by students (Figure 11) and a weekly updated leaderboard. For the finale, it was decided that only two of the 13 groups would compete for the prize due to the great difference in points. For this round, buzzers replaced paddles and sketching as an answer format was introduced. The timeline in Figure 12 outlines the activity proceedings.

Figure 10. *Educator facilitating Jeopardy (Source: Authors).*

Figure 11. *Students' Paddles - Activity components (Source: Authors).*

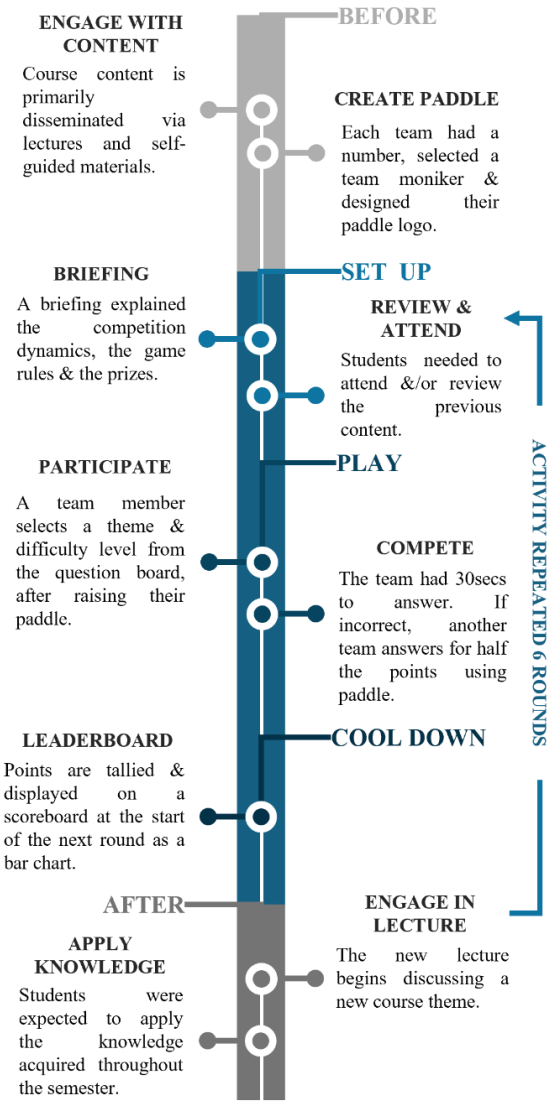

Figure 12*. Pilot Activity 4 Timeline (Source: Authors).*

Potential and Drawbacks

The activity was effective for knowledge acquisition as it motivated most students to review content material, which was its primary objective. The learning outcomes were fulfilled by high-achieving and motivated students. The iteration

of the activity was beneficial for some students and contributed to its effective operation. The timing was ideal, providing a refresher of previous content. The activity paddle enabled educators to easily identify group members.

Some students didn't participate due to their resistance to prepare, while the iterations became monotonous for others. Furthermore, the timing provided an opportunity for demotivated students to arrive late. The presenter was isolated from the students due to the stage and scale of the auditorium, which affected the engagement of some students. One of the late rounds was cancelled due to weak engagement and the demoralization of the presenter. The students who didn't create their paddle or regularly forgot it didn't participate according to the game mechanics. Lastly, the activity reduced the time available for educators to deliver new content.

5.5. Pilot Activity 5 - The Chair [CrE]

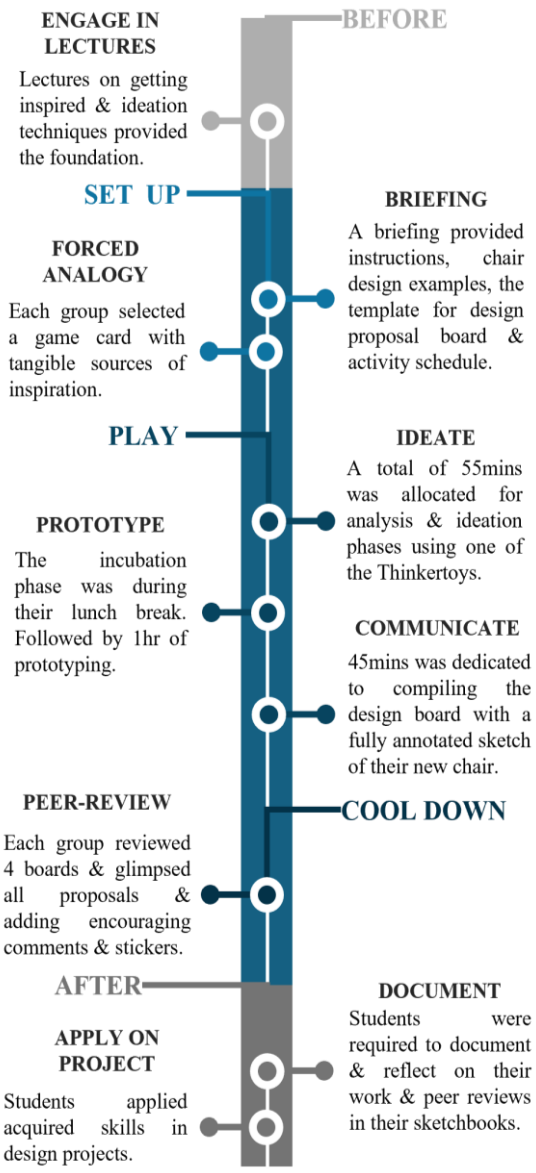

Figure 13. *Pilot Activity 5 Timeline (Source: Authors).*

Experts provided engaging lectures and facilitated this activity to produce a concrete experience, as presented in Figure 13. Educators prepared the briefing slides which involved Game Storming's forced analogy [45]. The dynamics demanded each group redesign a local Egyptian chair by drawing inspiration from a tangible source and presenting their proposal on a design board. The mechanics used Michalko's [46] ideation and incubation techniques. No strict rules were set, and the schedule was provided as a guide, except for the pin-up deadline. The components were game cards, a design board template, and peer-review sheets, all prepared by the educators. Groups conducted peer reviews as demonstrated in Figure 14. Each group reviewed four design proposals (Figure 15) to achieve reflective observation facilitated by educators. Sketchbook documentation was evaluated representing abstract conceptualization. Active experimentation occurred by applying ideation and concept generation in their projects.

Figure 14. *Students Engaging in Peer-review (Source: Authors).*

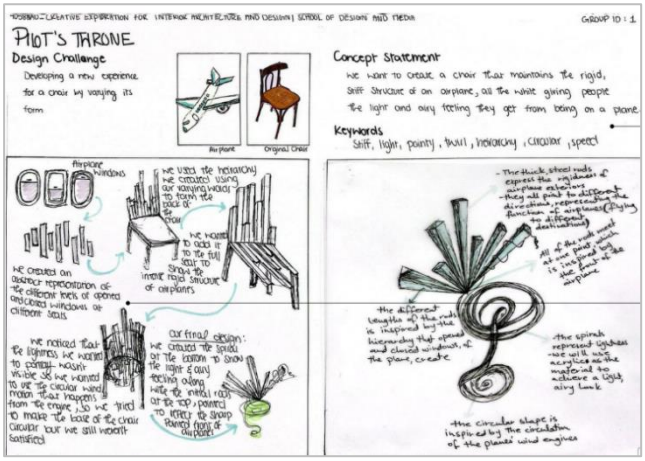

Figure 15. *Sample of Students' Design Proposal Board (Source: Authors).*

Potential and Drawbacks

The activity was engaging as students not only presented their designs but also actively participated in the peer review process, offering constructive criticism of their peers' work.

Students were reluctant to start and wasted time at the onset, educators needed to push them to stay on track and make sure they reached a proposal by the end of the activity. Prototyping took much longer than allocated. Debriefing didn't take place at the end of the activity due to a lack in activity design and limited awareness of its importance. As a result, the educators didn't reflect on the design process and the results of the peer review. However, students were restless and wanted to leave after the peer reviews.

5.6. Pilot Activity 6 - Matching and Sketching [LoS]

The concrete experience included students' engagement in a lecture by experts on Islamic architecture; and their proceeding participation in the gamified activity facilitated by educators. Dynamics involved the understanding of landmarks in Al Moez Street and their different Islamic Architectural eras; while the mechanics indicated cooperation in pairs for matching (Figure 16), cross-referencing, reading and sketching (Figure 17). This activity was evaluated through reflective observations documented in students' sketchbooks. Abstract conceptualization occurred during a field trip that facilitated a deeper understanding of the same landmarks. Active Experimentation included coached live sketching during the visit, as displayed in the timeline in Figure 18.

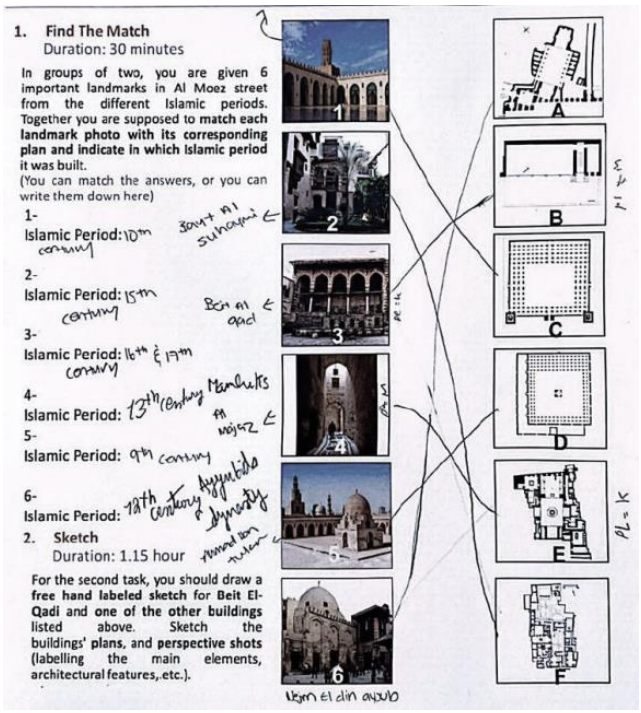

Figure 16. *Sample of Matching Exercise (Source: Authors).*

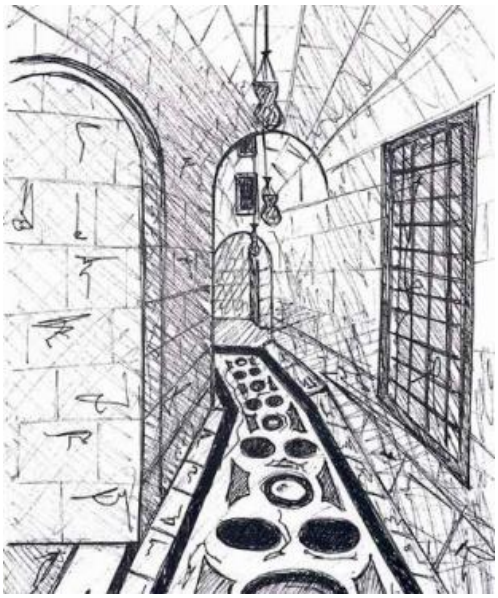

Figure 17. *Sample of Student's Sketch (Source: Authors).*

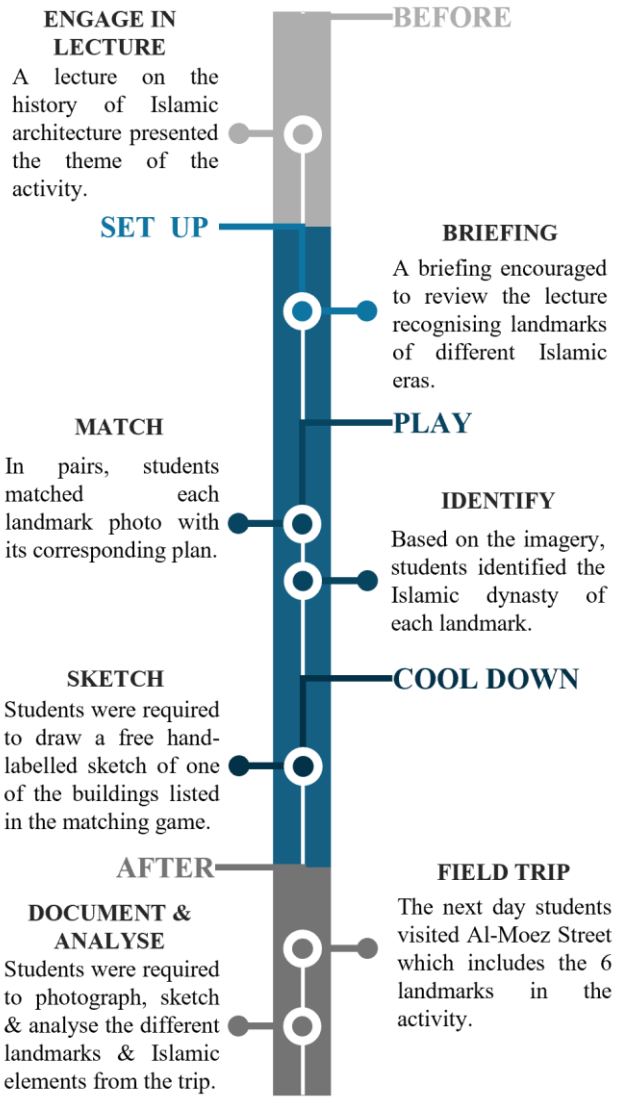

Figure 18. *Pilot Activity 6 Timeline (Source: Authors).*

Potential and Drawbacks

The activity was successful as it enabled students to identify both different Islamic eras and enhance their 2D to 3D literacy which contributed to its learning objective. Its placement in the middle, after an informative lecture and before the field trip was ideal for effective knowledge acquisition. The studio as a location was suitable for the activity as well as the pairing of students as an activity mode. Working in pairs ensured all members contributed to the activity.

The retention of information was low, as soon as the students found the correct answer or started sketching from reference images, they forgot the names and the eras. However, this was expected with rich historical content that is full of difficult terminologies and titles.

5.7. Pilot Activity 7 – The Pitch [CrE & LoS]

Figure 19. *Students and Educators during a Pitch (Source: Authors).*

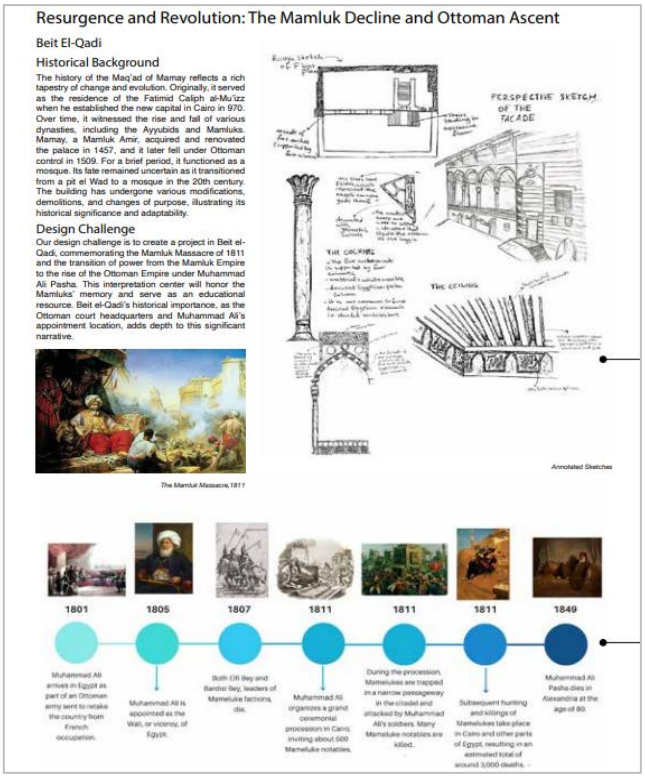

Figure 20. *Sample of Students' Pitch Proposal Board (Source: Authors).*

Experts provided concrete experience by engaging students in lectures. This was followed by coaching students to reflect on the design brief and receive feedback on their draft proposals, which represented reflective observation and abstract conceptualization, respectively. The dynamics involved students role-playing as 'entrepreneurs' pitching their design proposal to the educators who were 'potential investors', as seen in Figures 19 and 20. The mechanics included a time-limited pitch and critique by educators, while the components included 'Yes', 'Maybe' and 'No' paddles and buzzers prepared by educators. Finally, students were evaluated during this activity, which was the active experimentation, illustrated in Figure 21.

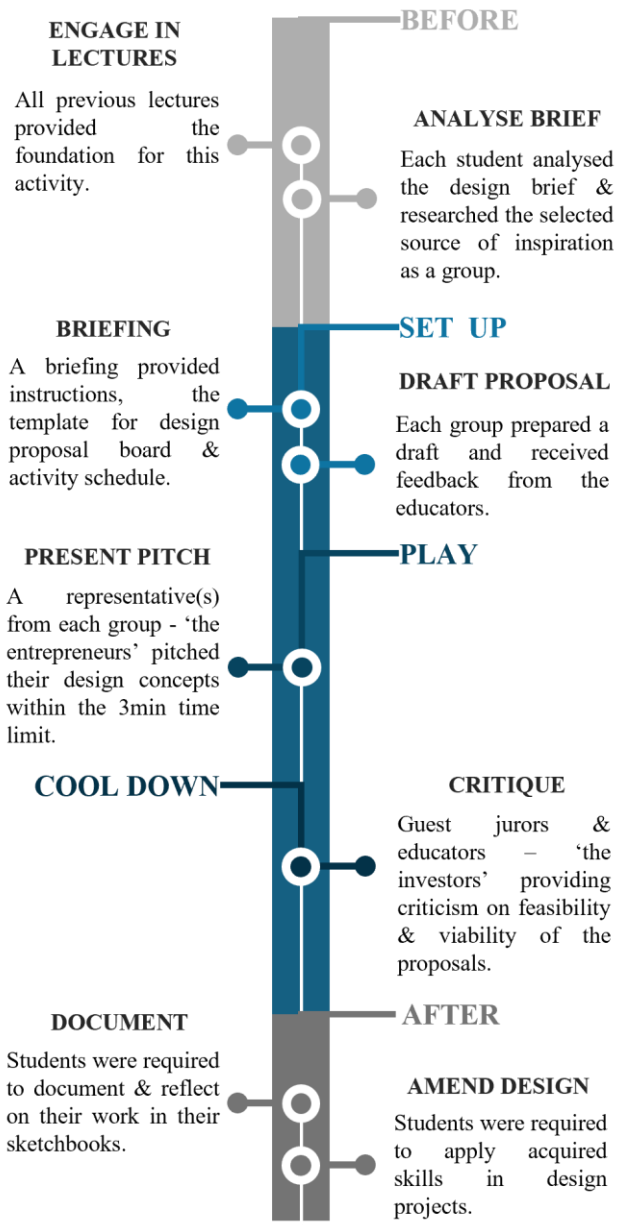

Figure 21. *Pilot Activity 7 Timeline (Source: Authors).*

Potential and Drawbacks

The studio as a location was suitable for the activity and its flexibility contributed to creating a panel setup mimicking notable business reality TV series. Educators acting as decision-makers made the activity fun and contributed to the students' knowledge during the discussions within the pitch. The final decision of proposal status given with the buzzers made the evaluation joyful. Even students whose proposals were rejected were not disengaged or resentful due to the manifestation of graceful failure.

The minor drawbacks impacted the design development, as students were not advised to take notes nor was the activity recorded for them to gather collective feedback from the panel. As a result, students struggled to recall all the advice and recommendations for amendments provided.

6. Findings

The ExL cycle of each pilot activity is collectively overlaid on one analytical diagram to visualize the relation between the activity design, cycle modes, and educators' roles. Figure 21 reveals that the ExL-based gamified activities manifest as either a concrete experience or an active experimentation. This means that when it occurs at the beginning of the cycle, the educator is a facilitator, while when it occurs at the end, the role shifts to an evaluator. The activity as a concrete experience ends the ExL cycle with the application of acquired knowledge on a larger task or project. However, the activity as an active experimentation indicates that the activity in itself is a larger task or project. Reflective observation requires mindful effort on the part of the students. Regardless of the role, the educator provides a probing act to provoke students into reflecting mode. The realization of the abstract conceptualization stage is crucial in determining the success of a gamified activity. It mediates between reflecting and acting; therefore, its target is to ensure the translation of the experience. If the educator is unable to determine whether students have successfully grasped the knowledge intended, then the abstract conceptualization stage did not take place. In hand, this indicates that the activity didn't fulfil the ExL cycle and wasn't completely effective in its outcomes.

The ExL-based gamified activities' design findings are based on both reviewed considerations from the theoretical grounding and deduced insights from the synthesis of the pilot activities. Hence, findings reveal that careful planning according to educational, time-related, and collaboration-setting considerations contributes to the achievement of an ExL-based gamified activity. Each activity requires different operational implementation; however, each operational factor should be efficiently planned to ensure success.

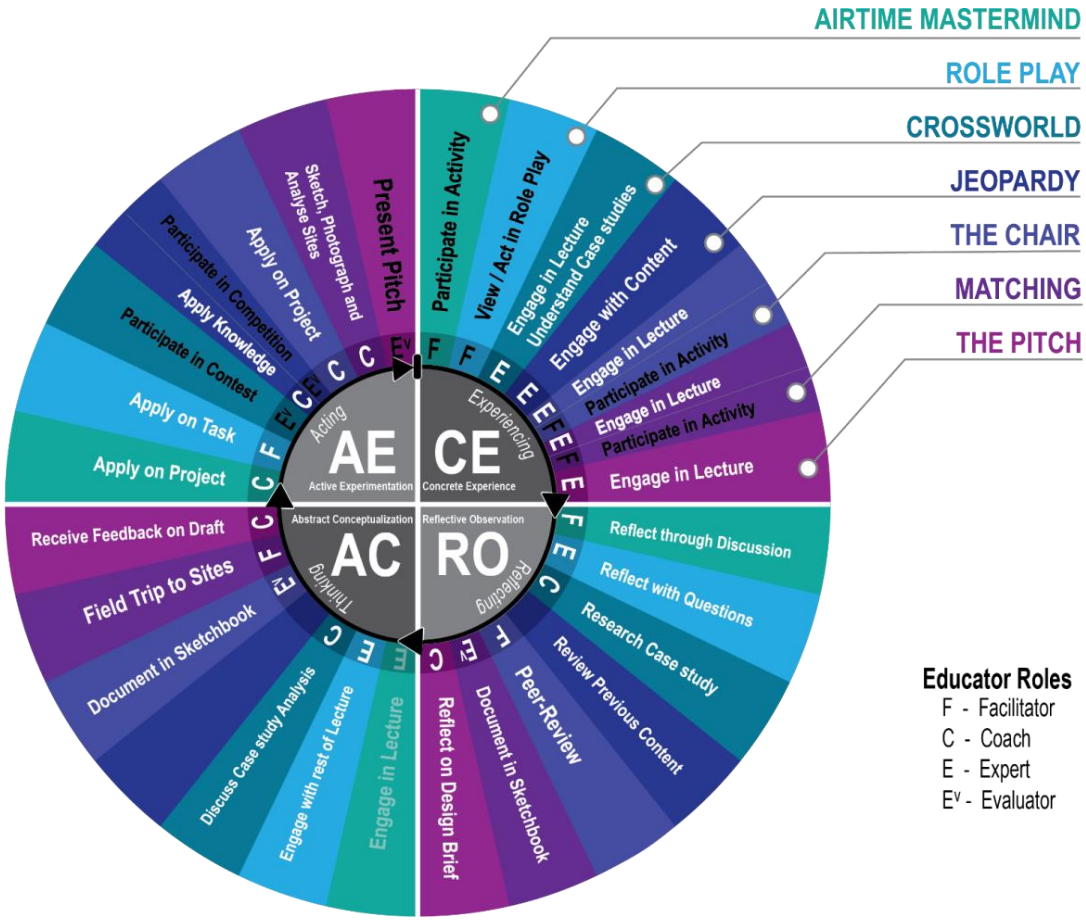

Figure 22. *Analysis of Pilot Gamified Activities using ExL Cycle (Source: Authors).*

It is evident that when the learning outcomes and the purpose are specified ahead of an activity; it is more likely to be achieved. It is clear that when all time-related considerations are meticulously calculated, students' engagement and understanding of the learning outcomes are fulfilled. This ensures that the gamified activity contributes to students' effective learning and doesn't devolve into mere amusement.

The study reveals that activity preparation can be divided into three types: none, controlled and uncontrolled. Controlled preparation refers to a guided setup in the presence of educators. Since uncontrolled preparation occurs in the absence of educators, the requirements must be engaging to ensure the preparation is completed. It is obvious that the duration of the activity and its timed stages highly impact students' engagement. The time frame reflects the importance of the learning outcomes and purpose.

As for the collaborative setting, the study highlights that educators are sometimes constrained by the location due to institutional logistical aspects. In such cases, educators should design gamified activities that are appropriate to the spatial setup of the location. Lecture halls and auditoriums limit collaborative activities, while studios and workshops with movable furnishing give way to various dynamic interactions.

The activity mode is directly related to the duration and number of participants. It is also evident from the pilot activities that there is a direct correlation between the number of participants and the size of the location. As a rule of thumb, the ratio between participants and location necessitates all participants must be heard and seen. The possibility of having several educators facilitating and mediating a gamified activity can be feasible when each educator oversees a group of participants.

Identifying the prerequisites to an activity contributes to its placement within a course. An effective gamified activity needs sufficient time for appropriate planning by educators in which all considerations are fulfilled. During the briefing, the dynamics, mechanics, and components along with the learning outcomes and purpose desired from the activity are shared. If the activity is designed to include a surprise or a discovery factor, the learning outcomes and purpose can be hinted at during the briefing.

When designing an activity, the addition of little fun game components majorly contributes to the engagement of the students. This stresses the educator's seriousness regarding the outcomes of the activity within a gamified mode. However, there is a fine line that educators need to attend to. The exaggeration in the amount and design of these components can divert students' attention to the game itself and not the educational intention behind it. It has also been highlighted that when a game's dynamics, mechanics or components are lacking; the game becomes less engaging by default.

Debriefing is a key aspect in ensuring a gamified activity is successful. This is measured on several levels. First, debriefing ensures the understanding of the learning outcome and purpose behind the activity that occurred. The debriefing also reflects on the gamified activity, which is an indicator for educators to measure its success for future enhancements. It is evident that many educators overlook this phase due to time limitations or students' restlessness, as it always takes place at the end of the gamified activity. However, it is obvious that the absence of this phase highly impacts students' awareness and understanding of the intended acquired knowledge and its use in future tasks.

In an overview of the aforementioned findings, confirming a clear achievement of the ExL cycle's four stages, along with the proper planning and implementation of all design considerations affirms the success of a gamified activity. Therefore, when overlapping the assessment of both, the ExL cycle and the design considerations in a gamified activity, drawbacks become clear. When a design consideration is overlooked a direct correlation of a missing or incomplete stage in the cycle appears. This is clear in the cycle (Figure 22), the hesitation in confirming the completion of the abstract conceptualization stage within the cycle assessment directly reveals that an educator had difficulties in the briefing and/or the debriefing operational considerations. Overall, these findings shed light on the importance of achieving a complete ExL cycle as well as all design aspects to achieve an effective gamified activity that contributes to students' learning experience.

7. Guidelines

The educational, time-related and collaboration-setting considerations in totality should be the basis on which the type of ExL-based gamified activity is selected. Subsequently, the gamified activity is designed according to the operational considerations.

Guidelines in Table 3 are derived from the provided literature review and pilot gamified activities documentation, observations, and findings. The proposed guidelines are also excerpted from the analysis of the potential and drawbacks of each pilot gamified activity. Educators are encouraged to use the guidelines presented to reuse or reinterpret the documented pilot activities or design their own gamified activities. Guidelines imply that educators should:

Table 3. *Guidelines for Educators (Source: Authors).*

EDUCATIONAL CONSIDERATIONS	Learning outcomes – Set measurable learning outcomes. Then, plan and design the expected outputs accordingly to verify hitting the desired learning outcome.

	Purpose – Select the purpose in conjunction with the learning outcome(s) before designing the gamified activity. The purpose should be very specific to ensure its achievement.
	Preparation – Be aware of the type of preparation required. Controlled or no preparation ensures student participation, while uncontrolled preparation demands self-motivation, and therefore educators should plan it in an engaging manner to ensure effective participation.
TIME-RELATED CONSIDERATIONS	Duration – Ensure all participants are included in all stages of the activity in one way or another, even as they perform different tasks. For lengthy activities, educators need to split them into stages with intervals, while avoiding redundancy to reduce the duration and maintain students' interest.
	Time frame – Set the time frame according to the importance of the learning outcome and purpose. For example, icebreakers should not exceed a session, while activities that directly contribute to knowledge acquisition could be extended.
	Location – Be conscious when selecting the location of the gamified activity. A flexible spatial setup accommodates diverse gamified activities, allowing students to interact freely.
COLLABORATION-SETTINGS CONSIDERATIONS	Participants - Ensure that all participants are seen and heard. In case of large cohorts, the support of additional educators can facilitate the effective operation of the gamified activity.
	Activity mode – Select an activity mode that ensures that each participant has a clearly defined role in the gamified activity.
	Prerequisites – Define the needed prerequisite knowledge of the gamified activity to consciously situate it within the timeline of the course and link it with other courses if needed.
	Planning – Be aware that planning gamified activities is time-consuming. This includes designing the activity in addition to altering roles to assess its outcomes. Educators should enhance their skills and familiarity with the various platforms and applications appealing to today's students.
	Briefing – Provide a briefing to explain game dynamics, mechanics, and components to make sure students understand what is expected from them during the activity.
OPERATIONAL CONSIDERATIONS	Dynamics – Design the activity dynamics ensuring it reflects the learning outcome while conveying interesting concepts and narratives to immerse students into the game mode.
	Mechanics – Set clear rules that govern the activity to activate a gamified mode while ensuring the educational outputs are generated.
	Components – Creatively select or make components that arouse students' participation. Visuals and sounds along with competition components contribute to students' engagement.
	Debriefing – Allocate adequate time for a debriefing. Educators should realise when to stop the activity to allow enough time for this reflection; as the debriefing is as important as the activity itself.

8. Discussion

This study provides tentative proposals which aid IAD educators in improving student engagement and enriching students' educational experience. The investigative exploration of the seven pilot gamified activities further supports Kolb's [23] ExL cycle since students successfully gained experience and acquired knowledge without realization of the learning process. It confirms that ExL-based gamified activities have potential in IAD education [13, 33], especially for entry-level students. These activities have proven to engage, motivate and include millennial and post-millennial students in their academic development. The implementation of gamified activities helped eliminate the fear of making mistakes which affects the progress of many IAD students [14]. This supports the research of Hughes & Lacy [29] stating that gamification allows students to fail without resentment. A noteworthy realization is that although the pilot gamified activities were not originally designed based on the ExL theory, it is evident that the success of any gamified activity is directly related to the fulfilment of every stage of the cycle [10]. The results of this paper have fundamental contributions to the implementation of ExL-based gamified activities.

As this study is cross-sectional in nature, it explores a single cohort at a particular time. Time-series studies of IAD students across a full undergraduate journey would provide useful insights into the requirements of ExL activities as students progress through more complex courses. Further investigation of the design considerations would benefit educators in planning and designing more effective ExL-based gamified activities. Students' inclusion through reflective rounds of feedback on exploratory gamified activities would be valuable in connecting

educators with today's students' mindsets to reach a fully comprehensive stimulating learning environment.

9. Conclusion and Recommendations

This paper attempts to make three main contributions to enhancing students' learning experiences in IAD education. The first is a critical review of the literature to identify the various aspects of ExL theory and the benefits of gamification tailored for IAD. The second is an exploration of the potential of gamification as a tool to achieve ExL. Thirdly, are the deduced design considerations for ExL-based gamified activities in IAD. Finally, the paper proposes a set of guidelines based on the deduced design considerations as a starting point for best practices in IAD education.

To develop a full picture of gamification, additional documentation of theoretically grounded pilot studies of an explorative nature in IAD education should be undertaken. As they have the potential to generate action plans eligible for further study and application. The introduced design considerations with special reference to the dynamics, mechanics, and components can benefit educators by providing a clear foundation for the design and implementation of ExL-based gamified activities. Accordingly, IAD educators will be able to creatively explore and experiment with the design of their gamified activities to engage millennial and post-millennial students through an interactive learning environment.

Abbreviations

IAD	Interior Architecture and Design
CrE	Creative Exploration
LoS	Language of Space
ExL	Experiential Learning
CE	Concrete Experience
RO	Reflective Observation
AC	Abstract Conceptualization
AE	Active Experimentation

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Author Contributions

Dina El Mehelmy and Ingy El Zeini co-authored and equally contributed to all aspects of this manuscript based on the CRediT Taxonomy.

Dina El Mehelmy: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Ingy El Zeini: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

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Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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