A Case Study of Experiential Entrepreneurial Learning Through LEGO® Play

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Abstract: Classroom learning through LEGO® play, or LEGO Serious Play™ methodology has been implemented within educational curricula for many years (Ng Yong Liang et al., 2021). The prominence of this approach in Higher Education management education (Martin-Cruz et al., 2022; McCusker, 2020) is growing, where LEGO® building has been viewed as a tool to help unpack management issues using creative play strategies (McGehee, 2022). Entrepreneurial learning differs from traditional, didactic learning by instead pedestalling experiential activities through learning by doing (Macht & Ball, 2016) and subsequent reflections (Kolb, 1984), essentially mimicking how entrepreneurs learn in practice (Ries, 2011). This case study focuses on providing entrepreneurship-focused learning for Foundation (Level 3) Business and Management students at a UK-based HE University. The case demonstrates a unique curriculum approach that delivers students a learning-by-doing experience through LEGO® play, before subsequently facilitating the reflective mapping of learnings to fundamental entrepreneurial concepts and skills. The class activity begins with students placed in teams, and being challenged with a seemingly simple LEGO® play task of building a model car which will subsequently be tested against other teams' models. However, the task has been strategically devised to include purposeful complications (e.g. LEGO® sets deliberately tampered with where key pieces or instruction books/pages are missing) meaning the initially straightforward task required students to use creative problem-solving entrepreneurial skills to successfully complete. After the models were tested and a team provisionally crowned the 'winner', the real learning comes from the second part of the session challenging students to assess their experiential learning from the activity through a deep reflective review, constituting a fundamental component of the learning process. Data was captured through both researcher observations during the activity and learner-centric data from student presentations of their identified learning. Initial analysis of the findings identified that students mapped a spectrum of entrepreneurial concepts and skills developed from the activity (including risk-taking, adaptability, teamwork, creativity, innovation, resourcing, and leadership), illustrating how integrating LEGO® play with experiential learning approaches can foster an effective and engaging student-led learning experiences in the classroom.

Keywords: Experiential Learning, LEGO, Creativity, Innovative, Design Thinking

1. Introduction

As LEGO® play becomes increasingly utilised for classroom interventions and novel learning experiences, increased academic and professional consideration is being sought to substantiate the approach. This case explores an integrated design-thinking perspective to developing an experiential learning session delivered through LEGO® play. Where LEGO Serious Play™ can be prescriptive and restricted to delivering just the activity itself, this case study was designed and facilitated with reflection built in, giving an arguably more authentic and useful learning experience for students. This session was trialled with Level 3 Business and Management students within an Entrepreneurship and Innovation module, seeking to explore a) How do LEGO®-based activities impact students' experiential learning?, and b) How does structured reflection after LEGO® activities enhance this (entrepreneurial) learning? To answer these questions, both student and facilitator perspectives have been explored, showcasing an evolving session design which could potentially be implemented across a broad range of subject areas for similar effective results. This paper illustrates how students responded with creativity when faced with issues of ambiguity. Students were able to identify an incredible 68 different entrepreneurial concepts and skills from completing this activity.

This paper brings a purposive, design-thinking approach to experiential learning inside the classroom. Through developing a LEGO® play intervention with built in reflection, the approach adds academic application to LEGO® based sessions, progresses conversations of authentic and experiential learning (Curtis et al., 2021) and addresses concerns regarding the challenge of students' reflection (Yeoh, 2017).

2. The Setting

This case focuses an Entrepreneurship & Innovation (E&I) module provided to Foundation level (level 3) Business Management students at a UK-based HE University. Foundation programmes provide an alternative pathway for students not achieving the requirements for direct entry to full undergraduate degrees. Students study six

business-related modules over a year, to subsequently gain access to their preferred full degree programme. Typically, the foundation programme has 120-180 students enrolled each year.

The E&I module was designed and implemented from 2020/21, initially for synchronous online delivery due to COVID-19 restrictions, before fully in-person synchronous from 2021/22 onwards. It is delivered over the period of a semester (12 weeks), aiming to provide students with entrepreneurship and innovation insight and learning, regardless of their subsequent chosen business degree path. Weekly, students receive a whole-cohort 1-2-hour lecture, with smaller group (30-40) 2-hour seminars (facilitated by two staff members). Assessment is 100% group-based, with teams of 6-7 members, where students can partly self-select their team composition during week 3.

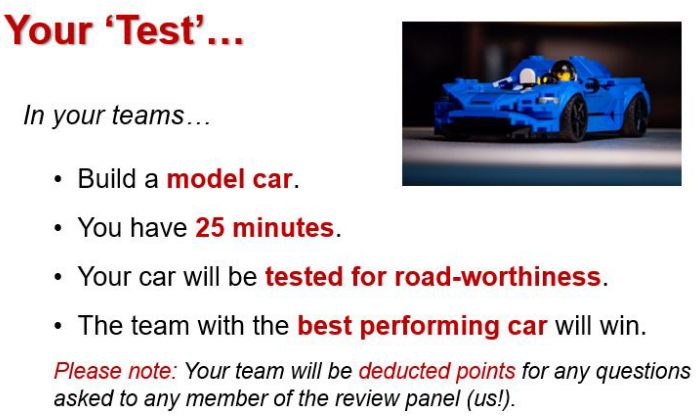

Figure 1: Model Building Activity

This case focuses on one specific 2-hour seminar activity. It was originally developed to help increase teamworking, communication, problem solving skills through LEGO® play. The activity requires students to construct a simple LEGO® model car using a LEGO® Creator 3-in-1 box within a defined time limit (see Figure 1). However, the task has been strategically devised to include purposeful complications, for example key pieces are missing, instruction books or pages are removed, and how the models are tested and the time remaining is deliberately withheld. Students therefore need to cope with ambiguity, adapt creatively to quickly solve problems, or even take some risks to succeed. Each model car is competitively tested in the classroom (propelling it from one side of the room to the other, with distance and intact-ness as marking criteria) and a winning team announced. Student feedback was positive and encouraging, for example, one student stated choosing the Entrepreneurship Degree as a direct result of this session. On review of the module, the teaching team wanted to improve upon this activity further, focusing not only on teamworking, but additionally magnifying the multiple entrepreneurial skills potentially espoused through completing this activity – thinking; What if we could ask students to map this experiential LEGO® play activity to entrepreneurial skills and concepts?

Figure 2: Additional Reflective Task

The initial activity task was identical to previously, however, an enhanced additional task was then added after the road-test challenging students to evaluate their performance and experience through a deeper reflective

review (see Figure 2). Students were encouraged to find entrepreneurial skills and concepts (through any means necessary – usually search engines on mobile-phones and laptops) and to actively map these against their experience of the activity task. Teams articulated their learning through presenting mind-maps on flip-chart sheets with considerable and highly positive results. Teaching staff subsequently re-award a winning team based on the teams' identification of concepts and associated reflections and learning, rather than the model-building activity, where ultimately the winners are those who learned the most from the experience and related it to the topic.

3. Literature Review

This case study addresses emerging threads within entrepreneurship/enterprise education and wider higher education requirements for authentic learning experiences. An overview of the literature through design thinking, experiential learning, and reflective learning highlights pertinent opportunities to further discuss our findings.

3.1 Literature Topic 1 - Design Thinking

As 'a way of thinking', design thinking is regarded as a cognitive process followed by designers while working on projects (Liedtka, 2020; Val et al., 2017). The principle of design thinking is human centred. The process starts with good understanding of people and their needs, the designers design the process, aiming to meet their needs. Design thinking is recognised as an innovative approach to encourage people to engage the process and dive into the human-related problems. It allows designers to explore many possible solutions in the first place to the problem, then develop users' ability to offer unique and diverse solutions (Brown, 2008; Carella et al., 2023; Garbuio et al., 2018).

Design thinking as a method of creative action (Brown, 2019) and an 'open' problem solving process (Rittel & Webber, 1973), Scholars have defined its processes in different ways. Brown (2019) and Liedtka (2015) developed five key stages for design thinking: ***empathize*** (understanding user needs); ***define*** (identifying the problem); ***ideate*** (brainstorming multiple creative solutions); ***prototype*** (creating tangible representations of ideas) and finally ***test*** (refining solutions). This five-stage process reflects the 'learning-by-doing' and 'trial-and-error' characteristics by blending critical thinking and experiential learning, which are essential to entrepreneurship education (Baltador et al., 2024; Liedtka, 2015).

Design thinking and project-based learning mode has emerged as an innovative education approach applied to different research areas, particularly in problem-solving and creativity (Baltador et al., 2024). Entrepreneurs face different dynamics and overall elevated complexity on the daily basis (Val et al., 2017). Being a successful entrepreneur requires skills like risk-taking, identification of new opportunities, adaptability and innovative competences (Carella et al., 2023). Design thinking could foster these entrepreneurial key trails. García et al. (2017) emphases that the application of design thinking in curriculum design could help students in shaping their entrepreneurial mindset by dealing with wicked problems and identify hidden issues.

3.2 Literature Topic 2 - Experiential Learning

There is a plethora of empirical literature within the field of entrepreneurship education which argues that an authentic experiential approach to learning is better than traditional knowledge-sharing methods for improving deeper learning (Cope & Watts, 2000; Curtis et al., 2021; Jones et al., 2019). Mimicking how entrepreneurs themselves learn (Ries, 2011), strategies to create 'learning by doing' experiences by which students can immerse themselves into authentic or simulated activities has also been well documented (Kolb, 1984; Macht & Ball, 2016). Experiential learning is not just captured within entrepreneurship education as a meta-analysis of 89 empirical studies comparing experiential versus traditional methods concluded that "students experienced superior learning outcomes when experiential pedagogies were employed" (Burch et al., 2019, p. 239). However, previous literature demonstrate links between experiential learning and entrepreneurship education are intrinsically aligned (Jones et al., 2019; Vij & Ball, 2010). Entrepreneurship education is increasingly being viewed as important for all students, regardless of discipline. Even if students are not planning on starting a business in the near future, entrepreneurial behaviour can support the learner's employability (Bell, 2021).

LEGO® building has been viewed as a tool to help unpack management issues using creative play strategies (McGehee, 2022). McCusker (2020) discusses how LEGO Serious Play™ can open up new classroom interactions through valued team participation. It provides an experimental approach which helps to enable intuitive

instruction, communication, participation, and collaborative learning in order to solve a perceived problem (Martin-Cruz et al., 2022). Engaging students with LEGO® Serious Play group challenges within a classroom environment encourages collaboration and communication, developing group cohesion and unity (Peabody & Noyes, 2017). It is an innovative way to promote social and cognitive skills that will be essential for students of new generations (Pedregosa-Fauste et al., 2024). LEGO® play has not only been used as a tool to facilitate classroom learning, but also to facilitate classroom thinking too (Ng Yong Liang et al., 2021).

3.3 Literature Topic 3 – Structured Reflection / Reflective Learning

Due to the likely uncertainty and ambiguity which abound entrepreneurial careers (Fisher et al., 2020; McMullen & Shepherd, 2006), the importance of reflection and subsequent learning is increasingly pedestalled within the discipline (Hägg, 2021; Kurczewska et al., 2018; Tan et al., 2024). Such a reflective period often is required following business failure or significant work-based challenges (Bae et al., 2025), enabling individuals to undertake the necessary sensemaking (Weick et al., 2005) to understand and overcome their situation (Maitlis & Christianson, 2014; Sandberg & Tsoukas, 2020). Such high-stakes settings are challenging to recreate in the classroom, however reflective learning could provide a bridge between theory and practice (Hägg, 2021), significantly aiding competence understanding and development specifically when scaffolding by the facilitating academic(s) and lesson-plans to support students through the process (Tan et al., 2024).

Emerging work is starting to explore reflective learning for entrepreneurship students. Tan et al. (2024) identify the integration of reflective learning (utilising Kolb (1984) and Gibbs (1988) frameworks) to experiential learning "significantly enhances the breadth and depth of entrepreneurial competencies" (p. 387) compared to a module control group, results which affirm recent calls through pedagogical research for more innovations and student reflections in business schools (Harney et al., 2021). Such reflective practice may not just impact the immediate learning of entrepreneurship students, arguably equally impacting personality constructs over time (including conation, cognition, and affection) (Kurczewska et al., 2018).

Reflective learning may be particularly crucial when traversing paradigms of thinking required to move from one context to another (Prashantham & Floyd, 2019). Such contexts are often afforded through aforementioned experiential learning pedestalled in entrepreneurship education (Burch et al., 2019; Curtis et al., 2021), specifically as students may need to unlearn or challenge existing beliefs predicated from previous educational settings (Klein, 2008; VandeSteeg, 2012). This said, sensemaking (Weick et al., 2005) and reader-response (French, 1987) ideologies essentially posit empowering individuals themselves to construct their own understanding, resultantly such approaches should not be limited to *just* entrepreneurship education settings, as understanding could be generated *in* and *for* any setting or discipline. The required reflective learning through independent, written form can be initially challenging for students, who find the difficulty with the self-confessional writing approach (Yeoh, 2017) where instead utilising a collective, facilitated sensegiving and sensemaking exercise could overcome some of these barriers to learning (Abrahams & Singh, 2010; Lans et al., 2013).

Reflective learning plays a considerable role in constructing meaning around experiences and events. This seems specifically apparent in entrepreneurial settings, where uncertainty and ambiguity emanate. Despite the usefulness, challenges regarding the *act* of reflection can be barriers for students traversing both new educational settings and paradigms of thinking, meaning active classroom facilitation, almost reflection without realising, could be imperative.

Utilising a design thinking education approach and espousing experiential learning and reflection throughout, this case demonstrates how an innovative LEGO® Play task can be utilised to develop and facilitate entrepreneurial skills.

4. Methodology

This research aims to investigate how LEGO®-based activities enhance students' creativity behaviours in the classroom. To gain 'insights' and 'rich information' (Richards, 2020), we collect primary data from multiple levels, including participant observation and students' written posts. The combination of these empirical research methods from qualitative stance helps us focus on understanding of students' creative behaviours during the LEGO®-building process.

Observation method has been widely used in pedagogy studies, especially in studying creativity in education (Katz-Buonincontro & Anderson, 2020). Observation enables researchers to 'visit little-known tribes and record

their activities for subsequent analysis and interpretation' (Cotton et al., 2010, p. 463). There are different types of observation methods based on the observation roles, including complete participant; participant-observer; observer-participant and complete observer (Merriam & Tisdell, 2015). We adapt participant-observer, in which the researcher engages in the same activities alongside research participants in the study without cancelling our identities. Three researchers conducted 7 observations, which generated 24 observational units (individual groups). The observation template is designed before actual observation were conducted, including five categories and seventeen sub-themes. Extensive details about students' activities and performance are recorded in the observation templates using notations and taking photographs. in addition to the observations, we also collected written posters drawing by students in the classroom. The combination of collected visuals and text in the posts provides rich information allowing us to analyse students' learning experiences through reflective learning.

Given the nature of the qualitative research of this study, our data analysis approaches combined thematic analysis (Boyatzis, 1998) with content analysis (Bernard et al., 2016). Thematic analysis method is used to identify, analyse and interpret patterns and themes emerged from our observation data. For students' posters, both quantitative and qualitative content analysis were employed. First, we quantified the presence of certain words for all collected posters. As the last stage of data analysis, we attempt to connect emerged key words and patterns to our research questions.

5. Findings and Discussion

Observational and reflective data was collected from 22 small groups of students.

5.1 Linking Design Thinking with LEGO® Curriculum Design /Design Thinking in the Context of LEGO®- Building Activities

Building upon our initial interactions with students, the historical participated observation and students reflection experiences, the teaching teams (the designers) interacted the 5 stages of design thinking to influence students' entrepreneurial skills development through LEGO® curriculum design (see Table 1).

Table 1: Design thinking and LEGO® activities in curriculum design

DT Stages	Goals	Implementation in LEGO® Activity Design
Empathize	Understanding user needs	*The designers (tutors) tried to have the best understanding of students' needs – developing Ent. Skills/prepared themselves with competence skills to address real-world problems.*
Define	Identifying the problem	*What Ent. skills students lack of and need to be developed through LEGO®-building activities (i.e. risk taking, problem-solving as the **competence** skills for entrepreneurs)*
Ideate	Brainstorming multiple creative solutions	*Design LEGO® activities by considering multiple ways which LEGO® can be used to address the identified needs in the define stage*
Prototype	Creating tangible representations of ideas	*The design team developed LEGO® challenges for students, encouraging them to produce their products by doing, trying and failing.*
Test	Refining solutions	*Conducted the LEGO® activities in the classroom and asked students to reflect on what they learned and how they felt.*

Implementing the 5-stage design thinking process in LEGO® curriculum design, the teaching team created a highly engaging, student-centred and iterative approach to entrepreneurial skills learning. The following demonstrates how the teaching team applied each stage effectively:

1. Exploring and gathering insights of students' interests, motivations and learning difficulties (classroom observations and students' LEGO® play behaviours) - **Empathise**
2. Defined specific learning objectives where LEGO® is integrated: dealing with uncertainty, risk-taking, problem-solving etc. – **Define**
3. The teaching team deliberately took out some LEGO® pieces and the instruction book without informing to students in different LEGO® boxes to observe students' reactions and actions during the LEGO® paly process – **Ideate**
4. Build the LEGO® car during the class and ask students present a road test at the end – **Prototype**
5. Conduct the pilot session in the classroom, and collected feedback from students and other colleagues to refine the LEGO® curriculum model – **Test**

The design team looped back to these 5 stages in the design thinking process based on the observations of students' reactions and reflections in the LEGO® play activities.

One of the three research objectives was to investigate how to integrate Design thinking in LEGO® based activities in entrepreneurial education from both tutors and students' perspective. Our evidence captures two key principles when designing LEGO® based activities to develop students' entrepreneurial skills and competencies. Firstly, design thinking can be used as a non-linear loop to capture students' learning needs and help staff, as designers, adjust LEGO® learning activities to foster students' entrepreneurial competence (Baltador et al., 2024). Secondly, integrating design thinking into the LEGO® curriculum design, embedding the 5 design thinking stages (Brown, 2008) cannot be isolated from the LEGO® play activities (experimenting) and post reflections (trial-to-error).

5.2 Observations

Staff observations from the activity showed that most teams opened the box prepared to follow instructional guides to build their model as quickly as possible adhering strictly to instructional guides (when available). Teams would delegate team roles to tasks such as sorting parts by colour, or identifying the correct parts by page and then passing onto other team members to assemble.

However, as stated previously, LEGO® box parts and/or instructions had been manipulated, so that some teams had key parts missing, or key instructions missing, or no instructions at all (coping with uncertainty / ambiguity). Teams with the no instructions either decided to just get on with assembling a new model (creativity / innovation) or, negotiated with competing teams for access to a 'spare' instruction book (negotiation) or, used mobile phones to search for the LEGO® Creator instructions online (resourceful). Some teams hid their model designs from other teams (protecting IP), and some teams observed other model builds (collaboration). Some teams even stole missing parts from other teams in the session (ethics)! One team decided not to use LEGO® at all, but instead, built a makeshift car from classroom furniture (thinking outside of the box). Many teams discussed asking tutors for advice, but realised asking questions would lead to a penalty (risk-taking). Not surprisingly, (nearly) all teams did not monitor time constraints, and therefore, several models were not test-ready, with some missing keys parts such as wheels. However, some cohesive teams did complete well within the defined duration, and made time to test during assembly, and on completion of their model car.

5.3 Data Analysis From the Reflections

22 learner flip-chart reflections were analysed and correlated by identifying every keyword used within the mind-maps to illustrate what students had identified as the essential entrepreneurial skills and concepts from the activity. Learner groups identified between 8 and 20 keywords per team, with a total 86 individual keywords identified. The frequency was also analysed to identifying the most used keywords (see figure 4).

That frequently data showed that the 2 main keywords occurred were innovation and risk taking (22%). Teamwork, creativity, adaptability, delegation, problem solving, and time management occurred between 10-20%, and then coping with ambiguity, thinking outside the box, vision, model testing, opportunity recognition, and perseverance occurred between 5-10%.

Figure 3: Frequency of keywords identified

6. Conclusions and Recommendations

This case study set out to illustrate how using LEGO® play in the classroom can be a very powerful tool for students to use experiential learning to seek and identify key skills and concepts used in entrepreneurship education. LEGO® play empowers students to be more interactive in the classroom. This experiential learning activity has identified 86 keywords from just one 2-hr seminars (from 22 teams). Observations showed that students were adaptive to creative problem solving under conditions of uncertainty and ambiguity, testing out rule restrictions in a very entrepreneurial style. It shows that experiential group-learning can have positive outcomes for students, whilst also having some creative fun in the classroom too.

Adding the final reflective question at the end of this activity engaged students in a much more dynamic way, breaking down traditional barriers to learning whereby knowledge is often only transmitted to them. Students were able to map and qualify their learning in a way that traditional methods fail to do. LEGO® play activities such as this can easily be adapted for many other disciplines too. Skills such as teambuilding, problem solving, creativity, innovation are not exclusive to entrepreneurship education but are very transferrable skills that most employers are seeking from Higher Education graduates.

Ethics and AI Declaration

Ethics approval has been submitted and approved by Northumbria University (Ref: 10000). AI tools have not been utilised in the production of this paper.

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