

EXPLORE, ADAPT AND REFLECT: EDUCATING DESIGN STUDENTS IN TRANSLATING DESIGN SUPPORTING TECHNIQUES ACROSS DOMAINS

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ABSTRACT

The interdisciplinary nature of design requires designers to be able to recognise potentially interesting emerging design techniques from neighbouring disciplines, such as marketing, management or engineering. A potentially interesting technique should be assessed, and, when found applicably, modified to suit a particular application in the design process. Training this skill to design students can be challenging. Students lack experience that designers use to make such assessments and modifications. This paper presents the results of a study in which we introduced an emerging design technique, LSP (Lego Serious Play) to graduate design students. The technique is introduced through a lecture and a workshop, after which the students are asked to assess its applicability in the product design domain by writing an essay. Students who expected LSP to be a useful design technique, attempted to apply LSP in a design case. By analysing the essays we aimed to find out how students assess new techniques, and how well they do this. It was found that in their essays, students present a relatively superficial review of the technique, touching only the obvious benefits and drawbacks. In order to fully understand (and in the end appreciate) the core values of the new technique, a regular lecture and a workshop turned out to be insufficient.

Keywords: Emerging design techniques, teaching, Lego Serious Play

1 INTRODUCTION

Design is an interdisciplinary profession. Consequently, design activities can benefit from input and support generated through techniques originally developed within other, adjacent disciplines. For example, many user centred design techniques used in the product design domain originate from software development disciplines. Designers should therefore have the capabilities to recognise potentially relevant techniques from 'foreign' disciplines, assess the applicability of the technique to product design, and, when needed, customise the technique to fit the anticipated design application. Training these skills to industrial design engineering students can be challenging. Although design students are generally expected to be sufficiently creative to customise a technique for specific applications, it requires experience and critical reflection skills to assess the applicability and relevance of a new design technique. This paper presents the results of a study in which students explore, reflect on and adapt a potentially relevant technique within their product development process. The primary aim of the study is to gain insights into how well design students are able to assess the quality and applicability of new design techniques. The secondary aim of the study is to gain insights into the applicability of LSP as a new design technique. The study was carried out with 37 graduate industrial design engineering students, who were first introduced to the LSP technique, and then asked to assess the technique in an essay. In a follow-up assignment, students who expected LSP to be a useful design technique, attempted to apply LSP in a design case.

The remainder of this paper is structured as follows. Section 2 further elaborates on the background of LSP to fully understand the technique that was introduced to the design students. Section 3 presents the approach and proceedings of our study. In section 4 we discuss the results regarding the primary and secondary research objectives.

2 BACKGROUND

LSP was originally developed in the mid 90's as an internal strategy development method by LEGO, eventually brought to the market in 2002 [1] [2]. The LSP method facilitates group discussions by letting participants express their knowledge, thoughts, issues, or opinions through LEGO models. The use of LEGO models ensures a balanced (i.e. everyone is equal) discussion in which every participant is able and facilitated to contribute (see [3] for an extensive overview of the working principles of LSP). The method is particularly useful for team building, problem solving and decision making.

It is expected that the method can also be deployed in a product development setting. It can help designers, or other stakeholders involved in the product development process, such as customers or suppliers, with discussing or elaborating on a specific problem, with reaching agreement on how to proceed, or with establishing a common ground between different disciplines. There are several examples of LSP being used in product design and engineering. [4] describes how LSP has been used successfully in design engineering classrooms for 4 years, "*encouraging full participation, creative contribution and communication across team members*" (p. 5). In [5], design students used LSP to facilitate workshops with stakeholders from the healthcare sector. Here the method primarily facilitated communication and interaction between the students and the external stakeholders rather than the communication and collaboration within the design team. Given the background of LSP and the successful application of the technique in several design and engineering settings, it is expected that LSP can be a useful addition to the range of techniques offered to design students.

3 APPROACH

The LSP technique was introduced to 37 graduate industrial design students in a course called SBPD (scenario based product design). The course introduces students to a wide variety of design methods and techniques, ranging from ethnographic research, body storming and personas to pivots, roleplaying and co-design. Each technique is introduced through a lecture combined with an assignment that students carry out in class. To investigate the adoption of LSP as one of these design techniques, three steps were carried out as further explained in the following subsections.

3.1 Experience LSP

The LSP introduction starts with a lecture briefly outlining the background and history of LSP, followed by an explanation of the working principles of this technique. The students then participate in a three hour LSP workshop. Because of time constraints, the workshop is reduced to a 'light' format, involving only the first 3 of 7 steps usually carried out in a LSP session (the full session was explained to the students in the lecture): 1) a warm-up build & storytelling assignment, 2) build and share the ideal coffee experience, and 3) build a shared model representing your group's ideal coffee experience. The design of an 'ideal coffee experience' was used as the topic for this particular workshop.

3.2 Reflect on LSP

After being introduced to LSP and having participated in a LSP workshop the students were asked to reflect on the technique by writing an essay. The essay should address why LSP could (not) be used as a design technique, what kind of participants would be involved, in which phase of the design process the technique could be used, and what kind of outcomes they expect from the technique.

3.3 Apply LSP

The students (in teams of 4) were then asked to develop a design approach for a specific design case. The design approach should make use of one or more of the techniques they had encountered in the course lectures. For each applied technique, the design team has to explain how, when and why the technique is used, and what modifications to the technique are required to suit their specific design case.

4 RESULTS

4.1 LSP Workshop

The workshop was facilitated by the authors, two of whom are licensed LSP facilitators. The workshop was recorded on video to review the proceedings afterwards. During the workshop we

noticed that the majority of the students (both individually and when working in teams) initially had difficulty with working with metaphors and abstract models. Instead, they used the bricks to build actual products rather than representations of feelings, thoughts or emotions that usually facilitate storytelling. After making some remarks from the facilitators, most of the participants were able to eventually create abstract models and tell richer stories. Nevertheless, some of the final group results still contained a lot of 'concrete models' of products and settings. For example, rather than describing the 'ideal coffee experience' in terms of emotions or experiences, students modelled an entire living room and coffee machines.

4.2 Essay Assessment

After the LSP lecture and workshop, the student teams wrote an essay in which they assess the applicability of the technique for product design. The resulting 10 essays have been used to assess the students' ability to critically review a new design technique as well as its potential benefits for a design project. The essays have been analysed by labelling the sentences (or sub-sentences) according to an open coding scheme.

Structure

The first labelling round provides insights in the range of topics addressed in the essays, as well as the popularity of these topics (based on code frequency, see Figure 1) and the variety of topics within individual essays (see Figure 2). Overall, the essays primarily discuss expected benefits of LSP in product design, and the general working principles of the technique. This indicates that most of the design teams approached the essay assignment from the point of 'describe why this technique works, and how', rather than 'does this technique work, and why (not)?' Furthermore, most of the groups are also able to say something about the expected use of the application, and able to position the technique in a specific part of the product design process.

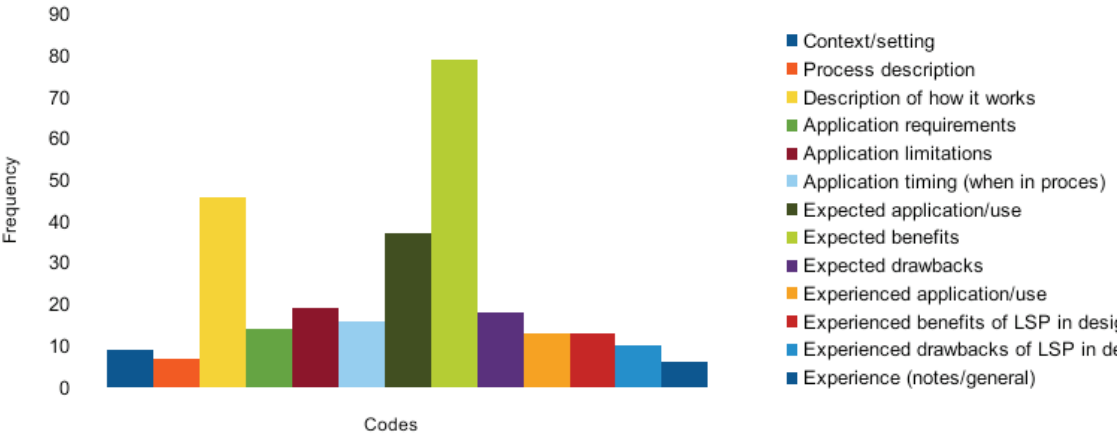


Figure 1: Overall distribution of codes

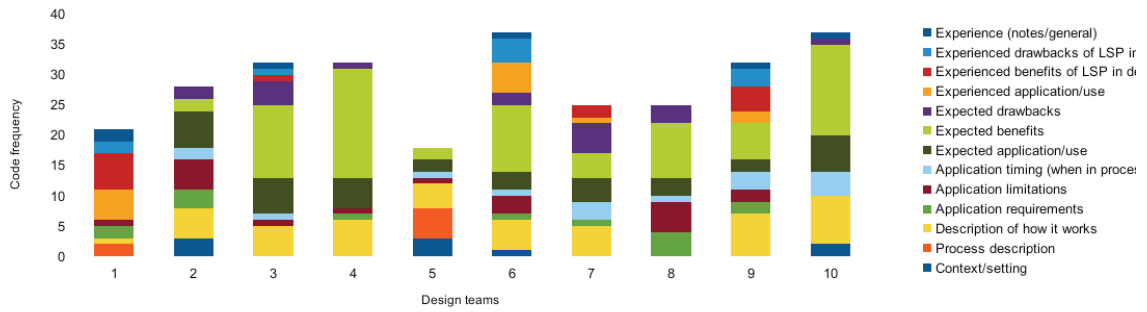


Figure 2: Distribution of codes within essays

Content

To further assess the quality of the essays, a second labelling round focussed on the content of each label. For example, 'expected benefits' may concern 'provide common language' or 'stimulate creativity'. The labels resulting from the first round have been re-examined and labelled into different content categories. The resulting content has been ranked according to their overall frequency (i.e. occurrence in the entire set of essays). To discuss the quality of the students' interpretation of the LSP technique, we will focus on the benefits and drawbacks described in the essays. Table 1 lists the content label frequencies of the 5 most frequent benefits and drawbacks and the 5 most frequent applications or use cases for LSP in the design process.

The content label frequencies show that most of the students expect the technique to be useful as an ideation and creativity technique that facilitates group collaboration and individual contribution. The benefits associated with this use are similar to those generally attributed to LSP. In particular, the 'distance between user and idea', which refers to the safety that the models provide while storytelling is picked up well and appreciated by the students? The 'low threshold', meaning that anyone can participate in the workshop, may not be the most relevant benefit of LSP, but the fact that the entire course was about actively involving end-users in the design process may have influenced the popularity of this benefit.

The drawbacks however also indicate that the students may have interpreted the LSP technique too much as a co-design technique, rather than a storytelling technique. In particular, drawbacks such as 'low level of detail' and 'predictable results' emerged from attempts to use the Lego bricks to build the actual product, rather than a model or metaphor to support a story (as also noted in section 4.1). For example, one essay mentioned "The method is also not very suitable for designing a detailed physical representation of a product, since the participants are limited to the shapes of Lego parts". When considering the LSP technique as an ideation technique, the 'time consumption' drawback also makes sense as LSP is less efficient for this purpose than e.g. a brainstorming session; "[...] it is very time consuming, and many results can also be achieved using other methods, like brainstorming".

Table 1. Content label frequencies of the 5 most frequent benefits and drawbacks

Benefits	#	Drawbacks	#	Application/Use	#
low threshold	13	time consuming	8	stimulate creativity	5
distance between user and idea	12	low level of detail	8	individual contribution	3
stimulate creativity	11	predictable results	4	ideation	3
individual contribution	10	compromise	4	group collaboration	3
active participation	7	creativity block	3	discover hidden issues	3

4.3 Design case

Of the 10 design teams (consisting of 3 to 4 students), one design team actually applied the LSP technique in their design case. One team mentioned LSP in their approach evaluation, saying "[...] the CUTA session could be substituted by scenario based methods which emphasize more on emotional

values, such as the LSP method". One other team mentioned LSP as a potentially useful technique, but refrained from using it because "[...] the more experimental Lego Serious Play method would not have been worked, because the farmers take those things too literally". The other 7 teams did not explicitly mention the technique in their design report.

The design case in which LSP was applied concerned supporting the work (through product or service design) of people working in an animal shelter. The team's design approach involved an analysis phase in which the students aimed to gain insight in the daily work of the animal shelter employees. The team started with an ethnographic study (involving interviews, observations and working at the shelter), followed by a LSP workshop and a focus group. With the LSP workshop the design team aimed to gain a deep understanding of why the employees work at the animal shelter, and what they aim to achieve in terms of animal well being. In the subsequent focus group, the design team expects the employees to brainstorm about how they can change or improve their current way of working in order to achieve a higher level of animal well being.

Session approach

The LSP session took place at the animal shelter and involved six employees, including five volunteers and the manager. Two hours were available for the session, during which three tasks were given. Firstly, as a warm-up exercise participants were asked to describe what they like about working at the animal shelter. Subsequently, the participants were asked to describe 1) what a happy cat looks like, and 2) what a cat in this animal shelter looks like. In the final part of the workshop, participants had to combine the results of questions 1 and 2 to identify the similarities and differences between 'a happy cat' and 'a cat in this shelter'. In each step of the LSP workshop the participants build their model, present the model to the group, and have a short discussion about what (and, more importantly why) they built something. The session was facilitated by one of the design students, while the other team members assisted and observed.

Session results

Although it is not the main interest of this paper, the results of the LSP session are briefly summarised to give an indication of how well the session worked for this design case. The main factors affecting the difference between 'happy cats' and 'cats in the animal shelter' are 1) a lack of quality time between volunteers and animals, mostly because there are too many animals and not enough volunteers, 2) a lack of motivation among community service employees or trainees (i.e. non-voluntary employees) leading to a lack of attention for the animals, and 3) an uncertain future of the animal shelter because of constant financial and organisational changes.

Students' Reflection

In their design report the design team reviewed the application of the LSP technique. Overall the positioning of the technique was considered appropriate; the LSP workshop added a deeper level of understanding to the superficial results of the observations and interviews. With respect to the technique itself the design team encountered some initial hesitation among the participants to work with the Lego bricks. To overcome the hesitation, the facilitator joined the first 'warm-up' exercise to demonstrate how the Lego bricks can help with telling a story: "[...] at first, it seemed a bit silly to them. [...] The participants overcame their hesitations very quickly and thought the LEGO was fun and rendered feelings of nostalgia". Eventually the participants engaged in the workshop and successfully constructed models and stories. The designers however noted that most of the participants found it difficult to work with abstract models and metaphors. Instead, participants often created a concrete representation of a particular situation. The design team attributes this to the level of education of (some of) the participants: "It was concluded that the LSP method can be a very useful communication tool, but only for people with a medium to high level of education". Nevertheless, the design team considers the technique to be an effective means to actively involve participants in the analysis phase of a design project: "This pleasant method of exploring the purpose of their work and their personal views opened the way to an equal and well balanced discussion. Pointing out the essence of their creation with a red stone and creating a common model with all essential parts together enhanced the idea of equal importance of every participant's opinion".

5 DISCUSSION

The results of our study show an interesting difference between how students assess a new design technique in an essay, and how they actually apply the technique in practice. The essays only contain a superficial description of the technique, its expected benefits and potential drawbacks. The students primarily try to prove the technique's added value to product design rather than assess its applicability. Based on the essays alone, our conclusion would therefore be that the introductory lecture and the LSP workshop were not sufficient to make the students understand the core values of LSP. Of course, it can be questioned whether the essays provide a reliable insight in the student's interpretation of the LSP technique. Firstly, time constraints within the course may have affected the quality of the essays negatively. The students may not have succeeded in properly capturing their perception of the technique in the essay. Secondly, the analysis of the surveys (i.e. coding the content of the essays) was carried out by one researcher. To increase the reliability of the analysis, a double review would have helped, or students could have been asked whether or not this is indeed how they interpreted the technique. Nevertheless, the superficial reflection of the LSP technique that results from the analysis corresponds to observations made during the workshop itself (facilitators had to point out the use of metaphors and abstract models). This leads us to believe that the surveys properly reflect the student's interpretations.

The secondary aim of the study was to gain insights into the applicability of LSP as a new design technique by evaluating the student's implementation of this technique in a practical design case. Based on the results of this study it is difficult to provide a clear answer to this question. On one hand, as already discussed the majority of the design students indicated that the use of LSP in a design case is limited. Furthermore, only one out of the 10 design teams decided to actually use the technique. On the other hand, the group that did use LSP in their design case was able to successfully deploy the technique after receiving additional guidance on how to implement the technique in their design case.

Letting students pick the techniques or methods they find useful may be a risky approach for design courses, unless you are sure that a technique is properly understood. The study has shown that we can not always assume a lecture and a workshop or demonstration of a new design technique to provide students with sufficient insights for a proper assessment. In this case, presenting students with a 'light version' of the LSP technique proved to be insufficient for them to fully understand and assess its applicability in a design case. Spending more time on explaining all the steps involved in the technique, and providing them with a more elaborate experience of a LSP workshop could have contributed to a better understanding of the technique.

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