

LANDSCAPE METAPHORS FOR BACHELOR DESIGN STUDENTS' IDENTITY AND VISION DEVELOPMENT

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ABSTRACT

Professional identity and vision (PIV) development is important for students to shape their educational path and future careers. It is important for students to be guided in this PIV development, but writing a PIV text could be challenging for many. To supplement the text-based approach of PIV writing, we explore how a physical toolkit using landscape and other metaphors could help students in their PIV development and reflection. Two case studies were conducted at Eindhoven University of Technology. Data collection was done through an adapted professional identity scale supplemented by semi-structured interviews. We conclude that our toolkit is most suitable for final-year bachelor students and those beyond this stage in their degree, and that the main use of the toolkit lies in its reflective nature.

Keywords: Professional identity, professional vision, design students, design education, metaphors

1 INTRODUCTION

For students in many disciplines, especially those with less well-defined career paths, Professional Identity and Vision (PIV) are tools to give direction and purpose to an educational path. Identity is a contemporary issue in engineering [1]. At Eindhoven University of Technology, a technical university in NW Europe, Professional Identity is defined as the student's identity as a designer, based on factors such as personality traits, interests and competencies [2]. Vision is defined as the student's beliefs about the future of design, its function in society and the role of design research [3]. All Industrial Design (ID) students at this university are expected to write and update their PIV regularly, but many bachelor students struggle developing and reflecting on their PIV. The university organises workshops and regular feedback moments from coaches, but these methods focus on a student's PIV as a textual document. Students—including in disciplines such as design, where non-text formats are common—could benefit from other ways of engaging in PIV development and reflection, for example through visualisation exercises, or ways to physicalise thinking through constructing models. Data physicalisation is an emergent research area concerning the disciplines of data visualization and design, where a 'physicalisation' is "a physical artifact whose geometry or material properties encode data" [4]. 'Constructive physicalisation' is the practice of fabricating personal physicalisations to encode data [5] or promote reflection [6]. Research has shown that visualisation and physicalisation exercises can assist design students in exploring design topics [7] or facilitate learning and accelerate the learning process (e.g. [8, 9]). In this paper, we examine how one such physicalisation method could help ID students develop their PIV. We build on an existing toolkit, Thinking With Things (TWT) [10], in which a workshop format focuses on metaphorical physicalisations (building on [11]) that use the physical properties of materials to investigate the qualitative nature of lived experiences. As such, it is suited to the target group of ID students familiar with using materials to express themselves, and the topic of PIV as the method focuses on lived experiences. We therefore ask: "How can the 'Thinking with Things' toolkit support bachelor ID students in creating and reflecting on a design-based PIV?"

1.1 Professional Identity and Vision Scales

Several studies have investigated professional identity across different fields, using various scales. The revised 25-item Professional Identity Five-Factor Scale (PIFFS) [12] and the Professional Identity Scale [13] are utilized in this study. Questions about self-efficacy and the professional as a role model make parts of PIFFS a suitable scale to assess students' PIV. The Adams et al. scale focuses on the sense of belonging within the profession. From the PIFFS scale nine questions covering four relevant factors

were used in this study. An additional nine questions from the PI Scale study were added. Two questions rated on a seven-point scale were added that inquire how participants experienced the toolkit’s value with regard to the development and reflection on their PIV respectively. (“How would you rate the usefulness of this workshop for developing your professional identity and vision” and “How would you rate the usefulness of this workshop for understanding your own professional identity and vision compared to the professional identity and vision of others”).

2 METHOD

2.1 Workshops

We ran two workshops, with a total of 14 Industrial Design students, described in sections 3 and 4. Before and after each workshop, students completed the questionnaire outlined in section 1.1. Workshop 1 was with nine first-year bachelor students (B1), typically aged 18–20, while Workshop 2 was with five final-year bachelor students engaged in their Final Bachelor Project (FBP), typically aged 21–25.

2.2 Planning

Table 1. Planning of activities for the workshops with duration for the B1 and FBP groups

Activity	Duration in minutes (B1)	Duration in minutes (FBP)
Welcome and participants filling in the informed consent form	1	1
Filling in the pre-workshop questionnaire	2	2
Introduction to the TWT method and its connection to PIV	2	2
Discussion of PIV in groups and building the landscape	21	15
Sharing and discussion of created landscapes between groups	19	9
Connective stage introduction, and start building	14	13
Sharing and discussion of created connections between groups	13	8
Performative stage introduction with new dynamic materials	13	removed
Sharing & discussion of performative stage results between groups	5	removed
Post-workshop questionnaire filled in again by the participants	4	4
Group interview with the participants	6	16
Interview with the PIV tutor (<i>B1 only</i>)	5	n/a

Table 1 shows the planning and the duration of each part across the two workshops. The adjustments and differences between the B1 and FBP workshop are further elaborated on in Section 4.1.

2.3 Quantitative Data Analysis

Responses to the first 18 questions of the questionnaire (comparing pre- and post-workshop responses) were analysed using the Wilcoxon signed ranks test. The same test was applied across the different categories. Due to the low number of participants in each group, the results of the Wilcoxon signed ranks test (and any other statistical analysis of the questionnaire) were deemed unreliable. Instead, responses were briefly explored per participant, observing their developments per question/category, and were compared to the interview responses to see whether results matched up. Median scores for each of the two final questions were calculated to give an impression of the workshop’s effect on PIV development and reflection. These results were primarily utilised to contextualise or confirm the qualitative findings gained from interviews and observations.

2.4 Qualitative Data Analysis

Observations were written down covering comments made, specific behaviours or actions, and the descriptions participants gave of their TWT creations. Along with the interviews they were analysed through open coding. Two researchers coded these into one codebook each, which were then discussed, leading to a single codebook where multiple codes could be assigned to a single piece of text.

Krippendorff's alpha [14] showed an inter-coder reliability of $\alpha = 0.4018$. A third coder made decisions in places where the previous two coders disagreed, to create the final code assignments. Due to the subjective nature of the topic and the low inter-coder reliability we cannot reliably draw any quantitative conclusions from the codes, and thus they were only used as a method to make sense of the many textual transcriptions.

3 WORKSHOP #1 - FIRST-YEAR BACHELOR STUDENTS

3.1 Structure

The first workshop involved the three stages used in the TWT format: *Topological (Landscape)* - Creating a shared landscape through physical metaphors such as mountains, bridges, and trees; *Connective* - Creating connections in the landscape representing relations through materials such as yarn, wire, and more; and *Performative* - Creating new models where dynamic transformation and reflection is represented through temporal materials (which change in some way over time) such as lights, marbles, and dissolving sugar cubes. The workshop took 105 minutes with 20 minutes of construction per stage, the remaining time being used for instructions and for participants to present their creations.



Figure 1. (Left) Laying out materials for the workshop. (Center) Using rivers to connect different parts of a landscape. (Right) Sugar cubes represent the absorption of knowledge

3.2 Procedure

The workshop was hosted as part of a PIV course lecture where nine B1 bachelor students and one tutor were present. In preparation landscaping materials were laid out on a table as shown in Figure 1. Participants signed an informed consent form that made clear that participation in the study was optional even if participation in the course was compulsory. Students discussed their PIV in groups, and then filled in the questionnaire described in section 1.1. In groups of three, students went through the three stages of the workshop, filled in the same questionnaire afterwards, and were interviewed to gain more information about their experiences. The tutor was interviewed separately. These interviews were transcribed through edited transcription corrected for repetitions, corrections, and interruptions. No participant identifiers were applied in the transcriptions as the nature of the interview made it difficult to identify speakers and connect them to the questionnaire responses.

3.3 Interviews and Observations

Materials were leading in the build process. Participants were attracted to materials first and subsequently projected meaning onto them. Exploration of materials inspired participants to incorporate these into their landscape. Participants noted the prominence of organic shapes in the kit: "I feel like this steers you very much in the nature direction. [...] we're a group of engineers. It would be really good to have some robot shape or similar things to have more ways to represent that." One student noted how the limited representation in the kit sparks creativity: "A human/person was the only thing I looked for. but it was good that it wasn't there." Another indicated that the limitation of the kit causes force-fitting to the objects available: "The fact that you can choose from certain things may also influence that you adapt [your PIV] a bit."

The Landscaping stage was easily the most appreciated. "Normally you write it down. But now I've made this thing around it and it's easier to remember." Participants regularly used landscape elements to create connections, as can be seen in Figure 1. While no specific comments were made on this, the use of connections within the landscape may have affected the connective stage.

The Performative proved confusing: "I felt like the last exercise was a bit random," and "I think I struggle to come up with something that represents the past and now." The purpose of the Performative

stage was questioned, and participants noted that it did not add anything compared to the first two stages. Creations in the third stage addressed learning experiences or design processes rather than the individual identity and vision of participants (see Figure 2).

The group felt the workshop did not immediately give them any new insights that contributed to developing their PIV. The most notable value was in providing a new way to address and construct a PIV, as noted by the tutor: “I think [the workshop] provides development [...] in a better understanding that you can make abstract things like personal identity, vision, more visual, and that you can maybe apply [making things visual] on other subjects also.” One participant noted that it helped them have a concrete view of their PIV, implying the value was more affirmative than constructive.

However, students indicated that the workshop helped them reflect or share. “[I]t helped me to reflect because I discussed it and now I have more ways of thinking about it.” One described that “[y]ou are thinking of it visually first and then you can find the words. It becomes easier to describe your PIV.” A sense of belonging is a common thread. In comments relating to sharing and group work, ‘ease of sharing’, ‘understanding the other’ and ‘relating to the other’ are recurring themes.

4 WORKSHOP #2 - FINAL-YEAR BACHELOR STUDENTS

4.1 Structure

During the B1 workshop, the students showed decreased motivation during the Connective and Performative stages. In addition, the students seemed to engage with the exercise too superficially to produce meaningful developments for the participants. The Performative stage also proved confusing. Another workshop was organised for FBP students to assess whether the Landscape and Connective stages are valuable to bachelor students overall, comparing B1 students to final-year FBP students. The participating FBP students were working on their graduation project during the period they participated in the workshop and were expected to have developed their PIV further.

4.2 Procedure

5 FBP students attended the workshop. These students were recruited through voluntary sampling. Compared to the B1 workshop, no PIV tutor was interviewed, and the performative stage was not included, as reception of the Performative stage was poor among B1 students. The workshop time was 1 hour. Two groups were formed (a group of three and a group of two). No changes were made to the data collection or analysis process.



Figure 2. (Left) Connecting ‘helping people’ and people themselves using a paperclip chain. (Right) Using a water metaphor to represent pitfalls and opportunities in PIV development

4.3 Interviews and Observations

Like with the B1 group, materials were leading in creating a narrative, as one participant describes: “You see [an object] and you think, ‘what can I do with it?’ instead of ‘this connection is here, I am going to the table and get something that fits it.’” When given a box of coloured paper clips to attach connective materials to their landscape, one FBP participant immediately started linking paper clips into a chain, seen in Figure 2. This student described directly identifying with materials and relating them to their identity: “I was drawn to things that interested me, and they were automatically in line with my identity itself because it’s what I like that I’m picking up. [...] I could make it to represent something, but it doesn’t mean it means the same thing to everyone.”

The prominence of organic shapes was again noted in both positive and negative ways: “there’s a lot of variety in trees, but then there’s no houses or anything.” One participant noted that “It also maybe makes you more creative due to the limitations.” Material properties are mentioned as a way to express the

nature of a connection mad during the second stage: “[w]e use different kinds of materials for the connections and those define the kind of connection.”

The Landscaping stage was favoured, much like with the B1 group. “I think this workshop really helps to put your PIV into a daily life because it’s [a] landscape, and you start thinking about what’s in a landscape that fits with my PIV.” The Connective stage had mixed responses as some felt it was redundant: “I didn’t totally get making the connections between the parts, as the landscape connects it in its context itself already, I think.” Another noted that “[t]he connections that we made at the end in the second part maybe were more forced [...] that made us lose the bigger connections that you already thought of in the first half.” Some felt that addressing connections directly pushed them to think deeply about the nature of the connections: “[F]or me I thought about it, and then created new meaning because you talk about it.” Figure 2 shows connections that emerged during this stage.

Participants specifically noted that no new insights regarding the development of their PIV were gained: “I didn’t really find it constructive. You recognize parts that you may already have incorporated, and I personally didn’t recognize new opportunities or parts.” Students did note the workshop’s communicative and reflective value: “I have quite some difficulty communicating my PIV to others. Reflecting in an abstract way on it is helpful to me,” and “[t]his exercise kind of forces you to think about how you are with respect to other designers.” When asked about the group setting, one participant described that “[...] it’s nice to experience the overlap between you and the others. You get ideas from each other or take over some.” Another noted that “[the exercise] tells you how you could be related to people who have completely different perspectives of design or a completely different vision.” This, much like the B1 responses, emphasises the workshop’s value for bonding and relating to peers.

5 DISCUSSION AND CONCLUSION

Overall, the Landscape stage was received most favourably by all participants. While the Connective stage was sometimes seen as redundant, it still produced interesting insights for participants through the properties of the materials offered. We recommend that the Connective stage should be included in the workshop, but the Performative stage should be excluded. The Performative stage mostly left B1 students confused. Participants mention that the exercise felt random and struggled to create something that reflects both the past and present. These participants also noted that the third stage did not really bring them anything the first two stages could not cover. This sentiment was recognised by the researchers when observing the participants building their landscapes; temporal components of PIV such as its development over time were naturally incorporated without the need to encourage this in the temporally oriented Performative stage.

During the workshop, FBP students were able to discuss and be critical about each other’s PIV more than B1 students. B1 students have less to reflect on as they are still creating the foundation of their PIV. However, during the interview some B1 students mentioned how the toolkit made it easier for them to engage with their PIV compared to working with text. We speculate that FBP students—as one might expect—have a more well-defined identity and vision, allowing them to look critically at each other’s PIV and the landscapes created. This may contribute to giving the FBP students a sense of belonging in their chosen profession during the workshop. Moreover, the materials used were leading in the emerging narratives, as students look at shapes, material properties and colours to explain their PIV. They are inspired by attractive materials and create a story around it afterwards. During the workshops, all the students addressed what they found important in their PIV and created different narratives within the landscape that reflect on the present and future of their PIV and designer experience. This finding suggests that the value of the TWT toolkit for PIV application lies mainly in creating a shared narrative where students reflect on their PIV in contrast to that of others and develop their sense of belonging through this.

5.1 Limitations and Further Research

We observe some limitations in our study. Firstly, this approach to PIV development might not be suitable for all students, as it requires students to think in metaphors and discuss fairly abstract concepts (identity/vision) using physical objects (landscape elements). Additionally, the selection of objects could strongly guide the type of narratives that students construct.

Secondly, FBP students self-registered or were invited to take part in the study, while the B1 students participated as part of a PIV course. This sampling difference could have influenced the results. A follow-up study should employ identical sampling methods for the different groups.

Finally, since we adapted both the structure of the workshop (removing the Performative stage) and the participant criterion (FBP rather than B1) at the same time it becomes difficult to identify confidently which variable caused the change in results between the two workshops. Future research may want to isolate the change in audience as the only changing variable between sessions.

Future work should explore whether the method could be applicable to students from other backgrounds than design. We believe that the design discipline places heavy emphasis on developing a unique skill set and vision, which may be less prevalent in other disciplines. Exploring whether our workshop setup can contribute to PIV development in other fields would be interesting.

Our workshop setup as described in this study is currently being integrated into the PIV curriculum of Eindhoven University of Technology. Further experiments will continue with a broader student group, in collaboration with the coordinators of the PIV programme.

We conclude that the use of the toolkit in PIV workshops lies in creating shared narratives where students reflect on their PIV in contrast to that of others. Through this they develop a sense of belonging to the profession, making the TWT workshop very suitable for FBP students (and potentially for master's students).

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