Tell Me Your Story: Digital Storytelling as a Teaching and Communication Tool

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Abstract
The paper describes an exploratory study focused on the use of Digital Storytelling (DS) as a tool for design students to communicate their self-reflection process and reveal their soft skills to a future employer. Digital Storytelling is widely recognised in the literature, as an innovative learning strategy supported by practical cases with implementation in classrooms. Based on the premise that DS can be used as a vehicle to help students "think about your own identity", the creative process of finding students' narratives led them to reflect on themselves and their life experiences. This study aimed to help students to reflect on their own cognitive profile during problem design solving and communicate creatively their soft skills to a future employer using a digital narrative. Product design students worked on their narratives for four weeks in practical classes during a course concerned with visual communication techniques. Students used digital technologies and computer software to create an individual short videos and communicate autobiographical narratives with original images and audio where the narrator is the story's protagonist. The stories were visualized in a group session with an invited DS specialist and a focus group was held to find out teachers' perceptions about the suitability of the DS as a tool for students' self-reflection. As an outcome, students' narratives focused on remarkable personal life experiences or academic involvements, some of them showing a significant emotional charge, others trying to highlight singular characteristics which may be appreciated and valued by a future employer.

Keywords: Digital Storytelling, Teaching Tool, Communication Techniques, Student's Self-Reflection

1. Introduction

Digital storytelling (DS) is a way to communicate ideas, and experiences to an audience using multimedia (Hartsell, 2017). The relevance of Digital Storytelling as an innovative learning strategy has been widely disseminated in the scientific literature through reports with practical examples of its implementation in the classroom. (Robin, 2008; Jakes & Brennan, 2005). DS can describe autobiographical narratives, with strong emotional content, in which the narrator is the protagonist of the story (Lambert, 2003; Herreros, 2012). Creating stories using personal voice to be shared with others, according to Hartsell (2017) can encourage students' self-expression and develop their confidence in life. To Herreros (2012), DS "activa en el alumno elementos cognitivos y emotivos que promueven la reflexión sobre su Yo y le ayudan a pensarse y comprenderse" (p. 72).

Based on the premise that Digital storytelling can be used to help students to "think about their own identity" Herreros (2012) a short activity (four weeks) was designed for which students had to perform a DS aiming to promote self-reflection on their cognitive profile as future product designers. The development of cognitive skills should constitute explicit learning objectives in design education. Kim and Kim (2015) defend this idea by stating that "education should be able to identify the cognitive style of each student and nurture a competitive expertise while managing the strengths and deficiencies of their cognitive style" (p.33). The process of story-making for a DS can promote critical reflection on experience which can be useful in design education and practice (McDonnell, et al., 2004)

Design problems are "underdetermined problems" (Dorst, 2003), ill-structured, or even 'wicked'. Design problems are open, undefined, and unstructured problems. Open, because they allow multiple solutions. Undefined, because it lacks a well-defined problem definition, and its inputs are not available at the beginning. Not structured, because its resolution does not follow a "recipe", the problem is redefined and modified as the solution emerges (Cross, 2007). This 'openness' of a design problem requires the mobilisation of different thinking styles and design is then constituted as a mix of cognitive styles so closely related "that, as a designer, you fluently flow from one to the other" (Dorst, 2006, p. 81).

The development of digital stories can provide students with different skills and literacies combining different competencies described by Robin (2008) as 21st Century Literacy, Digital Age Literacies, or 21st Century Skills. Technology literacy is the ability to use computers and other technology to improve learning, productivity, and performance. Visual literacy is concerned with the ability to understand, produce, and communicate through visual images. Therefore, from an educational perspective, the use of DS tool in this study aimed to help students to: (1) reflect on their own cognitive profile and communicate their soft skills to a future employer using a digital narrative, (2) discover their cognitive weaknesses during a problem design solving and be aware of their strengths to take advantage of it and (3) communicate creatively their soft skills to a future employer.

2. The story of a digital storytelling

2.1 Digital storytelling activity context

Twenty-three students of the 3rd year Product Design and Technology course from School of Design, Management and Production Technologies Northern Aveiro (ESAN) - University of Aveiro worked on their personal DS in practical classes from a course unit concerned with

visual communication techniques under the supervision of a communication design professor and a researcher from the Education field. The objectives of the course unit

namely at the level of technical skills of image edition and video editing were fully compatible with the proposed activity. Communication Techniques (CT) is a course unit for 3rd year, where the students have initial contact, over three years of graduation, with content about graphic and communication design. CT is divided into one hour of theory and two hours of practical work where the tools to support communication design, such as image editing and vector drawing, are taught and applied. This is also the first time that a DS project was proposed in the CT programme.

As an activity it was proposed that each student had to create a digital narrative with original graphic content, resulting from self-reflection about their personal journey as an individual and as a product design student. To guide and help students during the digital storytelling process, the syllabus was written and delivered in the first class explaining the purpose of the exercise, DS activity timeline, expected tasks and deliverables, and communications tools that should be used along the activity and video requirements (Table 1).

<table>
<tr><th>Purpose</th><th>DS activity deliverables Communications tools</th><th>Video requirements</th><th colspan="2">Competences to be acquired</th></tr>
<tr><td rowspan="2">Create a digital narrative to communicate student self-reflection process and reveal their soft skills to a potential employer.</td><td rowspan="2">· Empathic map
· Cognitive styles model (before DS activity)
· Cognitive styles model (after DS activity)
· Mood board
· Original and autobiographical final text
· Video</td><td rowspan="2">· Video length: 2-5 minutes
· Format: 1920 x 1080 (AVI, MOV, MPEG, MP4)
· Original text and images
· Student must be the narrator
· Use of graphics, audio, and video
· image editing software</td><td>Technical</td><td>· Image editing
· Video editing
· Use of communication tools (such as empathic map, storyboard, mood board)</td></tr>
<tr><td>Others</td><td>Reflexion</td></tr>
</table>

Table 1: Syllabus topics deliver to students at first class

2.2 Digital storytelling phases

The conception of digital storytelling follows several steps. Usually, the Digital Storytelling process begins with writing a script to communicate a specific issue. In this case, before writing their personal narrative, students had to find a particular story from their life or reflect on their singular characteristics that could be important for an employer in the design area. Of the 23 students enrolled in the course unit, 21 (91%) had attended a previous semester's course unit Product Design and Development (PDD) concerned with problem-solving by design, in which they already had contact with the Thinking Style Taxonomy (Table 1) proposed by Clemente at. al. (2016). A set of “thinking styles” that design student mobilises in problem-solving. The developed taxonomy indicates seven thinking styles and relates each one of those styles with a profession and the behaviour and attitudes required by that activity:

Imaginative (Artist); Focused (Olympic athlete), Determined (Surgeon), Empathic (Anthropologist), Analytical and evaluative (Judge), Holistic (Professional traveller) and Reflexive (Travel writer). According to Clemente (2017) “that parallelism is expected to facilitate taxonomy comprehension and memorisation by students” (p. S1536).

Job (Thinking style)	Attitudes	Actions
Artist (Imaginative)	Unconventional Fun Observer with all senses Emotional Dreamer With a certain amount of madness	Generates a lot (a "torrent") of ideas Identifies possibilities, what could be
Olympic Athlete (Focused)	Ambitious, Visionary Injects huge amounts of time and energy in their work Attention and concentration in a field	Focused on Objectives Distinguishes the essential from the irrelevant Has a clear vision of the desired output
Surgeon (Determined)	Lives well with uncertainty and ambiguity Determined, Independent Sees error and failure as an opportunity to evolve Relies on his own intuition Ability to work / manage a multidisciplinary team	Performs activities to achieve objectives Considers deadlines and events Takes advantage of the skills of each team member.
Anthropologist (Empathic)	Impartial Rejects preconceived ideas Curious Thirsty for knowledge Sensitive Attentive to details	Puts himself in the role of the other Identifies and assesses the emotional state of another Relates various information about a context to achieve a holistic picture
Judge (Analytical & Evaluative)	Disciplined, Rigorous Shrewd, Cautious	Evaluates ideas according to predefined criteria Compares what he has, given the intended purpose
Professional Traveller (Holistic)	Global and systemic thinking Ability to plan, manage and control the process Acceptance of chaos, Openness with respect to random events	Sees the process as a whole Understands the structure of the problem Determines the next step of the process
Travel Writer (Reflexive)	Self-conscious Ability to take advantage of the merits (strengths) Recognise personal singularities and use then to their advantage	Analyses the driven learning process Reflects on experiences, transforming them into useful knowledge

Table 2: Thinking Style Taxonomy (Clemente et al. 2016)

In the first lesson, students reflected on their cognitive profile from the experience they had in the PDD course unit on the previous semester. This first exercise consisted of filling in the Cognitive Profile model (before DS activity) (Figure 1) and creating an Empathy Map for which a template was provided. The Cognitive Profile model fill in by the students before and after DS activity included a task in which students had to paint their cognitive profile using the taxonomy of thinking styles (profession), assigning percentages to each one, until they reached a total of 100% (Figure 2).

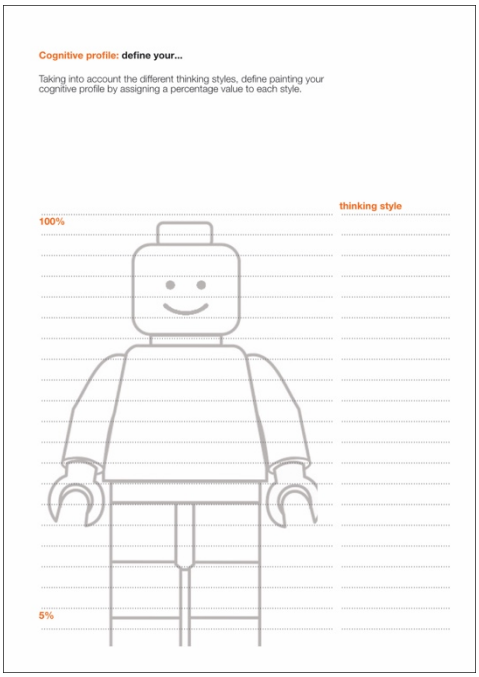


Figure 1: Cognitive profile model to fill assigning a percentage value to for each Thinking Style perceived

Figure 2: Student filling the Cognitive Profile model

The Empathy map (Figure 3) is a visualization tool divided in 4-6 areas (Think and Feel, Hear, See, Say and Do Strengths and Weaknesses) widely used to understand users' needs, feelings, and desires. In this case, the Empathy Map was used as a technique of self-knowledge and not to deepen the knowledge about the target -audience as usually used in the design process. To encourage a questioning attitude and through the responses, help students define their cognitive profile, the template had questions such as "Which elements/factors influence your cognitive profile?"; "What do your attitudes and behaviours reveal about your

cognitive style?" or "What do you do to improve your cognitive profile?". In the Strengths and Weakness areas, students are encouraged to reflect on their performance during a problem-solving project "When you think about working on a project what are the cognitive aspects you are most/less capable of".

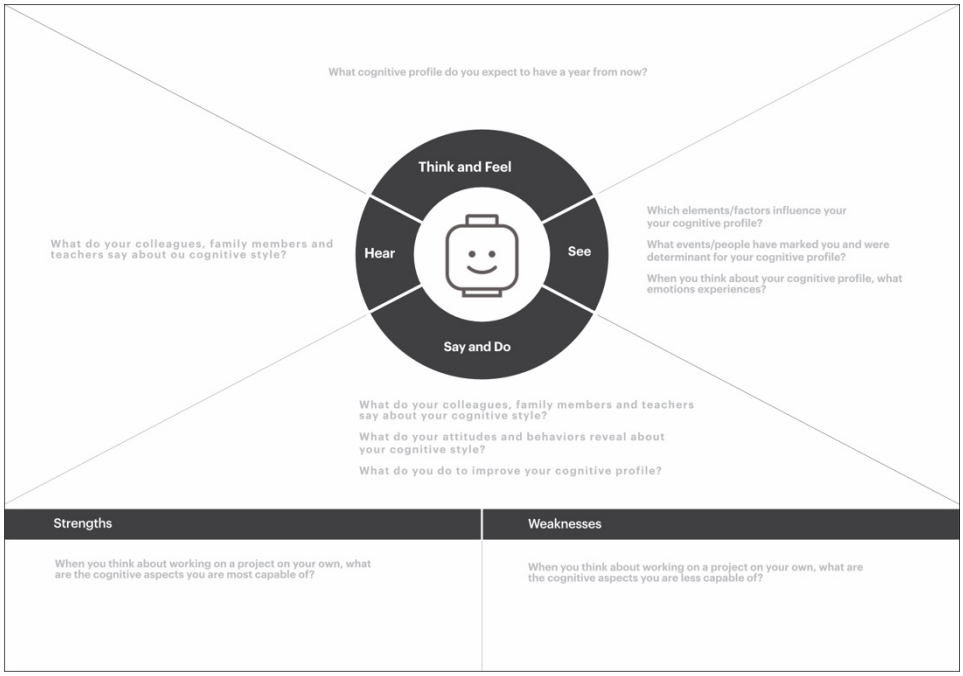


Figure 3: Empathic map template

Lesson two was facilitated by an invited researcher, a DS specialist who explained the DS concept, exposed the ingredients for a good story and exemplified the use of DS tool to create a digital curriculum. The visualization of DS examples designed and built by students in the scope of a course unit motivates the students for the proposed DS activity.

Students were encouraged to find a remarkable event or journey through life that illustrated personal characteristics that they would like to highlight. Once found, students write the first draft of their personal story. The task of writing the story script was assisted by the teacher in charge of the course unit, the researcher in the education area and the DS specialist invited for the session. After students generated ideas for their DS, the teacher/researcher/DS specialist team suggests the use of analogies and metaphors to enhance creative thinking.

In addition to the written text, the task requires students to carefully choose images to further illustrate the concepts they want to communicate. To empower the student with theoretical knowledge about communication through images, the teacher of the course unit prepared a theoretical lesson of one hour showing practical examples from the book "Pensar con imágenes" (Jardi & Costa, 2012) that demonstrate how images can be used to express and communicate ideas. All students had to create or take original images for their stories, and they could choose the type(s) of visual representation (illustration, photography, video, among others) they wanted.

In lesson 3, students start to collect original images/pictures/ drawings and generate ideas for communicating their stories. To organize the narrative flow, students design a storyboard with plans sequence, timings, transitions, voice-over text, and soundtrack. Figure 4 shows a storyboard delivery for one student. All students were advised to make a storyboard, which

was also an element of the assessment, however, some students preferred to start working on the video editing software straight away.

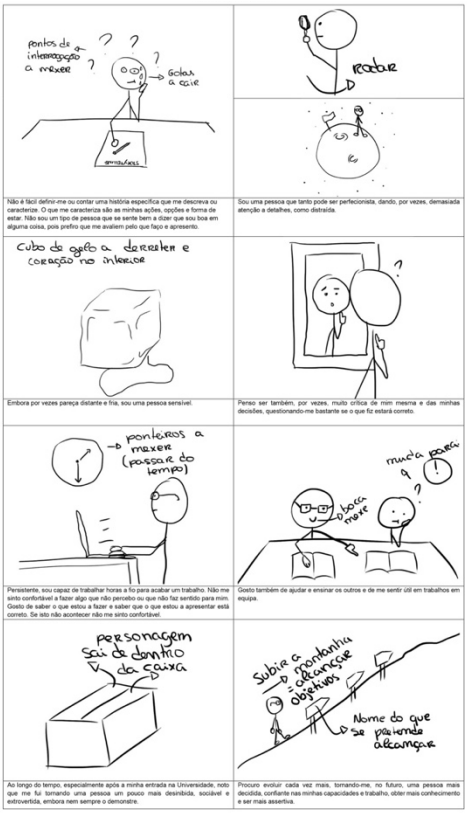


Figure 4: DS Storyboard describing the animation flow and the voice-over

In the last lesson dedicated to the activity, the students did the DS video edition and delivered the first version of their personal narrative. Students used digital technologies and computer software such as Movie Maker or Adobe Photoshop to create and build their videos.

After the delivery of the video's first versions, students were asked about the possibility of showing the videos to their colleagues in the classroom. Only one student didn't mind showing her work to the class, because she already shared it on social networks.

Students were free to choose what kind of visual language they would like to use. Some of them use animation mixing text with original illustrations (Figure 5) and others filmed themself as an actor (Figure 6).

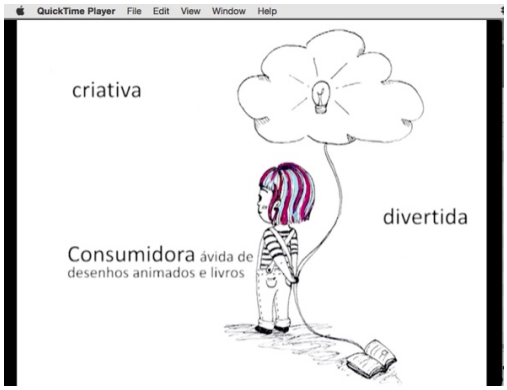


Figure 5 and 6: Pictures from students' DS

The deliverable videos were examined in a group session with the teacher in charge of the TC course unit, the researcher, and the invited DS specialist, where technical, formal, and content aspects were discussed. For each DS assignment, suggestions for improvement were proposed, which were then communicated to the students to improve the final version, to be delivered later. At the end of the session, the group discussed the rubrics that should be included in the DS evaluation grid.

In a later session, the videos were viewed by the same group of teachers involved in the activities developed in the previous semester's course unit Product Design and Development (PDD). After viewing the stories, the teachers were interviewed in a focus group session. The objective was to find out teachers' perceptions about the suitability of the DS as a tool for students' self-reflection about their cognitive profiles.

To assess the evolution of student's perception of their cognitive profile along DS activity, the students filled again the Cognitive Profile model (after DS activity). In the end, students' perceptions regarding the interest of the DS and its suitability to the objectives set for it were also collected. The infographic in figure 7 systematises visually the whole process of the proposed DS activity.

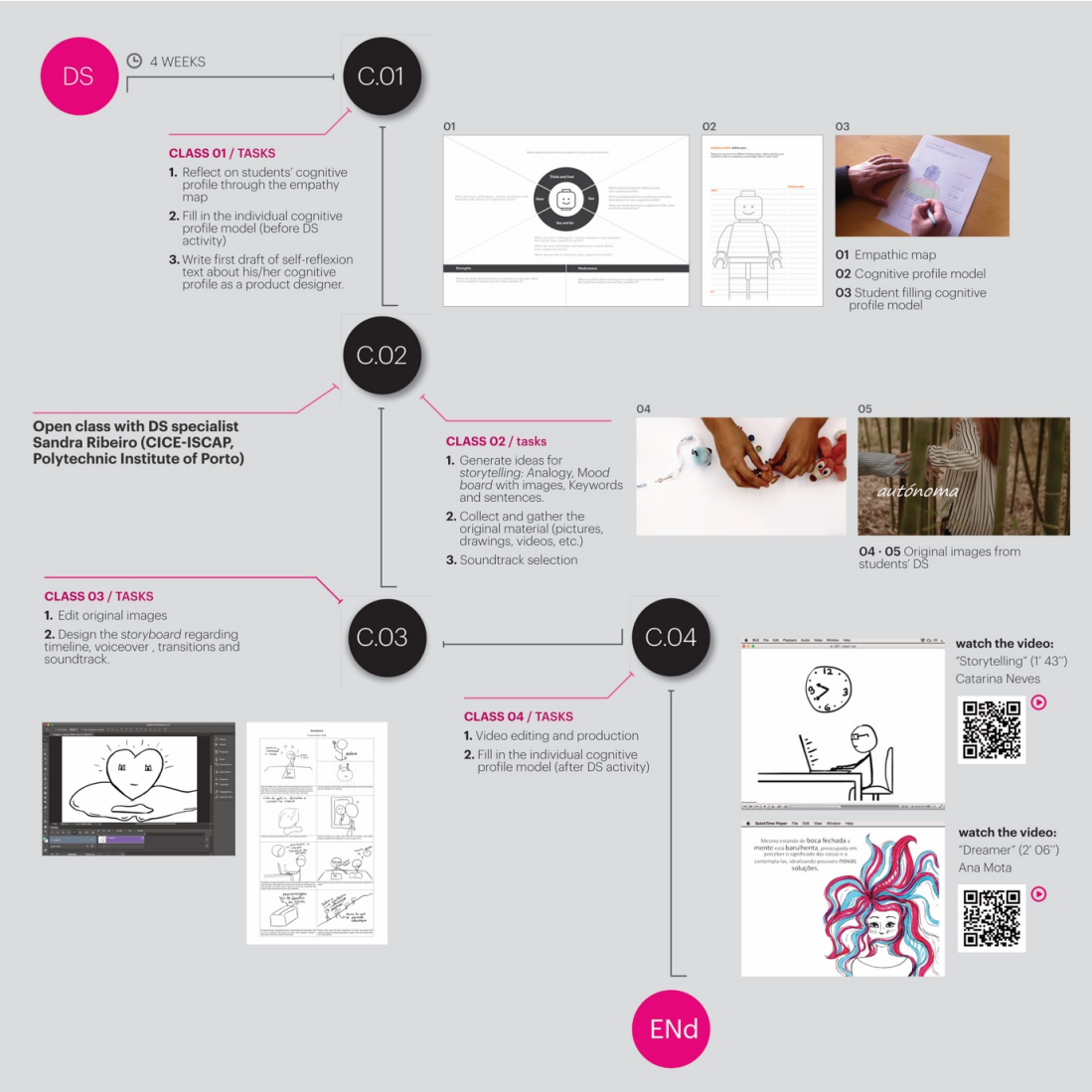


Figure 7: Infographic of DS intervention

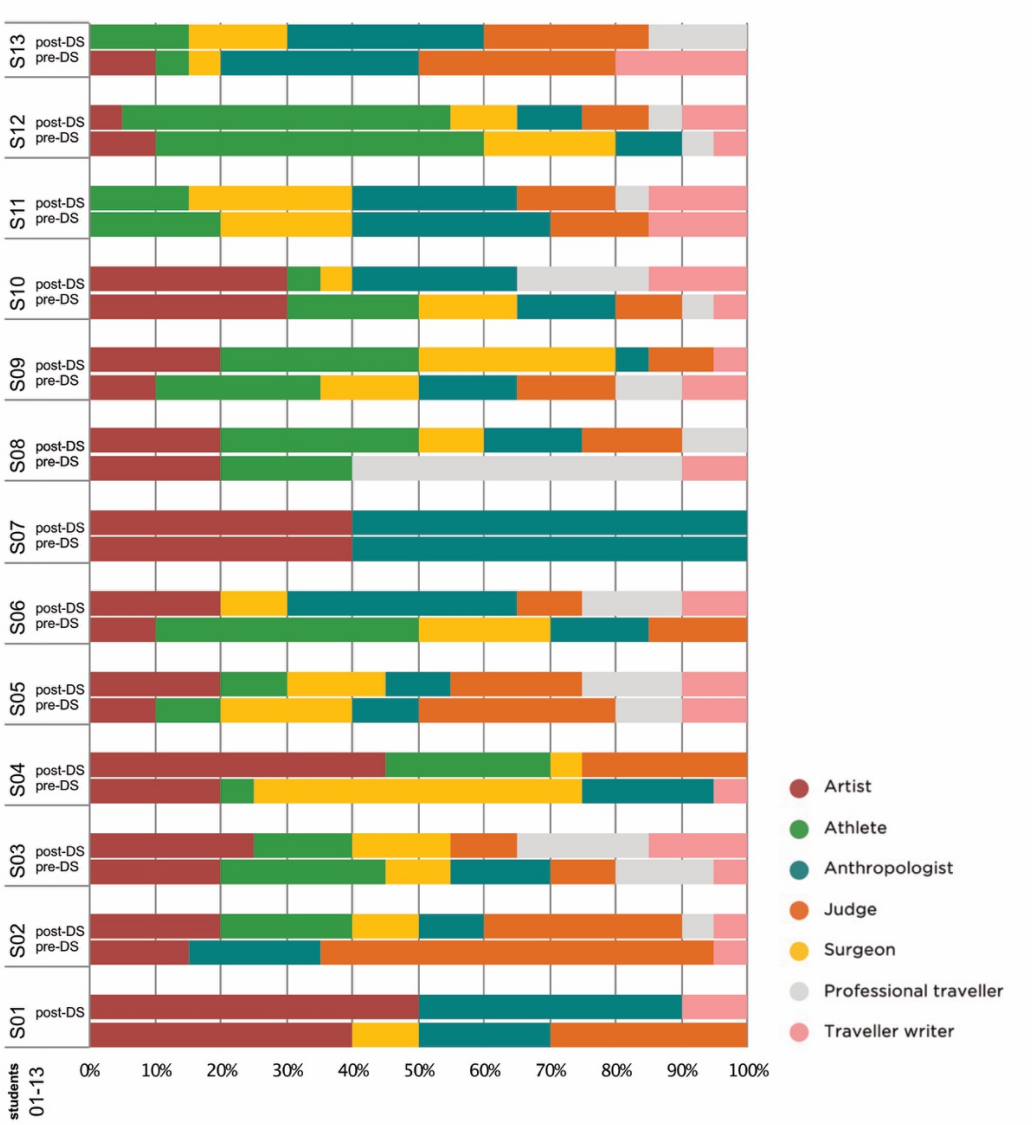
2.3 Students' perceptions about DS activity

Students who simultaneously participated in the DS activity and in the intervention that took place in the course unit of the previous semester, only 16 responded to the questionnaires carried out before and after the activity. After the activity, the students responded to five questions, on a scale from 1 to 5, they rate their perception about the effect of the DS activity on their ability of self-reflection, self- knowledge, and cognitive profile as future designers. Table 3 shows the averages of the responses collected. In the DS activity questionnaire, the topic best evaluated by the students was the contribute of the activity to the perception of their strengths as future designers. On the other hand, they considered that the activity contributed less to their self-knowledge. However, in both cases, the values were very close to the central value of the scale.

Question	Mean	Pattern deviation	Mode	Median
DS activity promoted my capacity for self-reflection	3,23	1,01	3	3
DS activity helped me to better define my cognitive profile	3,00	0,91	3	3
DS activity contributed to self-knowledge	2,92	0,95	3	3
I have a better perception of my cognitive strengths as a future designer	3,31	0,63	3	3
I have a better perception of my cognitive weaknesses a future designer	3,23	0,73	3	3

Table 3: Students' perceptions about DS activity

Graphic 1 shows the individual perceptions of the 13 students (S1 to S13) who responded validly to the Cognitive Profile model filled in by the students before and after the DS activity. In the beginning it was expected that, with the exercise of self-reflection provided by the DS activity, the cognitive profiles would weaken, i.e. that students would be able to fix their cognitive profile around a smaller number of thinking styles, this did not happen for most of the students. On the contrary, some students identified themselves with a greater number of thinking styles after the activity. Except for one (S7), all students changed their perception of their cognitive profile with the DS activity. However, the analysis of the graphic does not evidence any overall trend, which reinforces that the activity was experienced differently by each student.



Graph 1: Students' perceptions, before and after DS activity about their cognitive profile

Without having used explicitly the cognitive styles proposed, students have managed through their exercise of self-reflection, to trace and communicate a personal and unique cognitive profile, that can be related to the type of thinking that is required during a design project. Among the 23 DS completed and evaluated, several students used a personal life event as a subject from which they drew attention to their personal characteristics, like having played a federated sport or scouting, having experienced adverse situations in childhood such as a move to a different country, adapt to another culture, bullying or other discrimination. Other students used more elaborate analogies like considering a designer has a kind of superhero. In some personal narratives the correlation with the thinking styles proposed in the taxonomy is evident:

> Empathic (Anthropologist) - *"A designer is a dream maker. (...) To make dreams come true dreams requires responding to several dreamers. It is necessary to understand others and put yourself and put yourself in their shoes."*

> Determined (Surgeon) - *"Persistent, I am capable to work long hours to finish a project (...) I also enjoy helping and teaching others and feel useful in teamwork."*

Imaginative (Artist) - *"Since childhood, creativity and imagination were always with me, occupying the always with me, occupying the space of silence (...) I found myself diving in a sea of ideas from which a story would emerge a story would emerge (...) a pencil and the empty side of already written already written to lose me in my mind (...) Even with my mouth closed my mind is noisy."*

2.4 Teachers' perceptions about DS activity

Teachers of Product Design and Development (PDD) course unit were interviewed in a focus group session aiming to collect their perceptions about the implementation of DS activity in product design education. They perceived the activity proposed to the students as a "good idea", especially with the intention of enhancing a situation that put students "thinking":

> *(...) putting a challenge like this (...) makes them have to think (...) This is a great idea so that they can have a better perception better understanding of what they are, what they want*

After viewing the personal narratives, their opinion was consensual about which videos have a higher emotional charge and that only six of the 23 fully met the objectives set for the task. According to all, the other stories fell short in what concerns the exercise of self-reflection that was intended to be encouraged.The teachers were unanimous in stating that, according to their perception, the activity worked only for some of the students.

However, the ability to self-reflect, confronting the way "a designer is supposed to think" with one's own cognitive profile - according to the teachers - depended more on individual and particular characteristics of each student than on the activity carried out. Thus, according to them, a possible reason why the exercise would not have worked for many students would be the level of maturity, experience and life journey of each one:

> *(...) it also has a lot to do with growth and maturity of each one of them. (...) I think that (...) it has to do with the course and life experience they have had up to now. (...) Some have had a life experience, hard (...) that made them grow up quickly. E others not so much.*

A second reason emphasized by teachers was that students generally do not respond well to tasks that call upon abilities which they are not used to mobilising. Finally, the teachers recognised that the proposed task based on self-knowledge was "not exactly easy" to do.

With regard to the use of DS tool, teachers mentioned as an advantage, the fact that students can only use original material:

> *It's another advantage, is that it has to be... everything has to be original (...) they have always, over the years, based their work on copy paste (...)*

and being a "strong" communication medium and be easily disseminate something useful for contacting future employers:

> *We were able to see things in these videos that we wouldn't be able to see in an interview. It gives us much more information than looking at CVs or interviewing the person for half an hour. interviewing the person for half an hour.*

In the case of some videos, the teachers were surprised by life stories they had no awareness, changing their perception about the student and, in part, explained the attitude and performance of some students:

> *And this is also a warning for us, not to get into wrong analyses of people. As teachers (...).*

3. Findings

Students' narratives focused on remarkable personal life experiences or academic involvement. Some DS show a significant emotional charge, others highlighted singular characteristics like resilience, determination, creativity which may be appreciated and valued by a future employer. Some students showed a certain resistance in doing this work probably because they were not able to establish the relationship between the proposed activity and the objectives of the course unit, or simply didn't find the DS activity interesting. Noteworthy that it was the first time that a DS tool was proposed in the scope of the Communication Techniques (CT) course, this "novelty" surprised the students more reluctant to change.

The requirement to use only original material (pictures/text/ illustrations) was a problem for some students. The work did not leave room for "copy paste" and only source of information was the students themselves. They had to "turn to themselves" to find for material.

This resistant position, adopted by some students, seems to have ended up determining the overall perception of the class. Students and teachers' perception's revealed that the activity did not work effectively for all students and most of the students did not feel comfortable showing their stories to other colleagues. The presence of the external researcher, specialist in DS, was advantageous for students' motivation and very helpful in DS evaluation. From the research team's perspective, some narratives revealed unknown facts about the students, potentially explaining their attitude and performance. Overall, DS reflected the depth of the self-reflection process achieved by the students. If in some cases the exercise provoked evident discomfort, in others it seemed almost to respond to a need to tell one's own story.

4. Conclusion

Based on this first experience of introducing DS in Visual Communication Techniques course, the teaching/research team believes that, in addition to promoting digital, technological, and visual literacy (Robin, 2008), the DS presents itself as a learning tool with a huge potential in the development of self-reflection, writing, narration, information selection and thought structuring skills, among others. Jakes & Brennan (2005) emphasised the importance of listening to the student stories through DS, "Everyone has stories, including our students." (p.1), stories can break the ice and establish a closer link in the teacher-student relationship, highlighting difficulties of the students which are unknown to the teachers but somehow influence their performance in academic career and behavior in the classroom. DS is a tool students can use throughout their lives to tell stories and improves communication abilities. This kind of communication tools allows teachers to know their students better identify problems that maybe blocking student's learning.

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