

Creating inspiration by developing digital mood boards in student teams

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Mood boards have notable potential to serve as inspirational tools in design. However, we still do not fully understand how mood boards are created utilizing material found online in collaborative educational settings. The purpose of our study is to deepen our understanding of both team design and the creation of shared digital mood boards through a qualitative analysis on how three student teams created shared mood boards using computers, and how they gathered inspirational material from the Web. We discuss how the creation of a shared mood board is a complex process, including deepening and broadening cycles, where a key idea is either explained more thoroughly, or then expanded with additional, related ideas. In relation to mood board ideas, the teams decided the specific keywords to be used to gather images online, balancing the design constraints, with an intuitive yet systematic way of working. We encourage to acknowledge a digitally created mood board as a collaborative method for creating meaningful starting points for designing, and for finding inspiration outside the direct design problem. Our study provides information which is beneficial for developing pedagogies that include collaboration and the use of online inspirational material.

Keywords: team ideation; mood board; sources of inspiration; online material; metaphor; design education

Introduction

When developing new ideas, a designer needs a spark of inspiration. Previous studies have discussed specific sources of inspiration, their role and use in design (Eckert & Stacey 2000; Mete 2006; Omwami, Lahti & Seitamaa-Hakkarainen, 2020), as well as the kinds of activities designers engage in when seeking inspiration (Biskjaer et al. 2020; Gonçalves, Cardoso & Badke-Schaub 2016; Mougénot et al. 2008). Prior literature has considered the usage of mood boards as a tool for seeking out inspiration, and for problem solving in design and design education (Cassidy, 2011; Endrissat et al., 2016; McDonagh & Storer, 2004; Omwami, Lahti & Seitamaa-Hakkarainen, 2022). Despite their acknowledged potential, we lack a systematic analysis on how mood boards are created in collaboration – thus one of the purpose here, is to illuminate this process. Additionally, while concrete objects are still used as sources of inspiration, searching for inspiration from the Web has become one of several ideation techniques used in design (Herring, Jones & Bailey 2009). There has been increased interest in how online sources are used to gain inspiration and in problem-solving in design (e.g. Koch, László, Lucero & Oulasvirta, 2018). However, research on the processes of developing and gathering digital sources of inspiration, especially in collaborative educational settings, is limited. Additionally, those involved in design and design education are always on the lookout for new ways of combining traditional and digital ways of working. Examining students' processes may provide valuable information for developing and enhancing pedagogies.



Our paper presents findings from a qualitative study aimed at investigating the collaborative design processes of 12 second-year university students in training to become craft-education teachers. In their profession, craft education teachers need to gain proficiency to teach design, collaboration, and different craft skills for all levels of education. We contribute to prior work by analyzing how 12 students, who were organized into three design teams, solved a creative task of creating digital shared sources of inspiration (i.e. mood boards) – a task that steered the novice designers to look for and utilize metaphorical and conceptual material, that could potentially break early design fixation in following phases of their design work (e.g. Jansson & Smith, 1991). Through an in-depth systematic analysis on each student teams process, this study extends prior understanding of the potential of mood boards in design education, the creation of digital source of inspiration (e.g. Riikonen, 2019) as a collaborative process, and how online material is gathered for design work in educational settings (e.g. Biskjaer et al., 2020). To understand further how digital sources of inspiration, such as mood boards, are created and how inspiration found online is gathered in collaboration, we asked: How are mood board ideas generated and cultivated in design teams? How do ideas evolve as the work progresses? How do the teams gather inspiration material found online for their mood boards?

Related work

Team ideation and sources of inspiration

Design is an intricate and multifaceted process, wherein several stages are repeated until a desired outcome is gained (e.g. Lawson, 2006; KhakZand & Babaei 2018; Xiao, Luo, & Li 2022). According to Johnson (2005, p. 613) the ideation phase of the design process involves the generation, development and communication of ideas, where an idea ‘is understood as a basic element of thought that can be either visual, concrete or abstract’. These emerge gradually as a process, where previous ideas influence and stimulate future ones (e.g. Gonçalves & Cash, 2021). This requires the creation of different alternatives (i.e. divergent thinking), and reduction and selection from those alternatives (i.e. convergent thinking) (e.g. Cropley, 2006).

In collaborative design, team members actively communicate and interact, for example, to identify constraints, share ideas, make deliberate joint decisions, re-interpret and modify solutions and generate shared design artefacts (Hennessy & Murphy, 1999; Lahti et al., 2016). Creating collaboratively can have a positive effect on the development of a new product (see e.g. van Dam et al., 2021), but actually to work together requires skills in forming a common understanding of the whole process (e.g. Valkenburg, 1998). To overcome barriers to working together and understanding each other, members need to ask questions and give feedback to one another (Cash et al., 2017). However, not everything depends solely on individuals’ communication skills. In collaborative design projects, materiality (e.g. working tools, images) plays an active role in facilitating and directing communication and group ideation, as discussed in recent literature (Ball, Christensen, and Halskov 2021; Heiss 2020; Luck 2007; Khunyakari, 2021). In turn, also abstract elements can support communication. In their study, Graff and Clark (2019) discuss how working with metaphors support communication in collaborative design by improving knowledge sharing, joint understanding and individual learning.

At the early, ideation stage of the design project designers usually choose a direction for their work by collecting and selecting external stimuli – sources of inspiration (e.g. Eckert & Stacey, 2000; Gonçalves et al., 2014, 2016; Petre et al., 2006). The influence of sources of inspiration, mainly in the form of visual images, has been recognized in several design disciplines. While anything, whether material or immaterial, can inspire the birth and realization of a design (e.g. Mete 2006), visual objects have proven to be a source that can be interpreted in various ways (Eckert & Stacey 2003; Omwami, Lahti & Seitamaa-Hakkarainen, 2020; Petre et al. 2006). On the other hand, utilizing visual information may have a dual effect on ideation – relying on visual objects increases the risk of blocking the search for new inspiration, and may prevent the exploration of new possibilities (see Jansson & Smith, 1991).

Additionally, prior studies have addressed the variation between novices and experienced professionals in how much and what inspiration is utilized for creative work. For example, Mougenot, Bouchard and Aoussat (2008) argue that novices need more inspirational sources and pre-research, whereas experienced designers may rely more on their previous experiences and designs.

The exploration and curation of sources of inspiration are guided by diverse conditions, tools, and constraints. This study specifically delves into the realm of visual inspiration, examining how it is sourced from the vast expanse of the internet. Biskjaer et al. (2020) studied the strategies employed by novice designers in gathering inspiration, shedding light on the impact of task constraints on the research process. Their findings revealed that design students employed distinct strategies when seeking inspiration from Google, with the level of task constraint influencing the divergency of the search process. Notably, the less restrictive the constraint, the more divergent the exploration of sources of inspiration becomes. However, Biskjaer et al. (2020) point out that an increase in the quantity of material gathered did not necessarily translate to a higher number of generated ideas.

Gonçalves et al. (2016) studied how designers gather inspiration from a specific online search tool tailored for the use of their study. Their insights underscored that the search for online inspiration typically commences by framing the search with a specific 'keyword,' offering designers a directional beacon (also noted by Mougenot et al., 2008). While designers may vary in the way how carefully they specify these keywords, finding the right keywords emerges as a crucial step in the searching process as highlighted by both Gonçalves et al. (2016) and Mougenot et al. (2008). Moreover, the choice of media for inspiration may determine the way inspirational sources are sought and selected. Examining designers' information-gathering practices, Mougenot et al. (2008) observed distinctions in how internet and printed magazines are utilized. According to their study, the number of images retrieved from online sources, was comparatively lower than that from printed media.

Mood boards in design education

A mood board offers a visual, sensorial, and abstract method with which to ground the design process (Cassidy, 2011; Endrissat et al., 2016; Garner & McDonagh-Phillip 2001; Mcdonagh & Storer, 2004). Given its abstract nature, a mood board may encourage the designer to design with metaphors (e.g.s Omwami, Lahti & Seitamaa-Hakkarainen, 2022), a quality recognized for its potential value in enhancing creativity (Gonçalves et al. 2014; KhakZand & Babaei 2018). Described by McDonagh & Storer (2004, p.18) as 'a collection of abstract media (e.g., images, textures, forms)' with 'complex and multiple functions', mood boards become a dynamic and multifaceted resource for creative work.

Cassidy (2011), who has studied the creation of mood boards by individual design students, emphasizes the dual nature of mood board creation as both subjective and objective – an iterative process coupled with creativity. Starting from a brief, the process unfolds into an explorative, stimulating and unrestricted generation of initial inspiration, followed by the actual development of the mood board and the collation of media. To achieve innovative solutions, the development of the mood board necessitates a 'deeper level of engagement', the ability to evaluate and analyze possible solutions in relation to a given problem (Cassidy, 2011).

Method

The research setting, study participants and data

The data for this study was collected from the 'conceptual design' section of a 15-week long, 'inventing and craft design' course, held at a university. Overall the course consisted of three sections (conceptual design, modelling, and production), targeted for second-year craft teacher students. The aim of this 15-week course is to teach the students the basics of conceptual design and its applicability in craft projects. During the course students are assigned the task of creating a shared mood board in teams, and individually designing and preparing an outfit based on the board.

The conceptual design section begins with a short introduction to the basics (i.e. ideation, inspiration, visual tools) in one lecture, followed by the first course assignment of creating a digital mood board collaboratively in a 90-minute team design session. The assignment included two requirements: a title for the mood board and a stipulation that imagery of clothing-related material must not be used. All of the course students naturally organized themselves into teams of three or four, and each team was given an assignment to create a mood board using digital tools (i.e. computers, iPads, and mobile phones). From the course, three teams (n=12) of second-year craft teacher students voluntarily participated in our study, and were given the same assignment for creating a mood board. All of the data was collected from the design sessions of these three teams, named for the purposes of this study as team Pearl, Summer and Sprout, based on the names of the mood boards the teams created ('Pearl of a Year', 'the Finnish Summer' and 'the Sprout').

For our participating teams, we provided a room to work in where they had access to three computers and their own digital tools. Each team was called in separately for their 90-minute mood-board creation session. During these sessions the teams did not have any interaction with the course teacher. To ensure rich and reliable data, the teams' sessions were video-recorded from a wider and closer perspective using two Go Pro cameras with microphones. One camera was positioned to record working from above, one from the side. In addition, to capture the construction of the mood board and the inspiration gathering happening on the computer, we used Screencast-O-Matic software that recorded the work in real-time. Team Pearl's sessions lasted approximately 52 minutes, team Summer's approximately 90 minutes, and team Sprout's around 63 minutes. Altogether, the data consisted of nine hours and 59 minutes of video recordings, plus the final three mood boards developed by the teams.

Method of Analysis

We conducted a data- and theory-driven content analysis of the video data (e.g. Hsieh and Shannon, 2004), inspired by group interaction analysis with an artefact dimension (see Jeong, 2013). Overall, our analysis concentrated on: team interaction, the mood-board creation process and searching for and gathering images. Each phase of the analysis was an interactive process with the data, including the examination of the team's interaction with each other and the material objects (e.g. the mood board, working tools, and visual objects). We simultaneously monitored the video-recordings of both the wider perspective of the teams working together and the screen-capture recordings to ensure an in-depth view of the processes under examination.

Analyzing mood-board creation and team ideation

The first phase of our analysis was conducted on two levels and concentrated on answering the first research questions: how mood-board ideas are generated and cultivated, and how ideas evolve as the mood-board work progresses. To enable the analysis of team ideation, we began by creating a holistic view of the teams' mood-board processes. We started by going through each team's sessions to gain an initial understanding and then tagging moments that seemed relevant to our research questions. The unit of our analysis was defined as an idea suggested by team members (verbal or non-verbal) and/or an action (e.g. looking at the assignment paper, organizing the work, selecting or adding images for the mood board). We systematically analyzed the main design activities and their content from the video, working with earlier theories of collaborative design and mood-board creation. The main design activities were then divided into nine categories and 14 contents (Table 1). Based on these observations, we created process networks using Cytoscape (3.8.2) software. These visual process networks illustrate the iterativity of the creation process but also show the activities and their content (appendix A & B).

Table 1

Explanation of the symbols and colours used in the process networks, and the categorization of the main design activities and their content.

The main design activities – symbols and lines in the network	
∨	A key idea
○	Presenting an idea
◇	Referring to the design brief (i.e. reading the given task, reference to the course material or the course assignment)
□	Analyzing and/or interpreting and/or evaluating (e.g. analyzing the design constraints, interpreting an idea or content)
⬡	Testing (e.g. testing technical features of a presentation application)
△	Organizing the process: e.g. what, how, who and/or when?
▭	A joint decision (e.g. selecting a way to continue working, jointly selecting an idea with what to continue)
◻	An idea that was rejected or not included in the final version
→	The arrow illustrates the chronological order of the design moves
-----	The line between the nodes illustrates the connection between the ideas or the activities
The content of the ideas and/or activities - colours in the network	
	The initial ideas (brainstorming)
	Related to platform or the search engine
	Associative additional inspiration (verbal content)
	Visual inspirational material
	Technical features, technical functionality
	The larger theme or the name
	The layout and visual organizing
	Related to initial outfit ideas
	The design task or the nature of a mood board
	Finalizing the work
	Color -theme
	Audio material
	The mood of the mood board
	Constraints

The second level of analysis focused on the evolution of the mood board ideas. Here, we conducted a second round of analysis using the videos, now also reflecting on the process network and first-round observations. We started by analyzing how the students understood the mood board assignment. This provided insights into the starting point of the teams’ processes; i.e. the initial ideas that *opened* the students’ processes-and all the ideas or activities that followed. We also focused on the role of visual sources in the teams’ ideation. We systematically examined each idea, and continued to analyze their connections and evolution one by one. All of the interpreted connections between ideas that were

included in the process networks were marked using a dashed line. To analyze the connection between ideas, we applied theories regarding *key* and *anchor* ideas (see Laamanen & Seitamaa-Hakkarainen, 2014). Ultimately, we identified that the teams reinterpreted and analyzed previous ideas as part of the process to determine which ones would be selected for further development. The teams proceeded to either *deepen* these selected ideas by providing more detailed explanations, or by abstracting and merging interconnected ideas/themes. Alternatively, they *broadened*, and enriched the idea with new, yet related ideas.

Analyzing inspiration-gathering

The first phase of our analysis provided an overview of the mood-board creation process and team ideation. Nevertheless, it fell short of addressing our final research question: how do the teams gather inspirational material online? To tackle this, we conducted a fresh round of video analysis, specifically focusing on computer-based work and examining the connections and relations between ideas and images. We first analyzed moments from the mood-board processes where team members worked with images (marked as yellow in the process networks, appendix A & B). From these moments, we analyzed the actions performed on the computer, the flow of images together with team communications. The objective was to identify whether the teams formulated any plans for their image search, the nature of these plans, and how they put them into action. This enabled us to discern the fundamental practices employed for material gathering and the criteria that the teams established for their image search; i.e. how the mood-board idea should be explained through images, the constraints placed on the image search, what keywords and search engines were used, the roles these played in the process, and what images were selected.

Results

Team mood-board processes and the opening, broadening and deepening of ideas

The collective creation process of the shared mood board engaged the three student teams in an iterative and creative, divergent-convergent process. Based on our analysis, each team's process included the same kinds of activities and contents, such as presenting ideas, analyzing and evaluating them, organizing the process or testing technical features. The teams created mood boards that consisted of images gathered from the internet, and written material that was presented on a digital platform (Figure 1).

Overall, the processes consisted of deepening and broadening cycles, in which the teams explored the mood board task and its solution or possible options (cf. Cassidy 2011, 237). At the beginning of the creative work each team organized their group around one computer and discussed the task at hand. They reflected on the course material about conceptual design and mood boards, aiming to develop a shared understanding of what was required from the task and to clarify the definition of a mood board. The teams arrived at the realization that their objective was to create something inspirational. This notion of crafting an inspiring entity opened the team's idea space, acting as a guiding anchor (cf. Laamanen & Seitamaa-Hakkarainen, 2014), for each team. It not only set the context but also provided a clear direction for their creative mood board work. Additionally, while negotiating the task, a constraint emerged for teams Pearl and Summer: that the end result should be broad enough and ambiguous.

First, the teams started by broadening the idea for the mood boards by proposing initial ideas and themes related to what the members individually found inspiring (Table 2). These initial ideas, conceptual and metaphorical in nature, acted as key ideas. The teams documented these ideas onto their selected templates; team Pearl utilized Sway, while teams Summer and Sprout crafted their mood boards using Word. Subsequently, a deepening cycle followed, in which each team paused to analyze and interpret their initial ideas, aiming to identify common threads among them. Reflecting on the assignment and

the ideas documented on the platforms, each team engaged in negotiations to determine a potential overarching theme for further processing. As an example, team Pearl concluded that ‘a year’ could be the theme for them. At this juncture, team Sprout, despite their rigorous discussions about possible connections between initial ideas, did not verbally settle on a single theme. Instead, they introduced few additional ideas influenced by the thoughts they had shared.

Figure 1

Top left and right, a screen shot of team Pearl’s mood board. Below left, part of team Summer’s mood board, and below right team Sprout’s mood board.

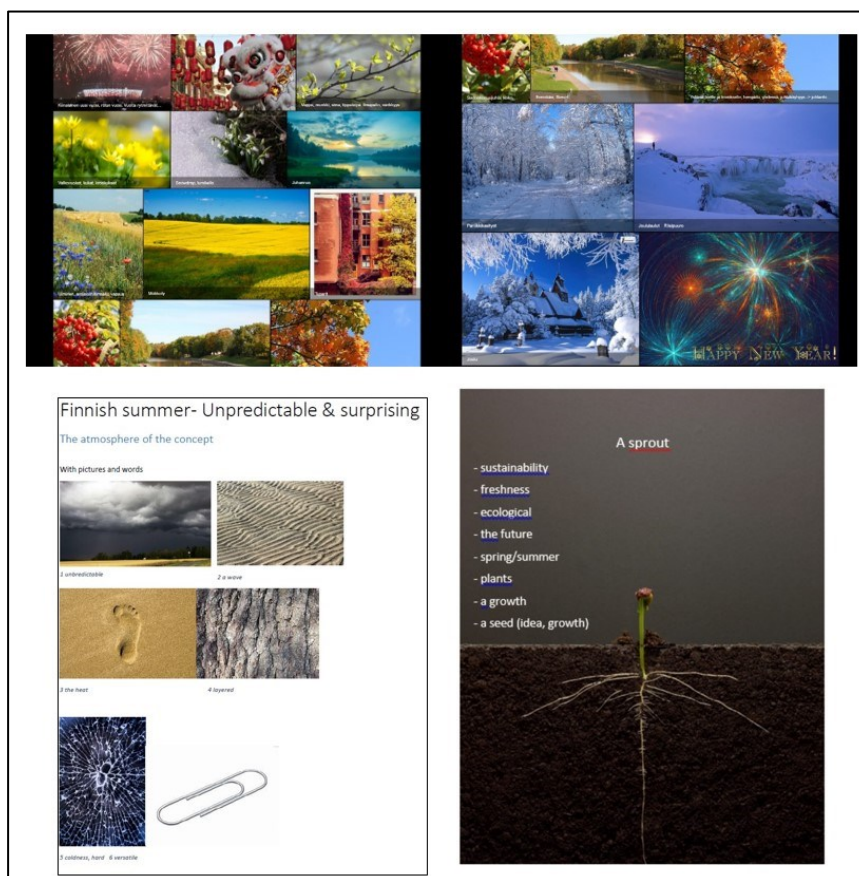


Table 2

The initial ideas generated by the participating teams that seem to broaden the mood-board idea.

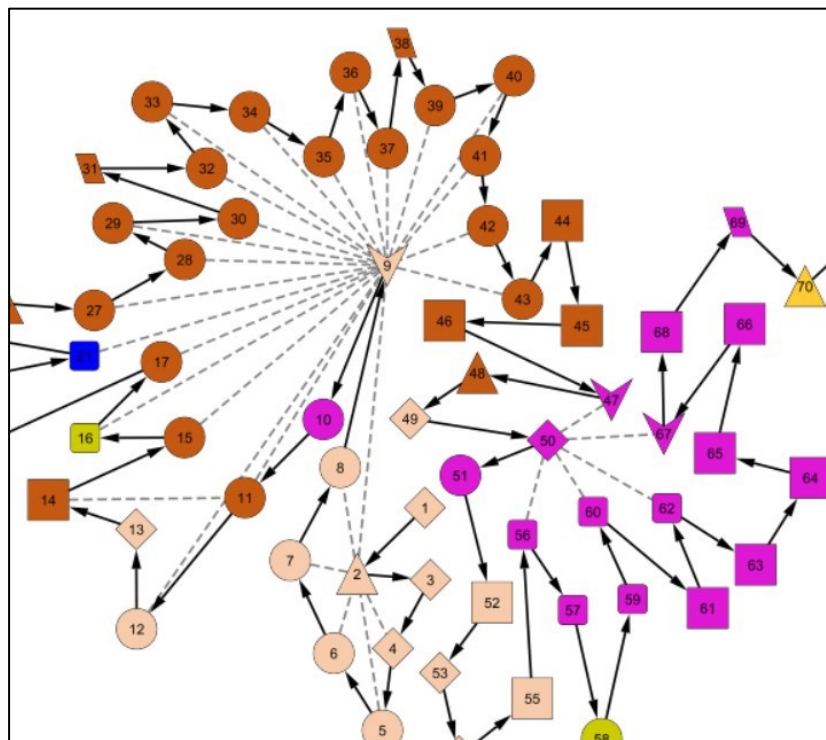
Team	Initial ideas
Pearl	Horse, year 2020, late spring, cool air, brightness, coming to life, acrobatics, mounted archery, summer, colors, plants, scents, multisensory, metropolis, city lights, hustle and bustle, extreme ends, botanical garden, countryside, nature, forest
Sprout	Fresh, light, summer, sustainable, hard-wearing, workers, ecological, zero waste, versatile
Summer	Warmth, urban, urban nature, soft, cold, sharp, different, unique, wave, wave-like, simple, layered

In Figure 2, we depict a segment of Team Summer's creative process. During this phase, the team generated initial ideas (brown color code in the network) to broaden the primary idea of a mood board as inspiration (Node No. 9). Subsequently, they progressed to deepen the initial ideas to abstract a larger theme (marked as bright purple). Moreover, to illustrate the method employed by team Summer in creating their larger theme 'Finnish Summer' within the deepening cycle, an excerpt from their conversation is presented below.

- student 1 --a one word that could be the main [theme] or the name where each could draw inspiration"--
- student 3 --with what kind of activities and situations this idea could be related? Like season or something?--
- student 2 Well, like winter or outdoor.
- student 3 -- we could like include, for example, a season, which would also define our idea a bit, but still have all the colours and shapes and temperatures and all, that are now kind of there [refers to the initial ideas written onto the board]--
- student 3 --what about the opposites of winter and summer?
- student 4 But it [theme] has to form a unity.
- student 3 Because we already have these contrasts here [referring to the initial ideas].
- student 3 --yeah, like reflecting on contrast and controversial [initial ideas], they seem to already be a part of our mood board--
- student 4 -- the concept of Finnish Summer---

Figure 2

A screen shot of team Summer's process network with opening, broadening and deepening cycles.

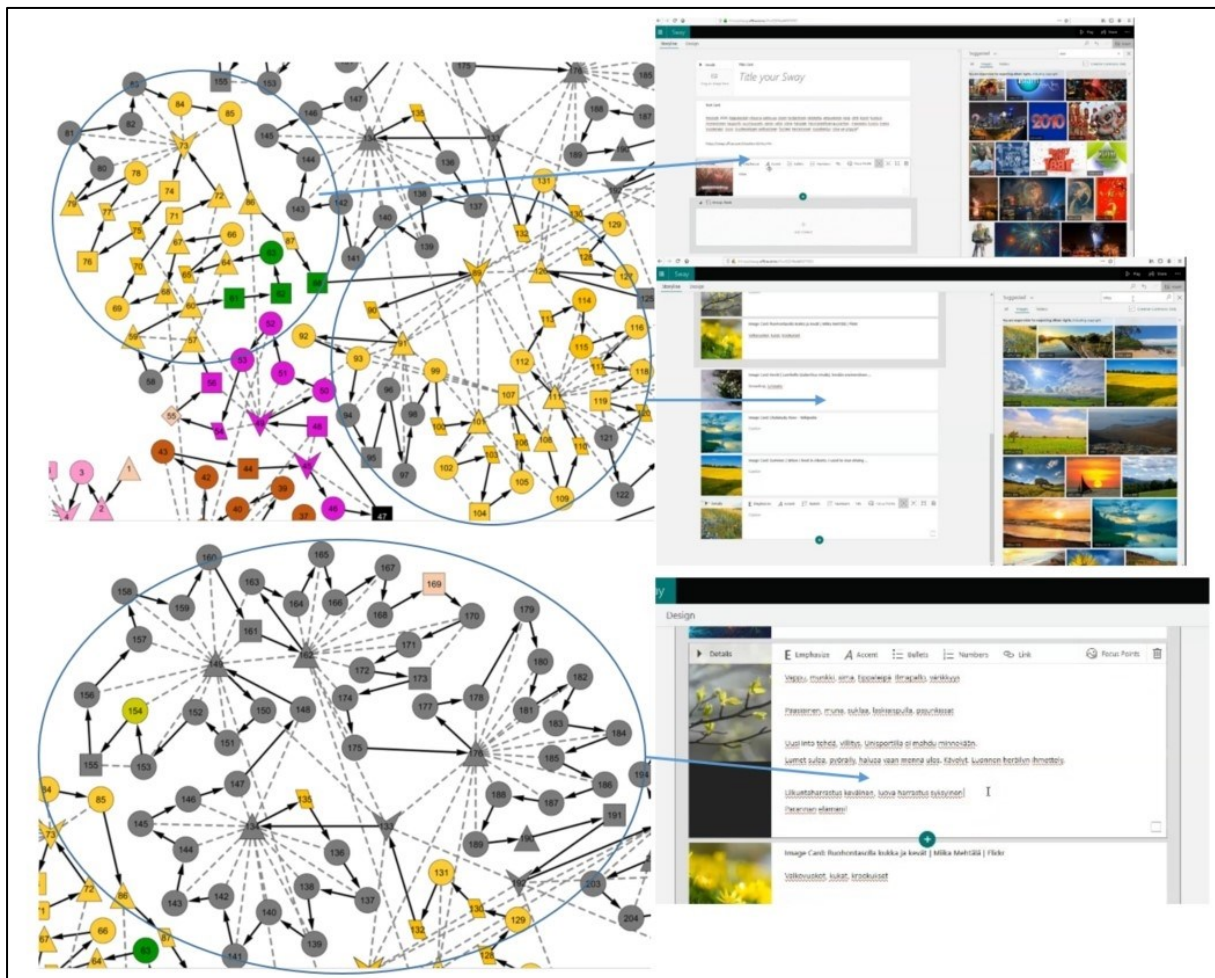


Team Pearl initially broadened the idea of 'a year' by incorporating three images. Following the evaluation of the idea, the team decided to expand it by broadening 'a year' into the four seasons through

the use of images. Deepening cycles followed, during which the team systematically concentrated on each season individually. This involved gathering additional associative inspiration pertaining to hobbies and seasonal festivals, as illustrated in (Figure 3).

Figure 3

Top left and right, and center right; team Pearl broadened their theme year with four seasons and images related to each season (yellow). Bottom left and right; an example of deepening cycles with additional, associative inspiration (dark grey).



Similarly, team Summer deepened their idea (Finnish Summer) with metaphors and explanatory images that also influenced the creation of additional inspiration; ‘thunder’ and ‘lightning’. Team Sprout’s process seemed to find novel directions during the image search. With this team, the determination of the main theme of the board underwent evolution during the image-gathering phase. Aligned with their recurring discussions on ‘ecological’ and ‘sustainable’, the team generated supplementary and broadening ideas, such as ‘lawn’ and ‘grass’. As they navigated through the image searches, they engaged in ongoing negotiations regarding their initial ideas, ending up with refining the idea of a ‘Sprout’ (Figure 1). Each team member shared personal memories and values, evidently influenced by the images and in connection with all preceding ideas. The quest for material for the board appeared to nourish the teams’ thought processes, fostering reflective discussions about their work (cf. Garner & McDonagh-Philip, 2001; McDonagh & Storer, 2004). Additionally, the tangible and visual

representation of ideas facilitated team dialogue by offering contextual reference points and serving as 'material anchors' (cf. Ball et al., 2021).

A deepening cycle concluded each team's ideation processes. Once the teams reached a consensus that they had gathered sufficient material, they proceeded to evaluate and interpret the work to comprehend the interplay between the ideas and the material content. After engaging in a back-and-forth exchange of different ideas for a descriptive title, each team agreed on a title unanimously approved by all members. Before submitting their finalized assignments, the teams executed some visual organization and made final adjustments. It's worth noting that at this stage, the teams refrained from further interpretation or discussion of their ideas

The reciprocal nature of image search

Our analysis shows both similarities and differences in how the teams gathered material for their mood boards. Overall, the practice of gathering inspiration included the negotiation and selection of the search engine as well as the keywords, the activity of browsing the image supply, and jointly agreeing on what images are to be included in the mood board (cf. Gonçalves et al., 2016). Gestures and tools, such as computers and mobile phones, played a supportive role in the process by offering reference points and anchors. For example, team members would either point to an image on the screen or display it on a personal mobile phone, articulating their reasons for advocating the inclusion of that specific image.

For all our teams, a constraint set by the course task (i.e., excluding clothing-related material) guided them to seek inspiration beyond their design context right from the initial stages of the inspiration gathering process. Additionally, constraints that emerged during the process played a role in setting requirements for the search, helping the teams to navigate with the endless stream of images found on the internet. There were variations in how teams navigated these constraints. Team Summer, for instance, initially set the condition that their idea should not be represented relying on traditional landscape images. Despite this limitation, during the inspiration selection, they ultimately opted to include an image of a field, suggesting a degree of flexibility in their approach. On the other hand, Team Sprout steadfastly adhered to their stipulation of gathering only material that depicted ecological and sustainable growth throughout the entire process. It's noteworthy that in all teams, the common requirement persisted: to source material that served as inspiration, aligning with their collective understanding of the nature of a mood board.

The teams started with deciding which search engine to use, and then moved on to specify the keywords. The keywords suggested and selected were influenced by the idea of the mood board as an inspiration, along with considerations of all the initial ideas (Table 2). Disparities existed in the number of suggested keywords and the actual usage on the computer. Additionally, it's worth noting that the precise count of keywords employed by Team Summer remained uncertain, as they also utilized personal mobile phones in their search.

From our observation, nearly all of the search entries provided search results. Nonetheless, not every result was considered account by the teams (Table 3). Consequently, only searches that produced inspiration selected by the teams to be included in the mood board were here interpreted as successful. All the images amassed by the teams were still photos, and selected in accordance to the mood board idea, and based on each team's collective decision about their suitability and inspirational effect.

Table 3

The number of keywords suggested and used by the teams, and the amount of search results, and how many images were selected from these searches.

Team	Keyword suggested	Keywords used	Search results	Images selected
Pearl	16	9	8	17
Summer	28	19	19	8
Sprout	5	3	3	1

The process of gathering inspiration was not exclusively dictated or steered by our participating teams. While the teams were responsible for choosing keywords, the image search tool of the search engine also played a pivotal role in shaping the types of images presented. The search engines actively influenced the creation of additional ideas, guiding both the process and the teams' conversations. For instance, Team Pearl immediately opted to utilize keywords suggested by Sway (the platform offers image searches based on written content). However, their first keyword choice, "annual conception," provided no search results, prompting the team to reassess their approach in searching suitable material. This demanded organizational skills from the group to restructure the entire process. Subsequently, the team turned to the theme of 'year' for the search, simultaneously shifting their language from Finnish to English to enhance the likelihood of obtaining search results. An excerpt from the team's conversation is provided below:

- student 2 --there are the ones that Sway suggests [keywords for finding images through Sway]--
- student 1 Oh yeah, right!
- student 2 Let's pick some of those.
- student 1 Ok, which of these do you prefer [Sway suggestions]: shooting, forest, acrobatics, annual conception...?--
- student 3 Let's start with annual conception, it would be fun! [No results]
- student 1 Ok, can we go back?--
- student 2 --maybe we should write something else, and possibly using English we would find [something] better.
- student 2 -- should we just write the larger theme year [as a keyword]?
- student 1 Yep, let's see what we get.

This search concluded successfully, with the team selecting three images, enabling them to move on to the next search. They decided to explore material associated with each season individually, one at a time, thereby broadening the idea for the mood board. In iteration, they navigated back and forth, allowing images to guide them onto new paths. Intuitively, they selected images of seasons and seasonal content that they found inspiring. For the teams, the image stream not only guided the selection of media, but also played a role in influencing the creation of additional ideas and content.

Our analysis indicates that the quest for suitable material was intertwined with the clarity of the mood board idea and how the teams intended to communicate it. In the case of Team Sprout, the search for inspirational material seemed to initially pose some challenges, as there appeared to be a lack of a shared understanding regarding the essence of their mood board. The team first decided to convey their initial ideas using an animated image (GIF). In contrast to the other two teams, Team Sprout employed a more

focused approach, utilizing only three keywords for their animation search. This strategy indicated a greater willingness to let the search engine guide their search for inspiration.

As illustrated in their process network, the team sifted through numerous GIF animations, responding to the visual stimuli within the stream (e.g., seedlings growing, flowers swaying in a meadow), and dismissing several potential images (indicated as small rounded squares in the process network). Despite encountering several rounds of unsuccessful GIF searches, this iterative process appeared to assist the team in formulating the overarching idea behind their mood board. Throughout this search, the team engaged in discussions about their initial ideas, exploring the connections and the underlying philosophy. These discussions led to the realization that a simple 'sprout' encapsulated and illustrated all aspects of their deliberations. The crystallization of their main idea steered the team to adopt it as a keyword in their search. Entering 'sprout' to find a time-lapsed GIF accidentally resulted in the discovery of a still image that they were all pleased with (Fig. 1). This also underscores the influence of the search engine in discovering inspiration.

Discussion and Conclusions

The purpose of our study was to analyze the creation of specific sources of inspiration (i.e. mood boards) and how novice teams engage in inspiration gathering in an educational collaborative design setting. The findings highlight issues for further discussion regarding the collaborative development of shared mood boards using online materials. However, it's essential to consider the limitations of the current study. The data was gathered from only three teams and analyzed qualitatively, and thus the concluding remarks drawn from the results should not be generalized.

Overall, our study highlights the complexity of the design process. As illustrated in the process networks, the collaborative creation of mood boards involved intricate, iterative cycles with both divergent and convergent phases, demanding systematic as well as associative ways of working together. Additionally, the creation of the shared mood boards was characterized by an abstract and metaphorical level of working, and intuitive interaction with tools and inspirational material. As explored in previous literature, the mood boards served as an inspiring tool for the student teams to create collaboratively. Steen (2013) describes co-design as co-inquiry and imagination, where individuals 'move from the outside world and others to the inside world, so that they can be curious and jointly learn' and 'move from the inside world to the outside world and others, so that they can be creative and jointly bring about change' (p. 28). His notions reflect well with the collaborative creation of a mood board. When developed together, the mood board task encouraged the students to venture into the unknown, fostering an openness to new possibilities, simultaneously requiring the negotiation and integration of individual imaginations, preferences, and ideas. First the teams developed a key idea grounded in their understanding of the nature of the mood board. Subsequently, they delved into initial concepts that underwent successive cycles of broadening or deepening refinement. These iterative cycles pushed and motivated the teams to challenge and reconsider their designs, ultimately inspiring the generation of more unconventional design concepts (cf. Clancy et al., 2023).

The endeavour for new possibilities continued during the search for inspiration material that is a central part for the mood board development (cf. Cassidy, 2011). The search for inspirational material on the web, was a balancing act between the abstractness of the mood board, the design constraints, and the possibilities provided by search engines. The task's constraint of excluding clothing-related material, coupled with the abstract and metaphorical ideas, directed students towards explaining their mood board concepts with conceptual imagery. Despite setting boundaries for the process, these constraints did not impede unintentional exploration or the influence of visual elements. On the contrary, teams still managed to forge connections between different design elements, uncovering additional associative inspiration that enriched their mood boards with materials sourced online (cf. Omwami, Lahti & Seitamaa-Hakkarainen, 2022).

All of the teams collected varied amounts of visual sources, but since the images were collected in order to explain a metaphorical and conceptual idea, the amount of the material retrieved did not seem relevant for the team members. We argue that rather than merely focusing on the quantity of inspirational material, the attention should always be on what kind of material is considered compelling and evokes curiosity and interest. As Oleynick et al. (2014, 1) argue, inspiration is ‘a motivational state that compels individuals to bring ideas to fruition’.

Like earlier studies (e.g. Gonçalves et al. 2016; Mougnot et al. 2008), our study highlights the role of keywords in searching material from the Web. Determining keywords in our teams’ cases was entangled with the creation of the mood boards; if the ideas weren't sufficiently crystallized, the search encountered challenges. However, the search for inspiration and the assembly of the mood board using images found online weren't solely reliant on the team members' proficiency in choosing keywords. Conversely, the search engines actively shaped the process by presenting both possibilities and limitations, thereby influencing the teams' creative endeavors. Despite thorough discussions on selecting keywords to align with the mood board idea and constraints, the teams couldn't entirely control the material generated by the search engines. In addition, the organization of the process around a single computer not only enhanced team communication but also fostered the development of a shared understanding (cf. Ball et al. 2021; Heiss, 2020) – a shared work space appeared to create a shared mind. The “shared canvas” of the computer played a crucial role in helping team members to come together and harmonize their creative thought process, and in turning internal ideation into a collaborative, visual, and tangible conversation.

Our study provides information that is beneficial for developing pedagogies that include collaboration and the use of inspirational material. We illustrate and discuss the three focal elements (i.e. the opening, broadening and deepening cycles) of the creation process. While students are certainly capable of independent work, their creative processes could gain value from educational and instructional support, especially given the nuances of these diverse cycles. Furthermore, as teaching and learning practices in design, art, and craft education undergo transformation through the hybridization of traditional and digital technologies, educators could derive practical insights from concrete examples illustrating the integration of these technologies. The collaborative creation of a mood board along with a suitable level of constraint (see Biskjaer et al. 2020) provides a noteworthy tool for demonstrating and instructing traditional team ideation and concept generation using digital materials.

We argue that (computer supported) collaborative design, has the potential to create meaningful sources of inspiration. In particular, we emphasize the mood board as a collaborative method for generating inspiration beyond the immediate design problem, fostering the creation of meaning for the design right from the outset of the process (see Omwami, Lahti & Seitamaa-Hakkarainen, 2022). For novice designers in particular, initiating the process at a metaphorical level, potentially increases the richness of the process and the development of innovative solutions (cf. Gonçalves et al. 2014; KhakZand & Babaei 2018). The mood board, both as a process and as a design object, was not a ‘static, material entity’ but more an active ‘reflector’ and ‘a creator of meaning’ (Folkmann 2013, 217), influencing the students to create meaning for their collaborative work – a value-laden and metaphorical concept for their mood board.

This study delved into the intricacies of the creative journey involving the construction of a mood board and the simultaneous gathering of images. To conclude, while the analysis examined the process of creating a mood board and the process of gathering images as separate processes, in the real world the two cannot be taken apart from each other. In essence, they form a unified process of co-inquiry, wherein two interdependent and co-evolving processes (see Crilly & Moroşanu Firth 2019) co-exist and influence each other. Future studies should, however, acknowledge social aspects in creating shared sources of inspiration, such as a team member’s background and skills, and their possible effect on the

work. Moreover, to comprehensively understand the collaborative creation of a mood board as a multi-sensory, digital, and multi-material process, forthcoming research should extend its scope to encompass a broader range of techniques involved in crafting the board (such as coding and software applications) and diverse forms of inspirational material (such as electronic fabrics, concrete objects, and music).

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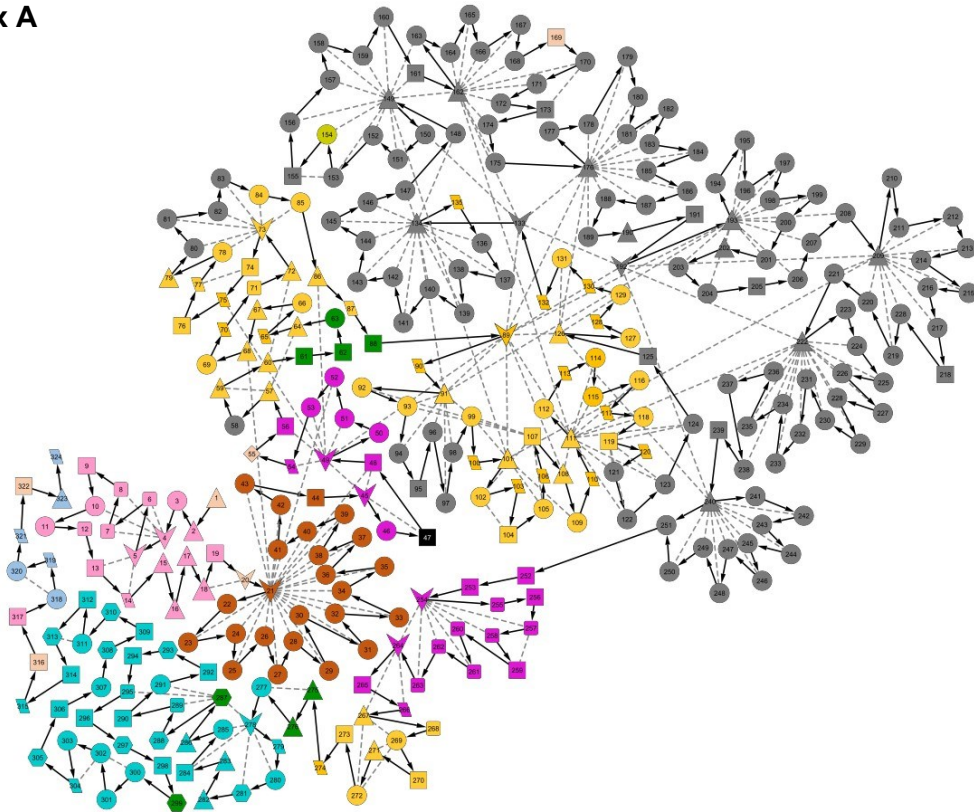
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Appendix A



Appendix B

