

The relevance and pertinence of Creativity and Innovation in the Design of creative processes

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Abstract. The main purpose of this study was to analyze and understand the relevance of the creative process in design. Using the poem "Esta gente", by Sophia Mello Breiner Andersen (1967), we sought to interpret the contribution of poetry as a means of creatively extracting the importance of improvement and change, relating, a posteriori, to the concepts of creativity, innovation and technology. A questionnaire was created in Google Docs, later made available online for access by higher education students (authors' contact network). The structure of the questions followed three essential aspects: creativity, innovation and technology. The use of poetry as a catalyst for the creative process was the starting point for developing this research study in Design. There was a very positive response from participants to the challenge presented to them, showing the authors the importance of creativity, innovation and the use of technology to the success of any company, nowadays and in the near future.

Keywords: creativity, creative process, innovation, artificial intelligence, technology, poetry, design

1 Introduction

This study arose from the need to understand the importance of the Creative Process, Innovation and Technology use for Design. Three concepts always seem to be interconnected - Creativity; Innovation and Technology; its contribution to the evolution of society in general and to the improvement of design, in particular, seems irrefutable. Artificial Intelligence (AI), increasingly talked about and considered by organizations, if used efficiently, could open new and unpredictable paths that allow for a significant improvement in procedures and aligned with the real needs of humanity.

In order to understand how students in the areas of communication and design perceive the importance of the creative process, authors decided to use a well-known poem by Sophia de Mello Breyner Andersen dated, 1967 („Esta Gente“). We asked participants to interpret some of the expressions used in the poem and relate them to the need to bet in creativity, innovation and technology so to promote positive and acceptable changes. We are currently living in difficult times: times of uncertainty, times of great change that constantly present new and complex challenges. There is an urgent need for the

ability to think differently, adopting the capacity for strategic planning, reflecting on the most appropriate and assertive technological and human skills to face a future full of challenges. The main questions of this study are (1) understanding the impact of the irreverence of poetry on creativity and innovation, and (2) how can technology, properly associated, influence the creative process in Design?

This work starts with a literature review on related concepts; we then present methodology, results' analysis, main conclusions and limitations.

2. Literature review

The concept of creativity, its importance and evolution over time is directly related to the need to develop something new or, at least, different and/or unknown until the moment of its appearance. For Brito (2023), poetry must be understood as the most sublime form of manifestation of subjectivity and feelings. A poem can touch individuals in an unquestionable way, establishing a break with the ordinary of everyday life (Andrews, 2018; Moura, 2019). Rolo (2013) associates creativity with different expressions used by researchers in the area, as well as cognition scholars: creative force; strategy; potential; cognitive process; capacity for disruptive thinking in a specific context; activity; problem solving process.

Creativity plays a fundamental role in Graphic and Editorial Design, being the driving force behind the conception of impactful graphic narrative communication projects. Authors such as Airey (2009) and Lupton (2016) corroborate the importance of creativity in this area. For Godin (2021), the magic of the creative process lies in the fact that it has no magic. In other words, when we talk about creativity, we think, first and foremost, about creative process(es).

In the context of creativity, Artificial Intelligence has been contributing significantly to creativity and co-creation through "prompting", rapid response capacity. AI tools and algorithms help to streamline the creative process by providing inspiration, as a result of rapidly accessing vast amounts of data to identify patterns and trends that can inspire new ideas and give good insights for co-creation projects. AI facilitates collaboration among different individuals and teams, since it provides a platform for real-time communication. Assertive project management is achieved by the rapid share of ideas, repetitive tasks automation, efficient organized information and their contribution for better decision-making processes (Santos, 2018).

The generative response, whether in text, image or other type of production, reveals a predisposition to be surprising, creative and original. In the current context, innovation is closely linked to technological acceleration. Advances in Artificial Intelligence in biotechnology and renewable energy are two examples of how AI can revolutionize entire industries. The rapid dissemination of knowledge and global collaboration have enabled and strengthened unprecedented coopetition between scientists and innovators. According to Dias (2013), innovation emerges as a catalyst for change. Design management, in turn, is understood as a dynamic activity essential for the management and leadership of the creative process. It aims to search for new models, attitudes, behaviors, paradigms and interpretations of reality that were previously non-existent (Hands, 2009).

Therefore, creativity can be associated with disruption, i.e., a process by which a smaller company with fewer resources can successfully challenge companies already long established in a given market (Christensen et al., 2013). It allows the company to add value to the market and be able to positively differentiate itself in terms of customer experience.

Innovation is another concept with increasing importance in the current context, clearly driven by the pace of evolution of science and technology. Schumpeter & Christensen (1911) highlighted the importance of disruptive innovation for economic growth. They were also among the first authors to speak of creative destruction, driven by new technologies and ideas to achieve long-term prosperity (in Santos et al., 2011).

Note that, in summary, creativity and innovation are intertwined concepts that drive progress and positive change. Creativity is about generating novel ideas. Innovation is the process of implementing those new ideas (transforming them in products, services and/or procedures) in such a way that they create tangible value (Acar et al., 2019).

Kissinger et al., (2021), at the height of Artificial Intelligence, refer to its impact on all areas of knowledge. They predict a trend towards coopetition between humans and AI, this being an inevitable process. Innovation and this entire process of machine-human interhelp are two powerful forces that are shaping the future of humanity. Martins (2000) considers that innovation project managers need to create a consistent organizational environment, in which everyone participates by giving ideas aligned with group objectives. In this way, adding value to employees, stakeholders and the organization itself.

Artificial Intelligence is impacting the way companies manage their knowledge, use innovation and has been revolutionizing design processes (Cautela et al., 2019). Professionals today have powerful tools at their fingertips to increase their creativity, efficiency and customization capacity. Collaboration between AI and Designers enables the creation of impactful visual solutions that connect brands and consumers in innovative and meaningful ways. The future of Design is gradually being shaped by the synergy between AI and the human creative mind. The supporting of design with computers and AI demands for a cooperative problem-solving approach that empowers designers with knowledge and the capacity to promptly solve specific issues in a quick way (Fischer & Nakakoji, (1992). Having overpassed its initial stages and now starting to revolutionize many different fields in some way, AI is on its way to become a disruptive technology (Yüksel et al., 2023).

Technology has always been associated with transformations in society and the capacity for the development of art. It also translates into symbolic and creative ways of communicating, transmitting ideas, feelings, emotions and beliefs through various manifestations: poetry, sculpture, painting, literature in general, music, among others (Dias, 2023). Separating society from the use of technology is, therefore, unthinkable: Kelly (2017) stated that they seem inseparable, believing that technology is a great life accelerator. Recent studies also seem to prove that technological innovation has been a drive in changing how marketing and advertising campaigns are planned and managed (Qin & Jiang, 2019). Santos (2022) believes that technology and Artificial Intelligence will fundamentally change advertising, communication and marketing, as well as society in general. More and more artists use applications and other tools not only to promote their pieces of art, but also to sell them at a very competitive price. Xue et al (2023) exemplify the use of AI through chatbots that communicate directly with

humans, facilitating the process of exchanging information quickly. ChatGPT is a clear example of a chatbot with an excellent level of performance: analyzes and understands the context of the question selected by the user, using available information to generate text and answer specific questions on the topic; provides information and surprises users. It turns out to be versatile, allowing to be used also in photography and art; painting/plastic art in different styles, from classic, modern, abstract, etc.; digital art, through conceptual images as well as specific design, design projects, studies, sketches, among others (e.g. NFT).

According to Santos (2018), nowadays there are digital solutions 368 at the design level, which allow realistic simulation through the visualization of photographs. He also refers to solutions that allow the verification and evaluation of performance 369: physical, mechanical behaviors, production viability, profitability of resources and interaction with human beings, in a usability relationship.

From this perspective, it can be a valuable tool for managers in general and designers in particular, providing insights and automating routine tasks, allowing them to focus on more creative tasks. It can also assist in generating ideas and concepts, suggesting combinations of colors, typography and layout based on current and historical trends, contributing to time and energy efficiency, as well as a relevant exploration of alternatives in search of something new and different (Santos, 2018).

3. Methodology

In an introductory phase, we decided to use a poem to explore if the participants were able to, by reading it, identify the importance of creativity and innovation for individuals and organizations. We chose the poem "Esta gente" by Sophia Mello Breyner Andersen (1967) and tried to develop an analysis of its main ideas. It is a poem that highlights the importance of being authentic, to develop critical thinking and seeking for original solutions to all the challenges we face as humans. By dissecting the main message of this poem, aware of the used metaphors, one can reflect, indirectly, on the need for creativity and innovation as the proper way to deal with the issues addressed by the poet. Poetry usually conveys complex ideas and emotions in a concise way. When analyzing the words that make up a poem, people can uncover subtle nuances, discover new perspectives and deeper meanings. On the other hand, it was also considered as an original and creative way to assess the importance of creativity and innovation.

Students were asked to analyze and dissect all the verses of the poem, with two essential purposes: first, to provide a greater contextual and historical understanding of the poem's main message. Secondly, develop a 'mind map' with relevant concepts, with the aim of generating possible ideas with creative relevance, so that in the subsequent phase they could move forward with materialization (development of graphic exploratory essays). The Concepts most debated and dissected by students were: "Freedom" and "Equal Opportunities".

Authors decided to use the methodology proposed by Demola, structured in two main phases (Picoito; Caria; Angelino; Dourado; Pereira; Ruivo; Vinagre; Ramos & Pires, 2023): 'Design Research' and 'Speculative Design'. This is a method that enables teams to tackle complex problems effectively, foster innovation and then propose impactful solutions that meet needs and expectations. In the 'Design Research' stage

the focus is on clearly understanding the problem in analysis; in the 'Speculative Design' phase, individuals explore creative and innovative solutions based on the insights gathered in the previous phase. Since the research involved students, academics and some people from companies, the method seemed to be very suitable. Participants responded very positively with surprising graphic results. As part of the creative process, the individuals materialized their Design work, responding to the methodology proposed and mentioned in the Design project briefing. The entire co-creation and Design Thinking process was done in the classroom, which was structured in 5 steps (empathize, define, idealize, prototype, and test). Evidence proving successful work is included in the annex (on the last pages) of this article. So Demola's methodology allowed the participants to think out of the box, therefore considering different ideas and possible scenarios.

In preparing the research itself, previous studies were also taken into consideration: (1) organizational contexts and conditions for creativity (Amabile, 1998; Woodman et al., 1993); (2) best practices for fostering creativity (Mumford, 2000); (3) creative leadership that induces innovation (Sternberg, 2007) and (4) general structure of research work (Malhotra, 2019).

We used a quantitative methodology with the development of an online questionnaire, through Google docs, with twenty-one questions, using a Lickert scale varying from 1 - completely disagree- to 5 - totally agree and based in the literature carried out. Ten questions asked participants to interpret the Sophia Adersen's poem and twenty-one were on innovation and technology. We used a convenience sample due to time and budget constraints; participants were all high education students in design, communication and multimedia courses (authors' networking). A pre-test was developed to verify any needed corrections; it was done with three experts in the area of creativity and innovation. The study took place from June to October, 2023.

4. Data analysis

153 valid responses were obtained. The final sample contained 54.9% female individuals and 42.1% male individuals; 2.6% did not identify their gender and 0.7% chose other. The majority of participants were under 40 years old; 44.4% of them were under 20 years old; 43.9% were between 21 and 30 years old, 7.2% were between 41 and 50 years old and only 3.9% were over 50 years old.

As far as areas of interest (where participants could choose more than one option) we found a high percentage of individuals with an interest in design – 69.90%; creativity/innovation had 65.40% and communication/marketing 55.60% of the participants. Art and Decoration had 49.70%; Technology 41.20% and Artificial intelligence 31.40%. Other areas got lower preference.

Taking into consideration the poem "Esta Gente" by Sophia de Mello Breyner Andresen, (published in 1967), we started by trying to understand the main ideas, concepts and aspects that individuals were able to extract from reading the chosen poem. Questions were presented as follows:

1. "These people whose faces, Sometimes bright, And other times rough" Intend to convey... (Figure 1)

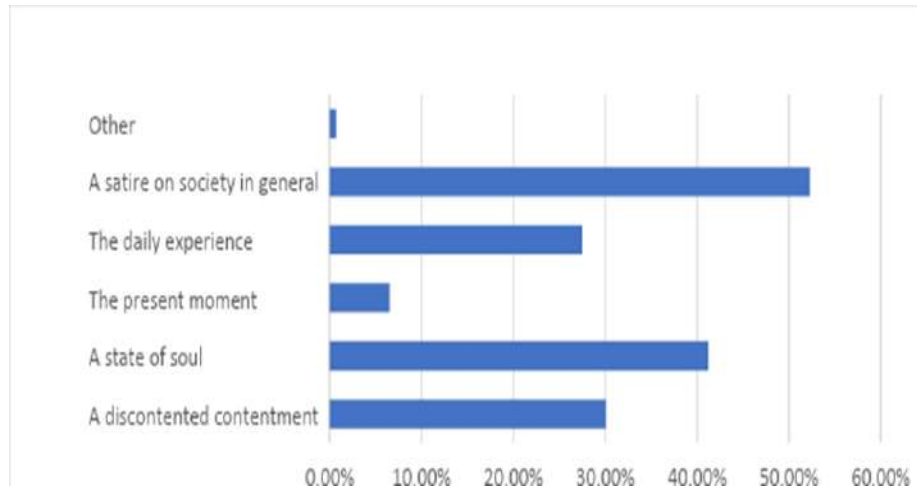


Figure 1 – Answers to Question 1

We found that the most chosen options were (1) satire on society in general (52.3%) and (2) state of mind (41.2%), essentially associated with inconsistency in mood, falsehood (happy people on the outside but sad inside) and difficulty being resilient.

2. "Sometimes it reminds me of slaves, "Sometimes it reminds me of kings" This idea reflects the different dimensions of the human being... (Figure 2)

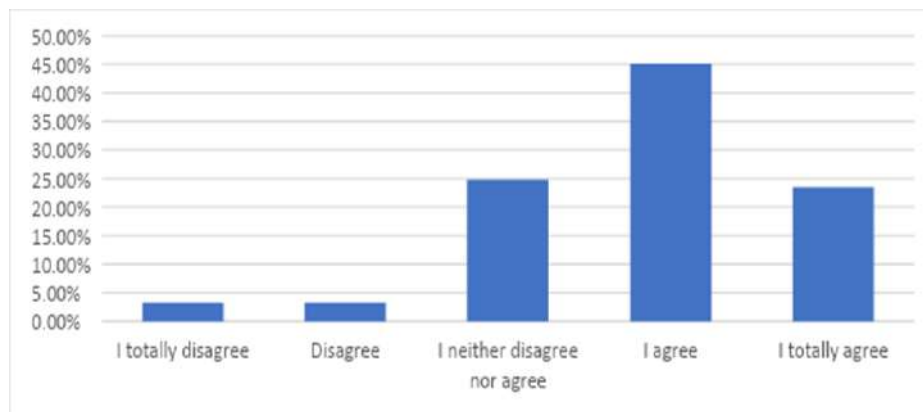


Figure 2 – Answers to Question 2

We can say that the majority of participants agree with the statement (45.1% said they agreed and 68.6% said they completely agreed).

3. "It makes my taste reborn, of fighting and combat, Against the vulture and the snake, The pig and the kite" - This idea reflects a fight against everything and everyone...

We found that almost half of the participants (47.1%) agreed with this interpretation (47.1% said they agree and 15% said they totally agree).

4. "Because we have a drawn face for patience and hunger" is a statement that reflects the normal state of most people. To this question, the majority of respondents chose "agree" and "completely agree".

5. "It is the people on whom, an occupied country, writes its name" - This statement reveals that each person's name is valuable. Participants were divided regarding their agreement (27.5% indicated neither to agree or disagree and 34.6% said they agreed).

6. "And in front of these people, Ignored and trampled on" - This idea reflects that people are treated badly, being ignored most of the time. Analyzing this question, we found that there was a very significant agreement: 41.2% agreed and 46.4% completely agreed with this statement.

7. "And more than a stone, Humiliated and trampled upon" When asked if this statement reinforces the idea that people are devalued, we found a complete agreement, with almost half of the people (49%) and (41.2%) agreeing (49% agreeing and 41.2% totally agreeing).

8. "My song is renewed, and I begin the search again" symbolizes that... (Figure 3)

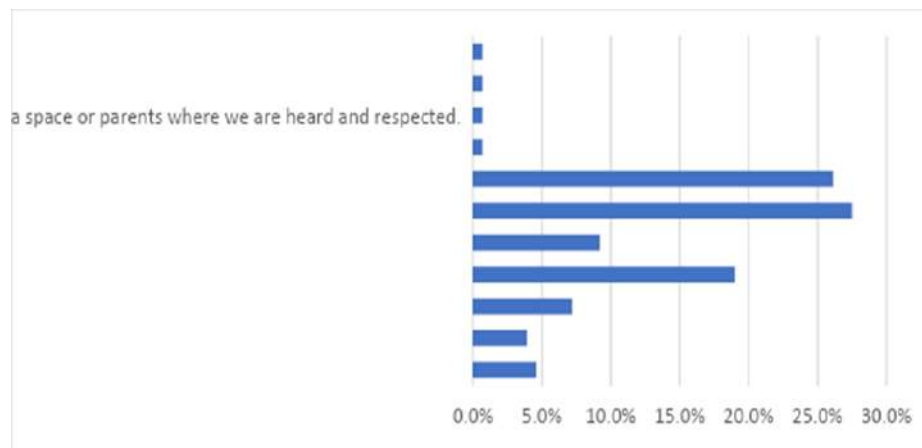


Figure 3 – Answers to Question 8

The most significant associations point to (1) the fact that change is necessary (27.5%); (2) develop strength to face everything new (26.1%); (3) the need to start over (19%). Thus, it can be said that, given the responses obtained, the idea of the need to change to promote different results was clear.

9. "Of a free country, of a clean life and a fair time" This statement reflects that it is necessary to... (Figure 4)

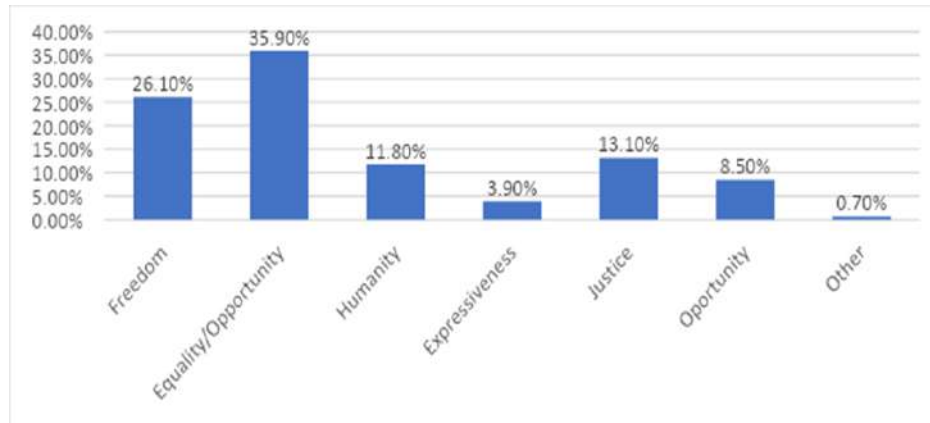


Figure 4 – Answers to Question 9

In this question, the most chosen options were: equity/opportunity 35.9% and freedom 26, 10%.

10. Freedom is for... (Figure 5)

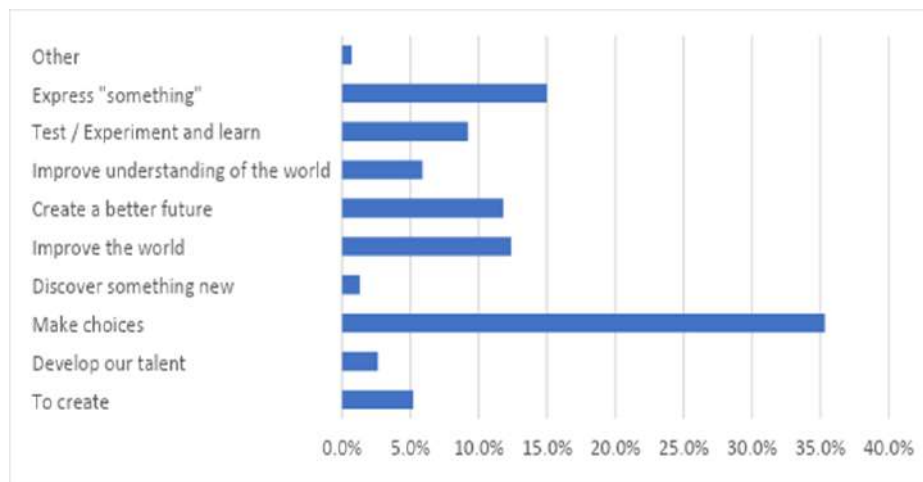


Figure 5 – Answers to Question 10

The most chosen answers point to making choices (35%) and express something (15%). In general, after considering the participants answers, we can assume the need for change, improvement and the capacity to look in a positive way to creativity, innovation and technology as a way to get it.

Then our study continued with questions directly related to Design, Creativity and Innovation.

11. How do you define good Design? (Figure 6)

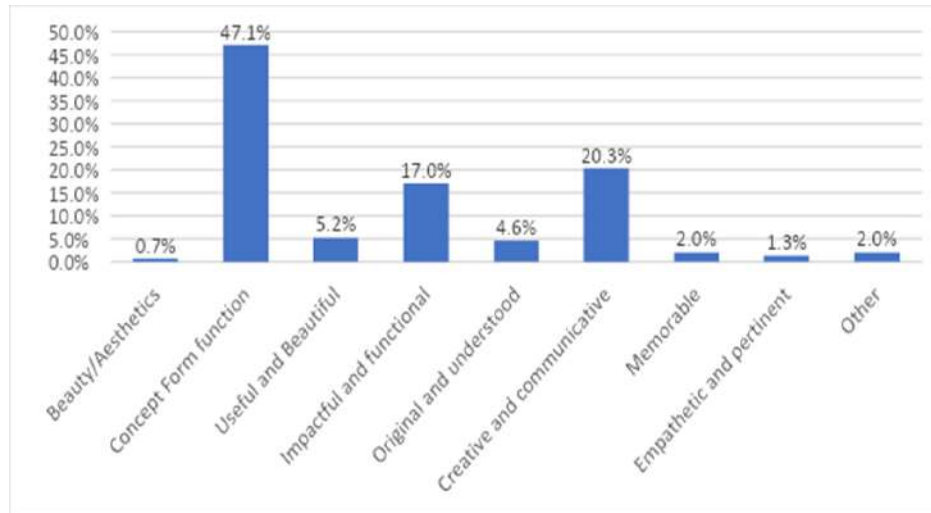


Figure 6 – Answers to Question 11

According to those interviewed, good design is mainly characterized by: (1) having concept, form and function (47.1% of responses); (2) have creativity and communication skills (20.3%) and (3) be impactful and functional (17%).

12. Should good design be visible? (Figure 7)

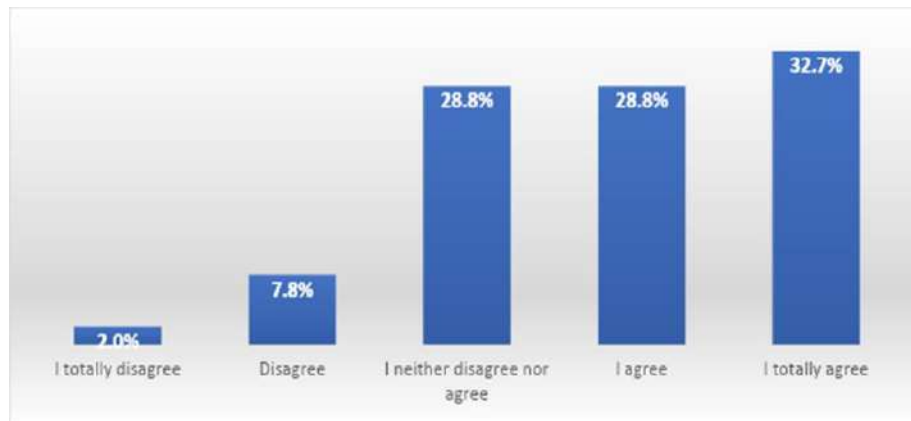


Figure 7 – Answers to Question 12

Regarding design visibility, we checked and 32.7% completely agreed and 28.8% agreed with the statement. We had only 2% of respondents in total disagreement.

13. “Should good design be invisible?” Regarding the invisibility of the design, we found that the most answered option was, neither agree nor disagree 36.20%, followed by the option of disagree 27.7% and totally disagree 22.2%. One can conclude that the majority of participants consider visibility as a prerequisite for good design.

14. Should the "voice" of Design convey the personality of a Brand, its values and positioning? We obtained very significant agreement on this question: 51% agreed and 37.3% totally agreed.

15. Does the "tone" of a Brand's Design define the way it uses words and its communication? Also on this question, the majority of respondents said to agree (49%) and 24.8% completely agreed.

16. Define creativity

With regard to the definition of creativity, the most significant responses point to the need to observe new perspectives (17%), leave the comfort zone (13.70%) and the ability to find new and possible solutions (13.10%). Some respondents also choose combining previous options.

17. Define innovation

Regarding the definition of innovation, the most chosen answer was "build/create new ideas based on a design project methodology (60.80%)". 14.4% of respondents indicated the implementation of actions that solve concrete problems and 11.8% reported putting ideas into practice.

18. Do Creativity and Innovation have a fruitful relationship with Design? (Figure 8)

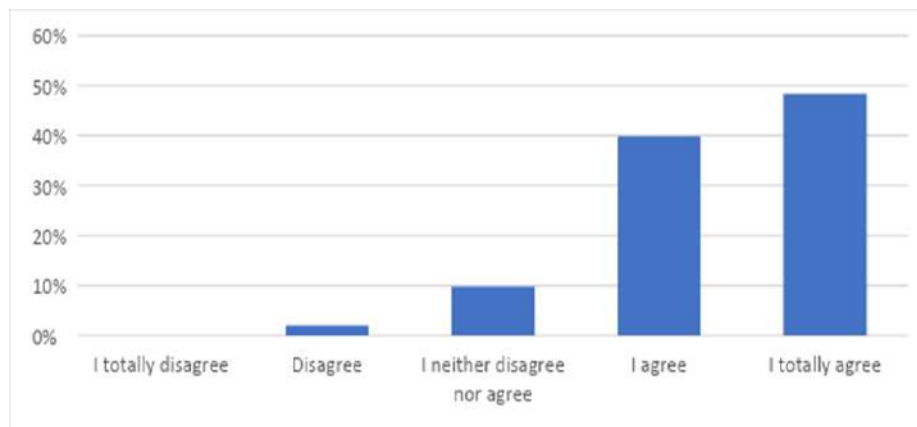


Figure 8 – Answers to Question 18

To this question we found that there is a fruitful relationship between creativity and innovation with design, as we had 48% of respondents who completely agreed and 40% of them agreeing.

19. Describe what you understand by Good Design?

The majority of responses indicate that good design is one that impacts the individuals, drawing their attention. It is also something useful and functional, relevant and innovative. It needs to be aesthetic but understandable, conveying usefulness. In short, participants consider that good design results in something aesthetically pleasing, functional and capable of satisfying users' needs. It is mainly associated with the creation of products, services, interfaces and environments.

20. As a tool to support creative block, can AI (Artificial Intelligence) be useful and relevant to the creative process in Design?

At the AI level, responses indicate that it can help creators to unlock their minds and, in this way, arrive at possible conceptual ideas more quickly. However, there seems to be a consensus on the fact that we are still far from fully using AI, with a long path to perfecting it.

21. In accordance with contemporary Design trends, present and develop ideas and/or suggestions for the creation of Good Design in the future.

According to the participants, in the future good design will have to satisfy (new) living standards, using new technologies and not be tied to time. Creativity is certainly a necessary skill, since individuals are too demanding nowadays. They are also fans of new technologies. The future of design will be marked by the integration of advanced technologies, sustainability, inclusion, accessibility and personalization (reinforcement of user-centered design).

5. Conclusions

The use of the poem helped the authors to understand, on the part of the participants, not only their creative capacity to interpret the content but also to extract concrete ideas regarding the need for change, to treat people better and to innovate to create an environment in which everything is better (through the ability to think outside the box, innovate and use technology to achieve new products, services and procedures – change to improve the lives of humans in all spheres).

As far as good design definition, participants said that concept, form and function are key variables (47.1%); creative and communication capacity was the second most important aspect (20.3%). As third important factor, respondents indicated the need to be impactful and purposeful (17%). Regarding design visibility, we found widespread agreement.

When asked to define creativity, to observe new perspectives had 17% of the answers; leaving the comfort zone got 13.7% of the preferences and finding possible solutions 13.1%. This is line with Rolo (2013) definition. Regarding innovation, we found that the most chosen option was: build/create new ideas based on a project methodology in design (60.8%). This idea is in line with the words of Dias (2013) that states that innovation emerges as a catalyst for change and design management, being a dynamic management activity. It also highlights the need for proper management and leadership strategies that encourages any employee to be a part of the creative process. This leads to the search for new models, attitudes, behaviors, change of paradigms and/or interpretations of the reality previously considered (Hands, 2009).

Regarding what is meant by good design, we observed that it is something that impacts the individual. A good design must be useful and functional, something impactful, that attracts attention, being relevant, creative and innovative.

As a tool to support creative block, AI (Artificial Intelligence) can be useful and relevant for Design creative process. Respondents said that AI can help creators to unlock their minds in a quicker way, showing possible conceptual ideas, such as referred by Xue et al. (2023). Despite being consensual to the participants the need to improve AI technics to take full advantages from it, everyone recognized the essential help that AI can bring to brands.

Regarding design trends in the future, it was possible to see that it will be marked by the integration of advanced technologies and/or AI, sustainability, inclusion and

accessibility, as well as the reinforcement of user-centered design for customized answers to customers.

Using of poetry as a starting point for this study proved to be an important catalytic element in the design creative process; it allowed different scientific areas to be linked and, at the same, to approach the theme in an out-of-the-box way.

So, in general, the participants concluded about the need for constant change and improvement. They also indicated that change depends on creativity, innovation, and the use of current technology, which subsequently leads to the design process of products, services and various procedures that are useful and aligned with the individuals' needs.

The biggest limitation of this study is related to the type of sample used. A convenience sample, without a huge number of participants makes extrapolation to the Portuguese population very difficult. Note that participants are also part of the authors' contact network, for budget reasons.

Another limitation has to do with the absence of a qualitative study, which could contribute to a better understanding of the topic. As future studies, we can implement a more representative sample of the population, as well as including new students from other higher education institutions in Portugal. We can also decide to complement a quantitative methodology with a qualitative one, using Delphi technic to interview some experts and extract their updated and reasoned opinions.

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<https://portugal.demola.net/>
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Evidence - student work/projects

Evidence of work/project in design created/developed by student, Rosa Della Ragione, in the Product Design course, IPVC-ESTG, 2021-22 academic year (www.ipvc.pt)



Author: student, Rosa Della Ragione, 17.06.2022 (ESTG-IPVC)

Evidence of work/project in design created/developed by student, Diogo Rodrigues, in the Product Design course, IPVC-ESTG, 2021-22 academic year (www.ipv.pt)



Author: student, Diogo Rodrigues, 20.06.2022 (ESTG-IPVC)



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