

Insights into the design thinking methodology through the innovation game "Partida Join."

Perceptions of the Design Thinking Methodology through the Innovation Game "Partida Join"

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Abstract: Design thinking (DT) is a methodology focused on people's needs and desires to solve problems creatively to foster innovation. One way to promote DT is through games and incorporating gamification elements. Thus, some games have been developed to support this approach. The innovative game "Join Match," developed by the Euvaldo Lodi Institute (IEL/BA), stands out among the existing games. This game is part of the "JOIN" methodology, a management technology developed with principles of open innovation, agile methods, and DT used in innovation management consulting. The JOIN match is a collaborative game designed to stimulate participants' creativity and empathy in applying DT principles for problem-solving. This game can be applied in both corporate and educational environments. In this sense, this study aims to evaluate the implementation of the design thinking methodology through the game "Join Match" from the participants' perception. The workshops took place in two higher education institutions located in Salvador, in the state of Bahia. For data collection, a questionnaire prepared in Google Forms was used using a 5-point Likert scale, ranging from strongly disagree to strongly agree. The results indicated team engagement and creative confidence to express ideas and make decisions. In addition, the JOIN game can empower individuals to solve problems and actively seek innovative solutions. However, aspects such as the relevance of learning for the participants' professional careers, allocation of time for execution, and environment for implementation showed lower agreement rates.

Keywords: design thinking, game, innovation.

Resumo: O design thinking (DT) é uma metodologia centrada nas necessidades e desejos das pessoas com a finalidade de resolver problemas de forma criativa no fomento à inovação. Uma forma de promover o DT é por meio de jogos, além da incorporação de elementos de gamificação. Dessa forma, alguns jogos foram desenvolvidos para apoiar essa abordagem. Entre os jogos existentes, destaca-se o jogo da inovação

“Partida JOIN” desenvolvido pelo instituto Euvaldo Lodi (IEL/BA). Esse jogo é integrante da metodologia “JOIN”, uma tecnologia de gestão, desenvolvida com princípios de inovação aberta, métodos ágeis e DT utilizada em consultoria de gestão da inovação. A partida JOIN é um jogo colaborativo projetado para estimular a criatividade e a empatia dos participantes na aplicação prática dos princípios do DT para a resolução de problemas. Esse jogo pode ser aplicado tanto em ambientes corporativos quanto em ambientes educacionais. Nesse sentido, o objetivo deste estudo é avaliar a implementação da metodologia *design thinking* por meio do jogo “Partida JOIN” pela percepção dos participantes. As oficinas ocorreram em duas instituições de ensino superior localizadas em Salvador no Estado da Bahia. Para a coleta de dados, utilizou-se um questionário elaborado no Google Forms por meio da escala de Likert de 5 pontos, variando de discordo totalmente a concordo totalmente. Os resultados indicaram engajamento das equipes e confiança criativa para expressar ideias e tomar decisões. Além disso, a partida JOIN pode capacitar indivíduos para resolver problemas e buscar soluções inovadoras de maneira lúdica. No entanto, aspectos como a relevância do aprendizado para a carreira profissional dos participantes, alocação de tempo para execução e ambiente de realização apresentaram menores índices de concordância.

Palavras-chave design thinking; jogo; inovação.

Resumen: *El design thinking (DT) es una metodología centrada en las necesidades y deseos de las personas con el fin de resolver problemas de manera creativa y fomentar la innovación. Una forma de promover el DT es a través de juegos, además de la incorporación de elementos de gamificación. De este modo, se han desarrollado algunos juegos para apoyar este enfoque. Entre los juegos existentes, destaca el juego de innovación “Partida JOIN”, desarrollado por el Instituto Euvaldo Lodi (IEL/BA). Este juego es parte de la metodología “JOIN”, una tecnología de gestión, desarrollada con principios de innovación abierta, métodos ágiles y DT, utilizada en consultoría de gestión de la innovación. La partida JOIN es un juego colaborativo diseñado para estimular la creatividad y la empatía de los participantes en la aplicación práctica de los principios del DT para la resolución de problemas. Este juego puede aplicarse tanto en entornos corporativos como en entornos educativos. En este sentido, el objetivo de este estudio es evaluar la implementación de la metodología design thinking a través del juego “Partida JOIN” según la percepción de los participantes. Los talleres se llevaron a cabo en dos instituciones de educación superior ubicadas en Salvador, en el estado de Bahía. Para la recolección de datos, se utilizó un cuestionario elaborado en Google Forms mediante la escala de Likert de 5 puntos, variando de “totalmente en desacuerdo” a “totalmente de acuerdo”. Los resultados indicaron el compromiso de los equipos y la confianza creativa para expresar ideas y tomar decisiones. Además, la partida JOIN puede capacitar a las personas para resolver problemas y buscar soluciones innovadoras de manera lúdica. Sin embargo, aspectos como la relevancia del aprendizaje para la carrera profesional de los participantes, la asignación de tiempo para la ejecución y el ambiente de realización presentaron índices de acuerdo más bajos.*

Palabras clave: design thinking; juego; innovación.

1. INTRODUCTION

Design thinking (DT) is a methodology focused on people's needs and desires, widely used in the corporate environment and gradually adopted by educational institutions to promote innovation and the development of skills and abilities (BROWN, 2020; CAVALCANTI; FILATRO, 2017; KLEINSMANN; VALKENBURG; SLUIJS, 2017; GUAMANQUINTANILLA et al., 2023). To operationalize and assist this approach, some games and gamification elements are used (GATTI JUNIOR et al., 2020; PATRÍCIO; MOREIRA; ZURLO, 2021; KLOECKNER; SCHERER; RIBEIRO, 2021).

In the context of games aimed at DT, Kloeckner (2018) conducted a study to facilitate the application of DT for innovation purposes. The author developed a game composed of two distinct boards: the first is called the "inspiration map" and focuses on generating insights. The second is called the "idea board" and focuses on generating ideas. The results demonstrated the game's effectiveness, contributing to a better understanding of the problem, the difference between insights and ideas, better use of methods and techniques, more abundant generation of ideas, more excellent delivery of value to users, and creative confidence.

With a different proposal, the board game entitled "Entrepreneurial Thinking" or "Entrepreneurial *Thinking*", proposed by Gatti Junior et al. (2020), aims to support the cognitive aspect of DT in business education. The game simulates a company, allowing participants to redesign the configuration according to their choices and experiences. However, some restrictions were mentioned, such as the application of the game in large classes and concerns related to assessment. From another perspective, the research presented by Patrício, Moreira, and Zurlo (2021) aimed to understand how gamification can improve the practice of DT.

The authors adopted the case study method to implement a board game called "*Ideachef*" to engage teams in idea generation in corporate and academic settings. The results showed that gamification could overcome the deficiencies identified in some DT practices, contributing to improving and complementing this approach in terms of organizational processes, participant engagement, and the connection between thinking and execution. In addition to these resources used in DT practice, the Eivaldo Lodi Institute (IEL/BA, 2023) developed the innovation game "Partida *JOIN* " based on DT principles (DOS SANTOS BRAGA; PIRES; 2019).

This game was developed based on a soccer match to enable the DT stages to be conducted playfully and engagingly. 1354 Given this context, two workshops on the game "Join Match" were held at two higher education institutions to assess participants' perceptions of using the *design thinking methodology* through the game.

2. OBJECTIVE

Evaluate the implementation of the *design thinking methodology* through the game "Match *JOIN* " for participants' perception.

3. REFERENCE THEORETICAL

This section introduces one revision of the literature on *Design* methodology *thinking* and the game from the innovation "Match JOIN."

3.1 Innovation Game "Join Match"

Academics began using the term *design thinking* (DT) in the early 1990s. It later gained popularity through Tim Brown, CEO of IDEO, a design and innovation company founded in 1991 in Palo Alto, a city in suburban California (PINE, ALT, 2017).

The definition of DT is multifaceted; there is no consensus in the literature on its concept (MICHELI *et al.*, 2019). However, DT reflects the style of thought characteristic of the designers, centered on the needs of the people (BROWN, 2020)

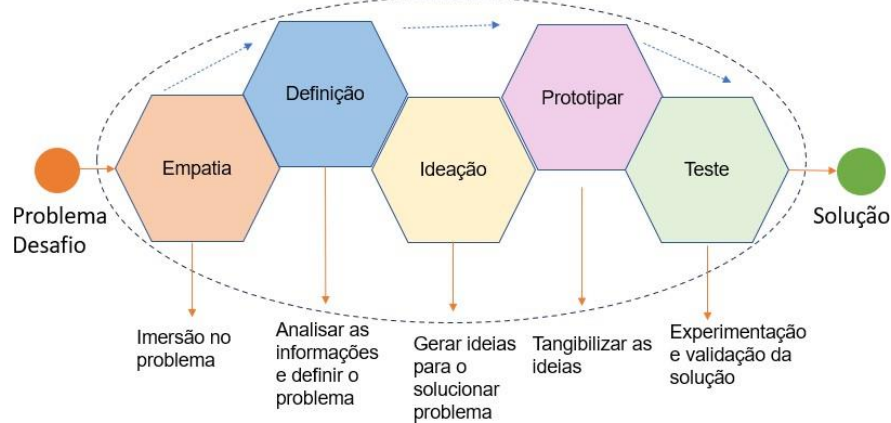
DT is considered a mental model, an approach, an attitude, a way of thinking and solving problems (PINHEIRO; ALT, 2017; BROWN, 2020). This study will consider a methodology due to its approach focused on problem-solving, which offers a systemic process applicable in various areas of knowledge to stimulate innovation (CAVALCANTI; FILATRO, 2017; GUAMAN-QUINTALLA). Some authors do not agree with that definition (PINHEIRO; ALT, 2017).

Among the attributes associated with DT are creativity and innovation, vision Gestalt, iteration and experimentation, interdisciplinary collaboration, tolerance for ambiguity and failure, I reason abductive, in addition to other characteristics (MICHELI *et al.*, 2019). These attributes emphasize the importance of DT in resolving problems, providing a better understanding of the challenge to be solved and the opportunity to identify errors in advance.

The operationalization of DT requires adopting a composite model with different steps (ROSCH; TIBERIUS; KRAUS, 2023). However, it is essential to highlight what those models present variations both in the quantities of steps and in the nomenclatures used. These steps are iterative, enabling the incorporation of new information that may arise during the process (PINE; ALT, 2017; LIN; EICHELBERGER, 2020; RÖSCH; TIBERIUS; KRAUS, 2023)

In a systematic literature review, Micheli *et al.* (2019) emphasized the models of DT that are more referenced in the literature. These models encompass the three-step approach developed by IDEO, the four-step model of IBM, and the model of five steps from the D. School, a proposal for the Institute of Hasso Plattner, located in the Silicon Valley of California. However, the approach of the DT of the D. School maintains the flexibility of existing models but seeks to supply one structure with more didactics to present one sequence of steps (LIN; EICHELBERGER, 2020). Figure 1 illustrates the DT model proposed by D. School.

Figure 1 - Steps of the model from DT from the D. School



Source: Adapted from Lin; Eichelberger (2020)

The model from the *D. School* (2010) begins in the stage of thought divergent (empathy phase), in which we seek to understand the needs and perspectives of the users of form in-depth (LIN; EICHELBERGER, 2020). Once this stage is completed, we move on to the next step in the process, called "define," which employs the thought divergent to identify and clearly define the problem or opportunity that needs to be addressed. At this stage, analysis and synthesis of the information collected during the empathy stage allow the focus on the scope of the problem and the definition of specific objectives.

Next, we move on to the idealization stage, in which the thought divergent is applied to generate various ideas and creative solutions (LIN; EICHELBERGER, 2020). After the generation of ideas happens, theselection stage is when they choose one or two more promising solutions to prototype, that is, realize the idea. This selection is based on predefined criteria and the node potential of feasibility and effectiveness of the solution proposals.

Finally, the selected solutions are prototyped and tested, allowing a practical and iterative evaluation (LIN; EICHELBERGER, 2020). These tests aim to obtain user feedback and identify possible improvements and adjustments. In this way, solutions are continuously refined based on the apprenticeship.

At each stage of DT, it is possible to incorporate and adapt methods to meet the specific demands of the context (BROWN, 2020; HEHN, UEBERNICKEL, HERTERICH, 2018). Under that perspective, the DT and compound put several methods that must be purposefully combined to achieve the objectives desired. In this sense, the term method refers to a technique or tool used to support achieving a purpose in one or more phases of the DT. To operationalize or support the DT, some games were developed (KLOECKNER, 2021; KLOECKNER; SCHERER; RIBEIRO, 2021; GATTI JUNIOR *et al.*, 2020; SAUCER, 2014). Between them, highlights- if the game of innovation "*JOIN match*."

3.2 Methodology *Design Thinking*

The "*Match JOIN*" and one game developed for the Institute Euvaldo Lodi (IEL/BA, 2023) based on the approach of DT. The game he does is part of the methodology *JOIN* created by the institution itself (PIRES, 2014; DOS SANTOS BRAGA; PIRES, 2019). The methodology *JOIN* is a management technology that originated with principles such as innovation open, methods, and DT used in management

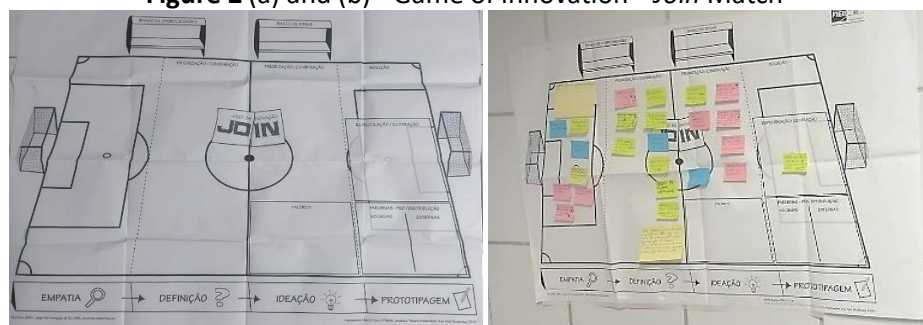
consultancy from theinnovation (OF THE SANTOS BRAGA; SAUCER, 2019; IEL/BA, 2023). THE IEL is a Brazilian institution that is part of the industry system, together with the Service Social from the Industry (SESI) and the Service National of Learning Industrial(SENAI).

THE IEL was founded in 1969 to promote the integration betweenindustry and education, seeking the development of talents and improvement of processes business (IEL//BA, 2023). Based in the city of Savior, the capital of the State of Bahia, IEL has programs and services that contribute to the strengthening of sector productivity and the training of professionals of young people. THE entityoffers diversified services and programs that help nodes improve companies' internal processes to promote innovation, management, and organizational competitiveness. Applying the *JOIN match* is one of the actions implemented by the institute in partnership with the Brazilian Service of Support to Micro and Small Companies (SEBRAE 2023).

SEBRAE offers workshops through the *JOIN Match*, which provides a opportunity to improve skills in innovation management, expand *networking*, establish partnerships, and generate innovative ideas for microenterprises. However, the *JOIN Match* can also be used in face-to-face and online activities, both in educational settings and in corporate environments, to solve problems (OF THE SANTOS BRAGA; SAUCER,2019 SEBRAE, 2023).

JOIN Match " is a collaborative game that aims to stimulate the creativityand empathy of participants, providing them with a practical experience of how to apply the principles of DT in the resolution of problems (SAUCER, 2014; OF THE SANTOS BRAGA; PIRES, 2019 SEBRAE, 2023). The game addresses the stages of empathy, problem definition, ideation, and prototyping proposals for the Institute ofDesign from the Hasso Plattner *D. School*. In this form, the game starts with understanding the problem and ends with prototyping the solution. Figure 2 shows the game of innovation: "Match *JOIN*."

Figure 2 (a) and (b) - Game of innovation "Join Match "



Source: Images captured by the authors (2023)

JOIN Match " is a game that draws an analogy with football, featuring a representation graphic of a football field (DOS SANTOS BRAGA; SAUCER, 2019; SEBRAE, 2023). In this form, the game employs the element of gamification, which materializes in the fun characteristic of a football game, offering a playful and collaborative experience in developing ideas for innovative solutions. In this sense, gamification is defined as using game elements, aesthetics, and principles to engage individuals, encourage actions, facilitate learning, and solve problems (ALVES,2015). From this perspective, participants are encouraged to score goals and present new outlets for their challenges.

4. METHOD

The game " *Join Match* " was applied in two higher education institutions in the city of Salvador, in the State of Bahia. The three-hour workshops were held on April 19 and June 27, 2023. Throughout the workshop, the SEBRAE professional led a brief explanation of the concept of innovation, followed by an introduction to methodology DT taught by the facilitator of IEL/BA.

To conduct the game, teams consisting of 5 members were formed. Each team received one exemplar of the game "Match *JOIN*," a node that went from the empathy phase to the prototyping of the solution. The challenges addressed for the proposed solutions were specific to the institution of teaching and the students they were enrolled in.

A time fraction was established to complete each stage of the DT. Execution ensures that all stages are completed within the period determined. After completing these phases, the students presented the results through a *pitch*, a concise presentation technique to communicate one idea, known as the speech of elevator, which he must present in approximately thirty seconds to two minutes (KERN, 2019). Subsequently, an evaluation was conducted by the students themselves. To determine the best solution to the problem addressed. Table 1 shows the workshop route with the game's adoption.

Frame 1 – Description of the steps from the workshop and your respective duration

DESCRIPTION OF STEPS	TIME IN MINUTES
Brief introduction to the concept of innovation and design thinking	20
Empathy stage	35
Problem definition	35
Ideation	40
Prototyping	35
Presentation and evaluation of results	15

Source: the authors (2023)

Putting the entire frame in frame 1 shows that the period destined for the ideation phase was more extensive than the subsequent steps (40 minutes). Note, however, emphasizes that these temporal delimitations may vary due to different circumstances, which can involve the students' engagement and difficulties of understanding in each stage, among other factors.

At the end of the workshop, he was available to you students with one *QR Code* that gave access to the one questionnaire elaborated on in the *Google Forms* platform. THE questionnaire consisted of six affirmative sentences with options based on the 5-point *Likert Scale*. One of the advantages of the *Likert scale* is the ability to identify the opinions and attitudes of the interviewees about each statement, which can be positive or negative (PRESTON; COLMAN, 2000)

As conceptualized by Gil (2008), the questionnaire is a methodological instrument composed of written questions directed to people to obtain opinions,

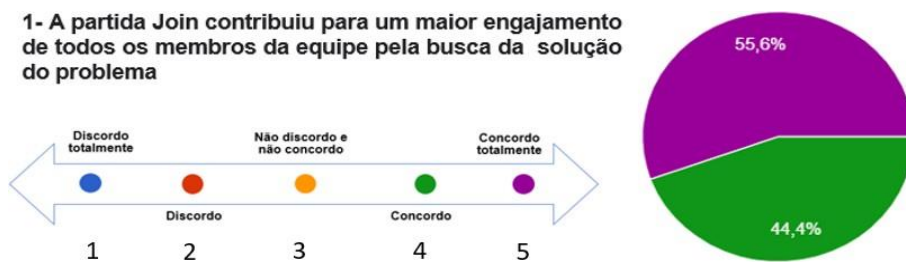
feelings, perceptions, experiences, preferences, beliefs, and information. In this way, a qualitative approach was adopted, based on the method proposed by Minayo (2007), which helps them respond to specific questions and highlight aspects of reality that cannot be quantified.

The options available were: I disagree (1) I disagree (2) a little alternative intermediate no I disagree and no I agree (3), I agree (4) and I agree(5), allowing participants to express the degree of agreement in regarding the questions presented. A total of 27 students participated in the search and responded to the questionnaire.

5. RESULTS AND DISCUSSIONS

In this section, they are presented with the student's answers to the questionnaire applied after applying the game "Join Match" in the two higher educational institutions. The results address participants' perceptions regarding team engagement, the relevance of learning for a professional career, autonomy in decision-making, stipulated time for application, the contribution from the game to the solution of the problem, and, finally, the evaluation of the space and resources used during the game. It was initially verified through Graph 1 whether the game "JOIN Match" contributed to better team engagement while searching for the solution.

Graphic 1 – Engagement of the team members



Source: Authors (2023)

Through Graph 1, it can be seen that 100% of participants agree (44.4%) or totally agree (55.6%) that the application of the "JOIN Match" contributed to better team engagement in the problem resolution process problem addressed (4 and 5). This result corroborates Patrício, Moreira, and Zurlo's (2021) research, highlighting that gamification's elements can expand the active participation of those involved in applying DT.

It is understood that the gamification and one strategy that makes the application of DT more engaging and fun is keeping participants more concentrated on the far-away part of the process, considering the estimated time to go through the steps. In this way, gamification elements are adequate resources as they can prevent participants from feeling bored during the process and trying to advance prematurely, which may compromise the effectiveness of the results. Graph 2 presents the perception of the participant's node and what it says with respect to the apprenticeship obtained through the JOIN Match during the workshop.

Graphic 2 - Relevance of JOIN match

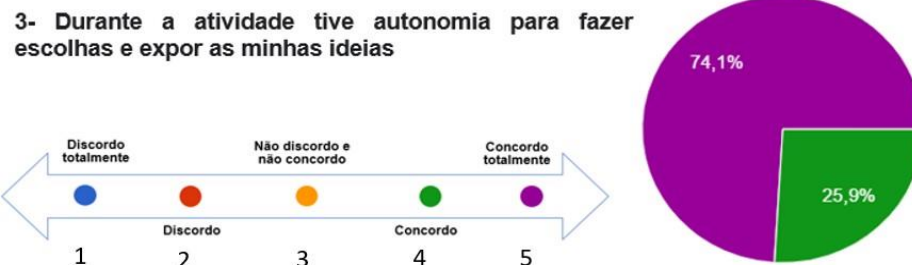


Source: authors (2023)

It is visualized in node Graphic 2 that 48.1% of the participants agree fully, and 44.4% agree that the learning acquired through applying the "JOIN match" was relevant to the professional career. Already, 7.4% of respondents do not agree or disagree with the assertion, highlighting one possible doubt related to the relevance of the knowledge acquired. Results (3, 4, and 5) indicate that applying DT through the *JOIN Match* may benefit certain areas more than others.

Although most participants recognized the importance of DT, It is believed that the perception of the effectiveness of this approach may be even more strengthened using practical examples applied in the business context, considering what the DT and comprehensive employees in various areas to boost the innovation in services, products and processes internal (BROWN, 2020; PINHEIRO; ALT, 2017). Graph 3 illustrates the participants' perception of autonomy in decision-making and freedom of expression during the DT in the middle of the game application.

Graphic 3 - Freedom of decision and expression



Source: Authors (2023)

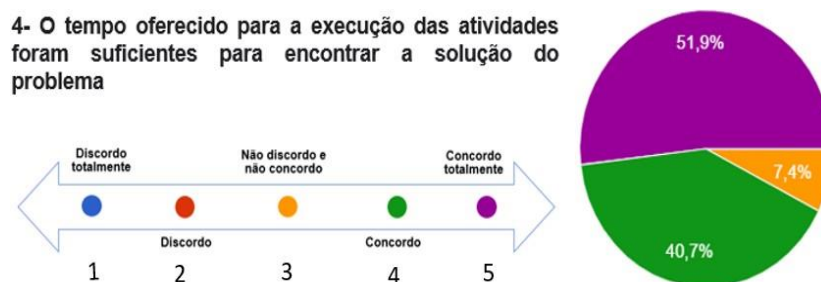
It is verified, node Graphic 3, that the majority of the participants (74.1%) agree fully and (25.9%) agree with the assertion that they enjoyed autonomy to make decisions and explain their ideas during the workshop (4 and 5). These data indicate that participants shared their ideas freely, developing creative confidence in the practice of DT, a characteristic identified in other studies (KLOECKNER, 2018).

The trust creative plays one paper fundamental node process of DT, and one time, what that approach requires is that participants feel the willingness to explore innovative ideas and tackle complex challenges. This characteristic is especially important during the phase of ideation and prototyping, where the generation of new ideas and experimentation are essential (LIN; EICHELBERGER, 2020). Of

that mode, and essential what you involved node processif feel confident in sharing your perspectives, contributing like this to the creation of meaningful solutions.

The trust creative can be assigned to the application scenario of one educational institution. In this environment, the absence of hierarchical structures such as directors, managers, and coordinators can help participants feel less fearful of criticism or judgment. This aspect becomes particularly relevant when considering the importance of DT in this context, both in stimulating creativity and in developing skills demanded by the job market. In addition to these aspects, it was assessed, using Graph 4, whether the time allocated to carrying out activities until the resolution of the problem was considered enough for the participants.

Graphic 4 - Time of execution of the game

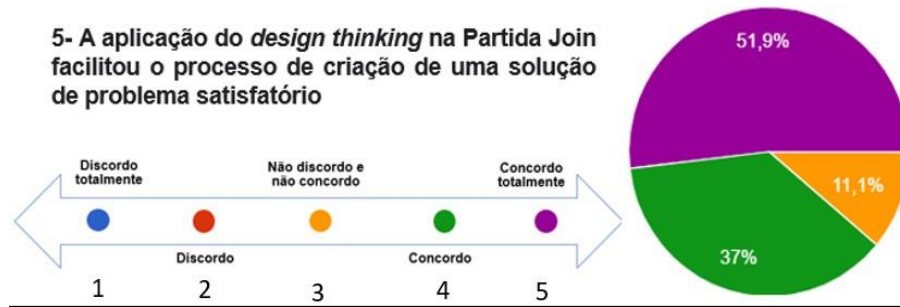


Source: authors (2023)

The data represented in Graph 4 shows that 51.9% of participants from the "Match JOIN" agree fully, and 40.7% agree that the time established for the execution of the activity was sufficient to solve the problem addressed. In comparison, 7.4% of participants opted for a neutral position, indicating that they do not disagree and do not agree with the delimitation of time (3, 4, and 5). Although most participants considered the established time appropriate, time management can become a challenge in applying DT since the time available may not be sufficient to go through the steps that require a more extended period, which may hinder the achievement of results effectively.

The temporal aspect depends on the specific objectives of each activity and the time available for execution. In addition, the time allocated to each step may vary for several reasons, such as difficulty of understanding, degree of participant involvement, and other factors. Furthermore, the definition of an appropriate time interval for each step can become a barrier in adopting DT, seeking to maintain the balance that allows the execution of the stages without resulting in disinterest or boredom among the participants. In this context, the games and gamification elements can play a crucial role as allies in applying DT. That said, it is worth highlighting that graph 5 presents the participants' perception concerning the application of DT with the help from the MatchJOIN in resolving the problem of a mode effective.

Graphic 5 – Process of solution of the problem



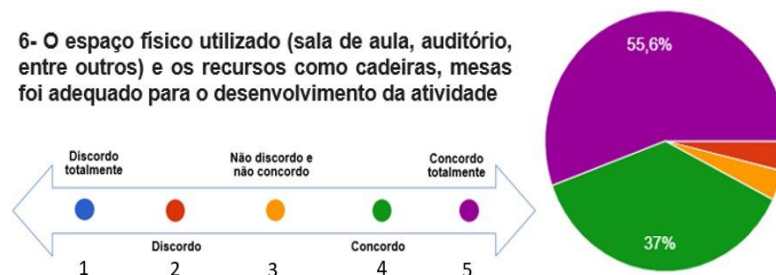
Source: Authors (2023)

In Graph 5, it can be seen that 51.9% of team members agree totally, and 37% agree that the game "Join Match" contributed to the generation of one solution effective, while 11.1% of the participants no expressed either disagreement or agreement with this statement (3, 4 and 5). A possible explanation for the intermediate responses (3) may be related to the restriction of time to iterate, one time what the process of DT and cyclic and allows adjustments put through prototyping and user *feedback*. In this context, the JOIN match can be one practical resource in the visualization and organization of the data, allowing the steps to be rewarded and new information

to be inserted.

In conclusion, node graphic 6 found that the participant's perceptions of the space and resources used in implementing DT with the game were different. The responses collected may indicate the need for environments and resources specific to adopting DT.

Graphic 6 - Environment and resources used in the application of the DT



Source: Authors (2023)

It is understood, node graphic 6, that 55.6% of the participants agree fully and 37% agree that the environment used, such as a classroom with chairs and traditional tables, was suitable for the activity. In comparison, 3.7% disagreed or did not disagree or did not agree with the sentence. Despite the high agreement rate, the spaces designated for the game could be more suitable for practical activities, favoring greater integration between involved and information sharing.

6. FINAL CONSIDERATIONS

This study aimed to evaluate the implementation of the *design thinking*

methodology through the game "Join Match" from the participants' perceptions. The results obtained highlighted the effectiveness of the game as a facilitating tool for DT by promoting participant engagement, stimulating creative confidence, and fostering the generation of innovative ideas. In this sense, games and gamification elements can be adequate resources to support the execution of DT.

Regarding the participants' perception of the relevance of learning for their professional careers, 7.4% neither disagreed nor agreed with this statement. This may highlight a possible doubt regarding the importance of DT in certain professions and the need for practical examples applied in the corporate context. The duration of the workshop (3 hours) was considered sufficient for the application of the game. However, it is worth noting that this variable may require good time management from the facilitators.

Time constraints may contribute to a lower perception of DT's relevance in the search for innovative solutions since when those involved realize that the result was unsatisfactory, they will not have the opportunity to return to the previous stages to collect information and refine the prototype. Furthermore, it is believed that applying the game in personalized scenarios that promote knowledge sharing can further enhance the experience with DT. However, most participants considered the environment with traditional tables and chairs adequate.

Given the above, adopting the *JOIN Match* based on DT principles in higher education can enable individuals to solve problems and playfully seek innovative solutions, preparing them for the job market. A limitation of the present study lies in the relatively small sample size, suggesting the possibility of conducting additional research in both academic and corporate environments, exploring the relationship between the application context and the creative confidence of participants, and variations in execution times.

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