

# Creative Design Approach: Developing Innovative Solutions For Children With Autism Spectrum Disorder

Luiz Rogério De Lima<sup>1</sup>, Cristiano Alves<sup>2</sup>, João Carlos Alchieri<sup>3</sup>

<sup>1</sup>(Science And Technology School, Federal University Of Rio Grande Do Norte, Natal, Brazil)

<sup>2</sup>(Design And Graphic Expression Department, Federal University Of Santa Catarina, Florianópolis, Brazil)

<sup>3</sup>(Science And Technology School, Federal University Of Rio Grande Do Norte, Natal, Brazil)

---

## Abstract

According to Lamanna and Meldolesi (2024), autism spectrum disorder (ASD) is a neurodevelopmental disorder, in which the reasons for this variation are not yet clearly understood. In this sense, there has been a significant increase in integrating technology to support therapy for children with ASD (Toma et al., 2024). Design processes have been assigned as a significant approach to solve problems by creative thinking. Therefore, since creativity is assigned as the human capacity to solve problems it is intrinsic that design process is an important innovation effort. Thus, this study aimed to evaluate the effectiveness of a Creative Framework to foster innovative ideas for a case study (SisTEA). The framework was performed in a multidisciplinary group. The results point out how the Creative Framework, as a systemic process, is important to generate new and significant ideas, enabling the development of innovative solutions for the treatment of children with ASD. This work highlights the importance of synergy between design and creativity to understand the needs of children with ASD in the search for effective solutions.

**Keyword:** System Development; Innovative Solutions; Autism Spectrum Disorder; Creative Framework; SisTEA App.

Date of Submission: 28-10-2024

Date of Acceptance: 08-11-2024

---

## I. Introduction

According to Lamanna and Meldolesi (2024), autism spectrum disorder (ASD) is a neurodevelopmental disorder that develops both during the prenatal period and in the early stages of postnatal life. Although the causes of ASD are not yet fully understood, it is known that there is an intricate combination of multiple risk factors. These factors include genetic and environmental components that interact in complex ways, producing heterogeneous effects. These interactions influence brain development, resulting in a variety of clinical manifestations that can vary considerably among affected individuals (Bernier et al., 2021).

The American Psychiatric Association (2022) describes the main signs and symptoms of ASD in its Diagnostic and Statistical Manual of Mental Disorders - DSM-5-TR. These include persistent difficulties with communication and social interaction that manifest in various contexts. These challenges encompass problems with social reciprocity, such as the ability to initiate and respond appropriately to social interactions. Additionally, there are deficits in nonverbal behaviors such as eye contact, facial expressions, and gestures, which are crucial for effective communication. Individuals with ASD encounter significant difficulties in forming, maintaining, and understanding relationships.

Data from the Centers for Disease Control and Prevention (CDC, 2023), an agency affiliated with the United States Department of Health and Human Services, indicate that the prevalence of ASD is approximately one in every 36 children aged 8 years, affecting approximately 4% of boys and 1% of girls. These statistics underscore the urgent need to implement effective interventions to promote holistic development and improve the quality of life for these children. There has been a trend of increasing ASD prevalence over the years, although the reasons for this variation are not yet clearly understood. However, changes in diagnostic definitions, greater public awareness, and improvements in the ability to identify and diagnose the disorder may influence the results and explain part of this growth (CDC, 2023).

As L. Brites and C. Brites (2019) emphasize, autism spectrum disorder has led to the formation of a broad multidisciplinary support network, resulting in the creation of new perspectives and approaches for assessing and intervening in this disorder. This integrated approach has proven essential for gaining a deeper understanding of the needs of children with ASD and for developing more effective strategies that address their unique characteristics.

In recent years, there has been a significant increase in interest in integrating technology to support therapy for children with ASD (Toma et al., 2024). This advancement has been evident in various areas, including communication, education, and therapeutic support. From this perspective, the development of the

SisTEA App (Integrated Support System for the Treatment of Children with ASD) arises with the purpose of offering support for interactions and treatment. SisTEA is an assistive technology system designed to provide a range of resources and tools specifically tailored to meet the specific needs of these children. Therefore, the application should facilitate the sharing of information and continuous monitoring of the child's progress, enhancing communication and collaboration among all involved in their care.

Therefore, this study aims to verify the effectiveness of adopting the Creative Framework as a tool to stimulate innovative ideas and enhance the application of SisTEA during its requirements engineering process, thereby improving the delivery of value to the target audience.

## **II. Theoretical Foundation**

The process of identifying, analyzing, documenting, validating, and managing the requirements of a system or software is called requirements engineering. This discipline is directly related to the stages of discovering a new solution, being a crucial step for the development of quality systems and software (Sommerville, 2018).

According to Pressman and Maxim (2021), requirements engineering includes seven distinct but interconnected activities: (i) conception; (ii) elicitation; (iii) preparation; (iv) negotiation; (v) specification; (vi) validation; and (vii) management. In this sense, Mahaux et al. (2014) affirm that creativity is a crucial element for requirements engineering, enabling the discovery of new perspectives and elicitation of requirements for innovative information systems. Similarly, Ciriello et al. (2024) describe the current search for innovative concepts in the software market and emphasize the crucial role of creativity in identifying user needs and creating new tools and services.

The complexity and various problems involved in the software construction process can be mitigated or creatively resolved, allowing the development team to create inventive and innovative systems (Vieira, 2014). According to Mostert (2007), the creative process begins with identifying the problem, goes through the ideation of a solution and ends with sharing this idea with other people. This creative development can be influenced by the organizational climate or environment in which it occurs, which can positively or negatively affect the generation of innovative ideas.

A creativity session may include the following steps: (i) identifying the problem based on understanding the context in which the user is embedded; (ii) generating ideas using creativity techniques that stimulate the team and are compatible with the project objectives; (iii) carefully selecting and analyzing the generated ideas; and (iv) creating action plans to implement ideas with the highest potential for producing effective results (Mostert, 2007).

Creativity techniques consist of a set of actions established with a group of people, based on the identification of a problem, with the aim of analyzing, selecting and implementing creative and innovative ideas. As pointed out by Saha et al. (2012), the exercise of creativity techniques is essential for generating new ideas and obtaining better results in requirements engineering, being used both to discover creative and innovative requirements and to understand customer expectations. Likewise, Lemos et al. (2012) state that creativity tools and techniques offer opportunities for innovation and can be applied to improve the skills of systems analysts in the creative process, supporting requirements engineering. Dutra et al. (2021) emphasize that a framework is a pre-defined structure composed of techniques, tools and concepts used to solve problems in specific projects or areas. In general, it is a set of guidelines that provide an operating scheme with pre-established functions, allowing adaptation to the situations and institutions involved.

Following the same line of reasoning, Winkelmann et al. (2024) state that a framework can be defined as a structure or skeleton designed to facilitate the development of solutions in a specific field, starting from an initial base. Additionally, according to the authors, the framework provides a solid foundation and a structured approach, capable of identifying a problem and establishing the groundwork for its resolution in a specific field. Thus, the framework provides a clear and consistent path to guide research, ensuring the consistency and validity of the results obtained.

Therefore, by adopting a framework to define innovation strategies, organizations can optimize their processes, increase productivity, promote the reuse of knowledge and best practices, and ensure a consistent and reliable approach to achieving successful outcomes. A significant example is provided by Alves et al. (2024), who described the Creative Framework as a starting point for the organization to define its strategic innovation plan and establish the basis for managing the new ideas that will be implemented. The use of the Creative Framework, developed over 20 years with 48 participants from the master's program in Science, Technology, and Innovation at the Federal University of Rio Grande do Norte (Brazil), has proven to be a valuable contribution to entrepreneurs in various fields, providing support in the composition and execution of their strategic innovation plan.

Certainly, the aforementioned factors reinforce the need to enhance a creativity technique to explore it to its fullest. Therefore, the use of a specific innovation framework becomes fundamental to effectively apply this technique in a software development project.

### III. Objectives

The general objective of this study is to demonstrate the application of the Creative Framework as a requirement engineering tool in the process of developing innovative ideas to enhance the SisTEA application.

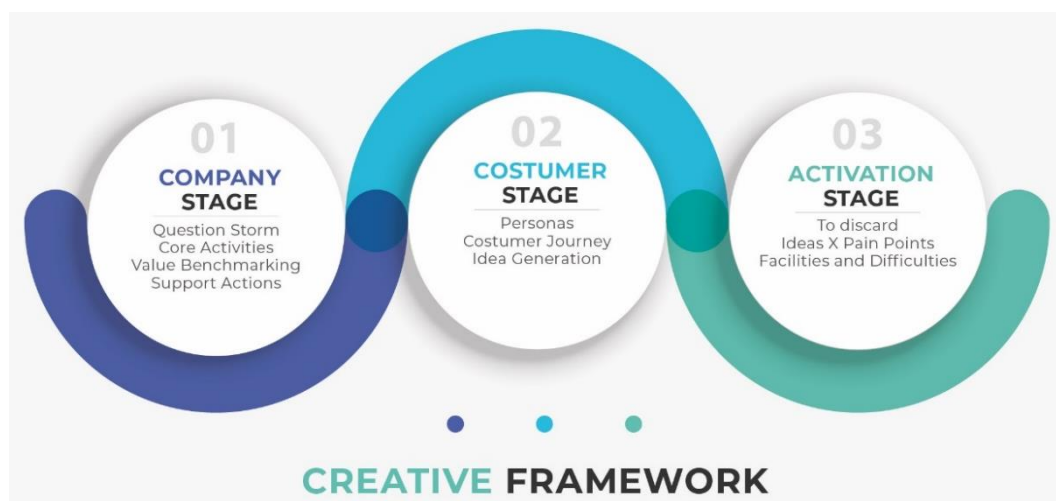
To achieve this objective, it is essential first to identify the needs and challenges of SisTEA application users. Next, it will be necessary to generate relevant ideas that effectively meet these needs, ensuring that the system can adapt and evolve according to these demands. Finally, it will be crucial to verify the feasibility of implementing the selected ideas, considering the necessary resources and potential obstacles that may arise. This set of steps will demonstrate the application of the Creative Framework as an instrument of requirements engineering in the process of developing creative ideas to enhance the SisTEA application, resulting in a significant improvement in value delivery to the target audience.

### IV. Material And Methods

The method adopted in this research follows an applied qualitative approach, utilizing systematic participant observation. Qualitative research is an investigative methodology that focuses on understanding and interpreting social phenomena. It seeks to explore and describe the complexities and particularities of contexts, experiences, and perspectives of participants, considering the meanings they attribute to the studied phenomena (Flick, 2009).

Participant observation, as a research method, provides an opportunity to gain a holistic and authentic view of the issues under study. The information collected will result in a deep understanding of the conceptual relationships between the problems and may also identify new challenges (Marietto, 2018).

Regarding the instrument used, the study was developed based on the application of the Creative Framework. This framework consists of a set of best practices and collective ideation techniques focused on creativity applied to innovation. The framework is divided into three stages (Figure 1) and utilizes various creativity-derived tools and methods such as Design Thinking, the 635 methods (involving 6 participants generating 3 ideas in 5 minutes), mind mapping, benchmarking, brainwriting, empathy mapping, personification, user journey, and prioritization techniques (Sabino et al., 2021; Dutra et al., 2021; Ribeiro et al., 2023).



In the first stage, called “Company,” the objective is to generate ideas focusing on business problems, seeking evidence, facts, and the company’s own identity. Activities in this stage include opening, question storming, core activities, mind mapping, idea generation, organization, selection, and presentation of generated ideas. Therefore, in the first stage, there is the identification of the company or business to be worked on and idea generation.

The second stage, called “Customer,” focuses on the human being, aiming to understand the journey and pains of customers. In this phase, activities such as documenting ideal personas for the company, mapping user journey, idea generation, and presentation are carried out. Thus, the second stage relates to qualitative characteristics with a focus on people and idea generation.

Finally, the third stage, named “Activation,” aims to achieve a viable outcome through suggestions, discussions, prioritizations, and final validation. Activities in this stage include converging to indicate the best strategic innovation idea for the project, matching solutions with customer pains and behavior, and prioritizing structure for business decision-making. In summary, in this last stage, there is the search for ways to activate the generated ideas and scenario simulation, evaluating which solutions are most viable for the company, considering ease and difficulty of implementation, and whether the solution is short-term, medium-term, or long-term.

It is worth noting that the Creative Framework is adaptable and can be applied in different ways, with or without the formation of groups. However, it is important to emphasize that satisfactory performance of the framework requires the formation of small groups of individuals.

### V. Application Of The Creative Framework

The Creative Framework was applied to a multidisciplinary group composed of six individuals, including four men and two women, aged between 18 and 30 years, with expertise in the following areas: nursing, product design, systems development, database management, and computer networks. The application took place in the Computer Laboratory of one of the units of the Grau Técnico Education Center, located in Natal/RN. The Miro platform was used to support the activities.

Furthermore, adhering to the ethical procedures suggested by Flick (2009), with the intention of ensuring total confidentiality for the participants, their names were kept confidential. This ensured that the information collected about them would be used in a way that prevents any identification by third parties. Additionally, efforts were made to prevent the use of this information by any organization that may act against the interests of those involved.

The collaborators were guided through three stages to suggest and discuss ideas in the brainwriting format. Stage 1, called “Company,” lasted three hours and fifteen minutes, and was divided into seven sections: Opening (understanding the business), Question Storming (mass question generation), Core activities, Activation actions, Mind mapping, Idea generation (using the 635 method), and Presentation of ideas.

**1. Opening (understanding the business):** In this initial activity, the SisTEA project leader conducted a 15-minute pitch presentation, sharing the history, business model, system structure, and its functionalities. The goal was to provide all participants with a clear understanding of the project’s initial purpose and planned functionalities, thereby facilitating their contributions to enhance the initial proposal. This phase was crucial for establishing greater empathy among the participants, creating an environment conducive to idea proposition, and reinforcing creative confidence, which in turn drove more effective idea generation for the business.

**2. Question Storming (mass question generation):** For twenty minutes, participants expressed their ideas in a less filtered and restrictive manner, aiming to extract information and gain a better understanding of SisTEA.

**Table no 1: Question Storming.**

Will the SisTEA App have accessibility?	How will the school, clinic, and family be connected?	Will the app have a school calendar?
Will the system be able to support simultaneous access?	What will the family input into the system?	Who are the actors in the system?
What are the benefits of the SisTEA App?	Will it be only for children?	How will the system help children with ASD?
Will children with ASD have access to the system?	What will children with ASD be able to do in the system?	What are the functions of SisTEA for the family?

**3. Core Activities:** Initially, for twenty minutes of brainwriting, divergent thinking was conducted, generating many ideas to deepen the understanding and perception of the business, as well as its relationship with the application users. Then, there was thirty minutes of discussion, organization, and selection of the four most relevant core activities to deliver value to the customer and contribute to competitive advantage (convergent thinking).

**4. Activation Actions:** During twenty minutes of brainwriting, participants were guided to think about actions that would support the activation of the four core activities, suggesting how these deliverables and solutions could be applied in the context and reality of the case study company.

**5. Mind Mapping:** Participants had fifteen minutes of discussion to correlate activation actions with core activities. Each action could be linked to more than one core activity.

**6. Idea Generation:** In this phase, lasting thirty minutes, the 635 method was used to generate ideas based on the entire repertoire created in previous activities, aiming to add value to the users of the case study application. In this activity, various general and specific ideas were generated.

**Table no 2: Idea Generation (635 method).**

Videos and cartoons	Playful interface with videos, spoken stories, memory games, and painting	Interactive interface with relaxing music
Educational games	Responsive and adaptable system (Android, iOS, and Web)	Audio books of children’s stories
Intuitive and include usage tutorials with videos	Share and monitor children’s activities	Sounds in the children’s section
Support for other languages	Encourage the child in a fun way when progress occurs	Customizable interface to better meet user preferences
Have a variety of color palettes and backgrounds	Easy and practical login and registration	Ability to upload backgrounds
Information feed	Ability to record moments, photos, videos etc.	Various interfaces

**7. Present Your Ideas:** Participants had forty-five minutes to discuss, prioritize, and present the most relevant ideas. From these, three ideas were considered feasible for application and activation in the case study to add value to the business.

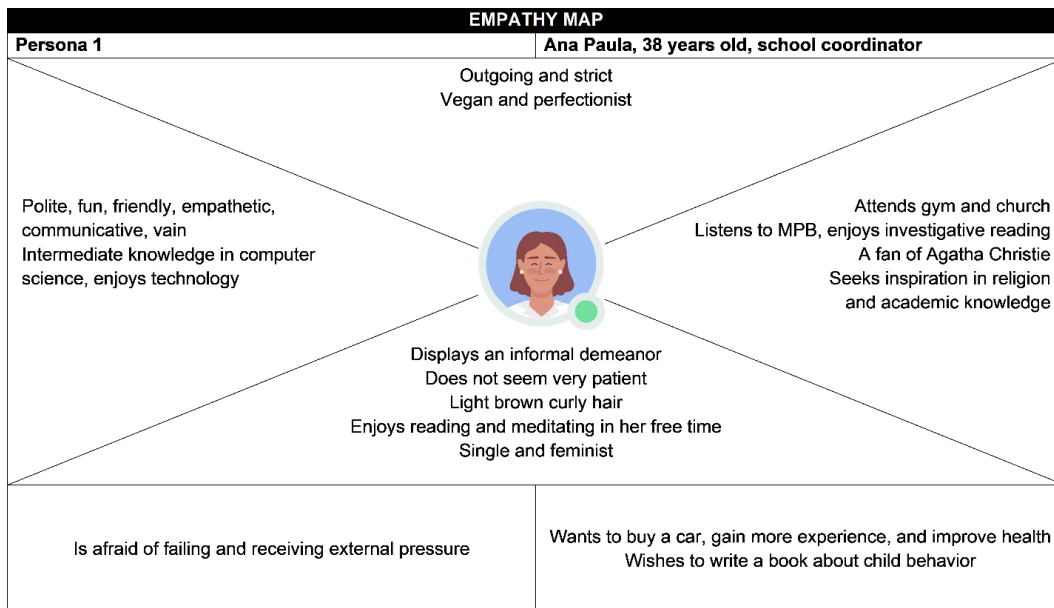
**Table no 3: Selection of the three best ideas.**

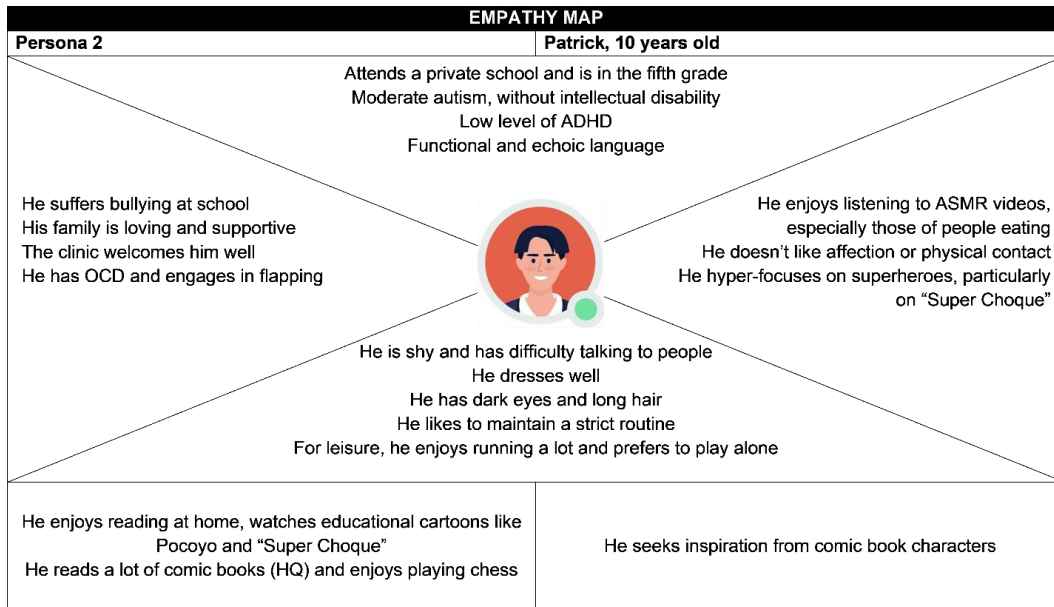
Playful interface with videos, spoken stories, memory games, and painting	Customizable interface to better meet user preferences	Responsive and adaptable system (Android, iOS, and Web)
---------------------------------------------------------------------------	--------------------------------------------------------	---------------------------------------------------------

As for Stage 2, “Customer,” lasting two hours, it was divided into five sections: Personas (documenting the ideal persona of the company and their main needs and pains), User Journey (mapping the routine behavior of the persona and potential touchpoints of the innovative solution), Idea Generation (sharing repertoires, generating individual ideas, and converging on the best ones), and Present Your Idea.

**1. Customer Feelings:** In this initial phase, for fifteen minutes, participants were encouraged to explore customers’ feelings and perceptions regarding SisTEA. This allowed for greater empathy with their expectations and concerns.

**2. Personas:** During this phase, participants had twenty minutes to create two personas: one representing a healthcare/education professional and another representing a child with ASD. Empathy maps were developed for each persona, aiming to understand their needs and pains.





**3. User Journey:** In this section, lasting forty minutes, the collaborators were encouraged to create the journeys of the two personas previously constructed. Through this mapping, it was possible to identify the crucial moments and the most significant pains faced by each persona throughout their experience.

**Table no 4:** Customer journey of persona 1.

Thursday
<p><b>Morning:</b>                      06:30 Wakes up and prepares breakfast.                      07:00 Accesses SisTEA to plan the day's activities.                      07:30 Takes the bus to school.                      08:00 Assists at the school reception.                      08:30 Accesses SisTEA on the school computer to manage incidents.</p> <p><b>Afternoon:</b>                      12:30 Lunch.                      13:00 Attends a meeting with teachers.                      14:30 Updates information on students' behavior and grades in SisTEA.                      15:00 Posts photos and videos of the children's daily activities for parents and entertainment.                      15:30 Visits classrooms to check on students' well-being.                      19:45 Ends work at school.</p> <p><b>Evening:</b>                      20:00 Returns home by bus.                      20:30 Takes a refreshing shower.                      21:00 Goes to the gym for planned workouts.                      22:00 Returns home.                      22:30 Has a healthy meal.                      23:00 Prepares to rest.                      23:30 Goes to sleep for a well-deserved night's rest.</p>

**Table no 5:** Customer journey of persona 2.

Tuesday
<p><b>Morning:</b>                      07:00 Wakes up and enjoys breakfast.                      07:30 Gets ready and heads to school by van.                      07:50 Arrives at school and participates in activities with neurotypical classmates.                      12:00 Returns home.</p> <p><b>Afternoon:</b>                      12:15 Takes a refreshing shower.                      12:30 Lunch.                      13:00 Takes a brief one-hour nap.                      14:00 Goes to the clinic for sessions with a speech therapist and psychologist.                      18:00 Returns home and watches the "Super Choque" program during dinner.                      18:30 Does homework using SisTEA.                      19:30 Enjoys leisure time with games, movies, and reading comics.</p>

Evening:  
22:00 Prepares for bed, ensuring a restful sleep for the upcoming Wednesday.

**4. Idea Generation:** Using the 635 methods again, lasting thirty minutes, participants focused on customer needs. Following this stage, there was a ten-minute discussion to select the most relevant ideas.

**5. Present Your Ideas:** At this point, participants had five minutes to present the three ideas considered feasible for application and activation in the case study, aiming to add value to the business.

Finally, Stage 3, “Activation,” lasting two hours and fifteen minutes, occurred in four sections: Let Go, Discard (convergence to indicate the best strategic innovation idea for the project), Ideas vs. Pains (convergence to match solutions with customer pains and behavior), and Ease vs. Difficulty (convergence to prioritize decision-making for the company).

**1. Let Go:** In this section, for fifteen minutes, participants were encouraged to critically and objectively analyze their ideas and approaches, identifying elements that could be improved or discarded to make proposals more effective.

**2. Discard:** Over 40 minutes, there was a convergence to select the best strategic innovation ideas for the project. Proposals were carefully evaluated, and those that did not meet the established criteria were discarded, focusing only on the most promising ones.

**3. Ideas vs. Pains:** In this section, participants spent 40 minutes analyzing how the selected ideas addressed and resolved the pains and challenges identified in the customer journey. Each idea was assigned a value based on its ability to meet customer needs, and ultimately, the ideas with the best evaluations were prioritized.

**4. Ease vs. Difficulty:** Over a period of 40 minutes, selected ideas were analyzed from the perspective of their ease and difficulty for activation. Participants assessed the required resources, potential obstacles, and implementation feasibility for each idea, assisting the company in decision-making regarding priorities. Data were collected through participant observation during the application of the Creative Framework, which was executed in three sessions, each lasting four hours, totaling twelve hours of interaction with a group of six participants (four men and two women) with multidisciplinary knowledge, especially in Information Technology.

This data collection approach involved an observer who was present and actively engaged in what was being observed. Throughout the collection process, the observer made detailed notes on the development of the Creative Framework and collected documents prepared during its application.

## VI. Results

The study evaluated the effectiveness of the Creative Framework in the development of the SisTEA application for children with autism spectrum disorder (ASD). The framework was divided into three stages: ‘Company,’ ‘Customer,’ and ‘Activation.’

In the ‘Company’ stage, activities were conducted to understand and explore the business related to the SisTEA application. This included identifying the needs and challenges of users, as well as understanding the company’s goals and objectives. This stage helped establish the foundation for generating innovative ideas.

In the ‘Customer’ stage, activities focused on the application’s users. Personas representing the ideal user profile and their main needs and challenges were created. The user journey was also mapped out, identifying points of contact for the innovative solution. Additionally, ideas were generated through a process of sharing experiences and converging on the best ideas.

In the ‘Activation’ stage, the generated ideas were evaluated and presented. The most relevant ideas feasible for application and activation in the case study were selected. These ideas aimed to add value to the business and meet the needs of SisTEA application users.

Through participant observation, it was possible to verify how the framework was applied in the requirements engineering process of the SisTEA application, enabling the generation of relevant ideas and enhancing the project. An example of a relevant idea generated during the process was the creation of a playful interface for the application, including videos, spoken stories, memory games, and painting activities. Another important idea was the development of a customizable interface to better meet user preferences. Additionally, a responsive and adaptable system compatible with Android, iOS, and Web platforms was proposed.

Therefore, the use of the Creative Framework contributed to structuring and improving the SisTEA application, facilitating the development of innovative solutions for the treatment of autistic children. The methodology used allowed a deep understanding of the process and provided a comprehensive view of the participants’ interactions and contributions throughout the board’s activities.

## VII. Conclusions

In this study, the Creative Framework was used as a tool to support idea generation and provide the necessary requirements for developing an adaptive system aimed at children with autism spectrum disorder

(ASD). The use of the Creative Framework contributed to structuring and enhancing the SisTEA application, facilitating the development of innovative solutions for the treatment of autistic children. Additionally, the methodology used allowed for a deep understanding of the process and provided a comprehensive view of the interactions and contributions of participants throughout the framework activities. In summary, this framework enabled a more structured and organized approach to the project, enabling the conception of more efficient and effective solutions to meet the specific needs of the target audience.

## References

- [1]. Alves, C., Wagner, L. S., Carvalho, Z. V., Gonçalves, M. M., & Alves, D. E. (2024). Creativity And Design Process To Raise New Business Models: Analysis Of A Cocreative Framework. *Journal Of Design Thinking*, 4(2), P. 175-190. Retrieved July 9, 2024, From <https://doi.org/10.22059/Jdt.2024.374960.1122>
- [2]. American Psychiatric Association (2022). *Diagnostic And Statistical Manual Of Mental Disorders: Dsm-5-Tr (5th Ed., Text Rev.)*. Usa: Apa.
- [3]. Bernier, R. A., Dawson, G., & Nigg, J. T. (2021). *O Que A Ciência Nos Diz Sobre O Transtorno Do Espectro Autista: Fazendo As Escolhas Certas Para O Seu Filho*. Porto Alegre: Artmed Editora.
- [4]. Brites, L., & Brites, C. (2019). *Mentes Únicas (2nd Ed.)*. São Paulo: Editora Gente.
- [5]. Centers For Disease Control And Prevention (2023). Prevalence And Characteristics Of Autism Spectrum Disorder Among Children Aged 8 Years — Autism And Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. *Mmwr Surveillance Summaries*, 72(2). Retrieved July 9, 2024, From <https://www.cdc.gov/mmwr/volumes/72/ss/pdfs/ss7202a1-h.pdf>
- [6]. Ciriello, R. F., Richter, A., & Mathiassen, L. (2024). Emergence Of Creativity In Is Development Teams: A Socio-Technical Systems Perspective. *International Journal Of Information Management*, 74. Retrieved July 9, 2024, From <https://doi.org/10.1016/j.ijinfomgt.2023.102698>
- [7]. Dutra, F. F., Alves, C., Carvalho, Z. V., Matamoros, E. P., & Sabino, W. C. (2021). Análise De Framework Criativo Cralves Para Potencialização De Proposta De Valor De Modelo De Negócios De EcoInovações. In *Acadêmica De Propriedade Intelectual (Ed.), Anais Do Vii Enpi*, 7(1), P. 2093-2102. Aracaju, Brasil. <https://www.api.org.br/conferences/index.php/enpi2021/enpi2021/paper/viewfile/1442/766>
- [8]. Flick, U. (2009). *Introdução À Pesquisa Qualitativa (3rd Ed.)*. São Paulo: Artmed Editora.
- [9]. Lamanna, J., & Meldolesi, J. (2024). Autism Spectrum Disorder: Brain Areas Involved, Neurobiological Mechanisms, Diagnoses And Therapies. *International Journal Of Molecular Sciences*, 25(4). Retrieved July 9, 2024, From <https://doi.org/10.3390/ijms25042423>
- [10]. Lemos, J., Alves, C., Duboc, L., & Rodrigues, G. N. (2012). A Systematic Mapping Study On Creativity In Requirements Engineering. In *Association For Computing Machinery (Ed.), Proceedings Of The 27th Annual Acm Symposium On Applied Computing*, P. 1083–1088. New York, Usa. <https://doi.org/10.1145/2245276.2231945>
- [11]. Mahaux, M., Nguyen, L., Mich, L., & Mavin, A. (2014). A Framework For Understanding Collaborative Creativity In Requirements Engineering: Empirical Validation. In *Institute Of Electrical And Electronics Engineers (Ed.), 2014 Ieee 4th International Workshop On Empirical Requirements Engineering (Empire)*, P. 48-55. Karlskrona, Sweden. <https://doi.org/10.1109/Empire.2014.6890116>
- [12]. Marietto, M. L. (2018). Observação Participante E Não Participante: Contextualização Teórica E Sugestão De Roteiro Para Aplicação Dos Métodos. *Iberoamerican Journal Of Strategic Management (Ijms)*, 17(4), P. 5-18. Retrieved July 9, 2024, From <https://doi.org/10.5585/Riae.V17i4.2717>
- [13]. Mostert, N. M. (2007). Diversity Of The Mind As The Key To Successful Creativity At Unilever. *Creativity And Innovation Management*, 16(1), P. 93-100. Retrieved July 9, 2024, From <https://doi.org/10.1111/J.1467-8691.2007.00422.X>
- [14]. Pressman, R. S., & Maxim, B. R. (2021). *Engenharia De Software: Uma Abordagem Profissional (9th Ed.)*. Porto Alegre: Amgh Editora.
- [15]. Ribeiro, W. D., Alves, C., & Santana, O. V., Jr. (2023). Criatividade E Inovação: Análise De Aplicação Do Framework Cralves Para Geração De Novas Ideias De Negócio Em Uma Startup Do Mercado Editorial. *Revista Brasileira De Gestão E Inovação*, 10(2), P. 40-55. Retrieved July 9, 2024, From <https://doi.org/10.18226/23190639.V10n2.03>
- [16]. Sabino, W. C., Alves, C., Carvalho, Z. V., Correia, E. F., & Dutra, F. F. (2021). Análise Da Potencialização Da Proposta De Valor Da Plataforma Tera A Partir Do Framework Cralves. In *Associação Acadêmica De Propriedade Intelectual (Ed.), Anais Do Vii Enpi*, 7(1), P. 2226-2235. Aracaju, Brasil. <https://www.api.org.br/conferences/index.php/enpi2021/enpi2021/paper/viewfile/1506/780>
- [17]. Saha, S. K., Selvi, M., Büyükan, G., & Mohymen, M. (2012). A Systematic Review On Creativity Techniques For Requirements Engineering. In *Institute Of Electrical And Electronics Engineers (Ed.), 2012 International Conference On Informatics, Electronics & Vision (Iciev)*, P. 34-39. Dhaka, Bangladesh. <https://doi.org/10.1109/Iciev.2012.6317443>
- [18]. Sommerville, I. (2018). *Engenharia De Software (10th Ed.)*. São Paulo: Pearson Education Do Brasil.
- [19]. Toma, M.-V., Turcu, C. E., Turcu, C. O., Vlad, S., Tiliute, D. E., & Pascu, P. (2024). Extended Reality–Based Mobile App Solutions For The Therapy Of Children With Autism Spectrum Disorders: Systematic Literature Review. *Jmir Serious Games*, 12. Retrieved July 9, 2024, From <https://doi.org/10.2196/49906>
- [20]. Vieira, E. R. (2014). Construção Do Guia De Padrões De Criatividade Para Desenvolvedores De Software. In *F. G. Teixeira, F. C. X. Da Costa, & V. G. Ribeiro (Eds.), 11º Congresso Brasileiro De Pesquisa E Desenvolvimento Em Design*, 1(4), P. 3154-3164. Gramado, Brasil. <https://doi.org/10.5151/Designpro-Ped-00128>
- [21]. Winkelmann, C., Barros, R. S., Mager, G. B., & Nickel, E. M. (2024). Frameworks Teóricos E Conceituais: Definições E Contribuições Para Pesquisa E Prática De Design. In *Sociedade Brasileira De Design Da Informação (Ed.), Anais Do 11º Cidi E 11º Congic*, 12(1), P. 540-552. Caruaru, Brasil [https://doi.org/10.5151/Cidiconcic2023-35\\_647518](https://doi.org/10.5151/Cidiconcic2023-35_647518)