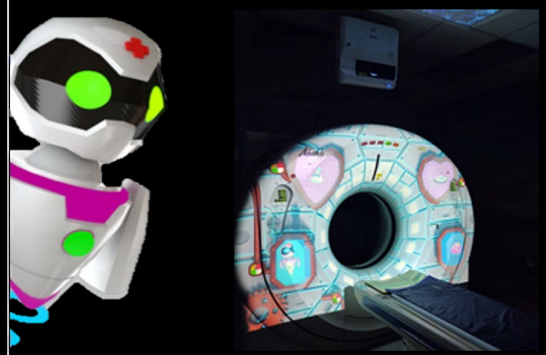
ALBERT EINSTEIN
SOCIEDADE BENEFICENTE ISRAELITA BRASILEIRA

RSNA 2022 | Empowering Patients and Partners in Care

Augmented reality and on-site projections: Taking pediatric CT examinations to the next level.



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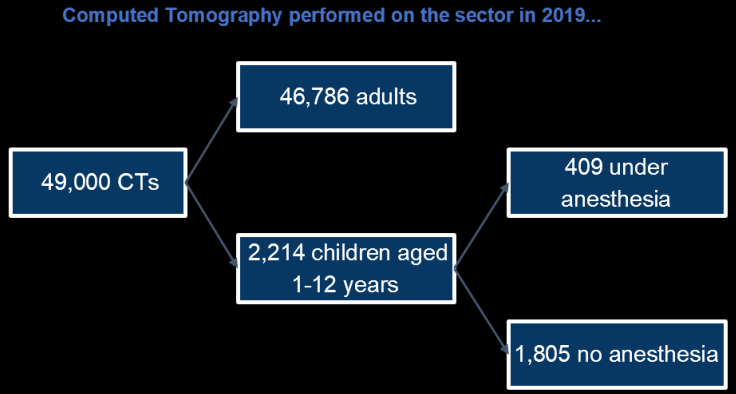
This Project was developed in partnership with Epson® do Brasil

Introduction

There are many challenges regarding pediatric CT, including indication precision, protocol optimization for adequate (ALARA) radiation exposure, methods for static image acquisitions, and managing patient and parents' anxiety.



- Most of the time, the CT exam is successfully performed without anesthesia, but the implementation of a more playful and welcoming environment brings the possibility of user interaction and distraction, allowing the best experience for both the child and relatives.
- Thinking of an innovative concept, we brought technology in favor of health, intending to bring an interactive, fun, and welcoming environment to the patient during the exam procedure.

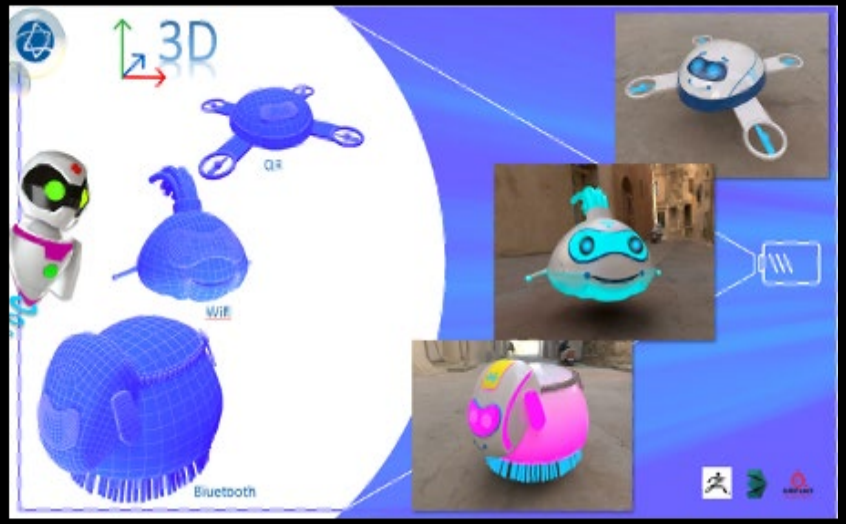
Purpose

- To improve the patient experience around the CT exam through an immersive augmented reality characterization of the scanner site and to report the system development, our initial experience, and further progress points.

Methods

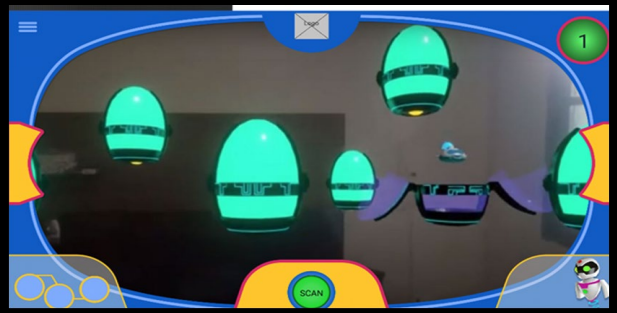
Through a governamental stimulus program (“Informatics Law” by the Ministry of Sciences, Technology, Innovation and Communications), we estabilished a partnership with Epson do Brasil to concept, create, develop and implement a new setup ambientation of pediatric CT scan, based on augmented reality immersive games and on site projections.

- A field research was carried out to choose the characters that most please children in a group of n=25 outpatient individuals ranging from 2 to 12 years old.
- A field survey was carried out with the leadership of the CT department to understand the main problems the sector has concerning processes.



- The next steps were the development of designs, scenes, and scripts by the 3D animation team, in addition to the physical structuring and installation of equipment. Finally, a survey was carried out with five qualitative and quantitative questions to measure patient satisfaction with the new technology.

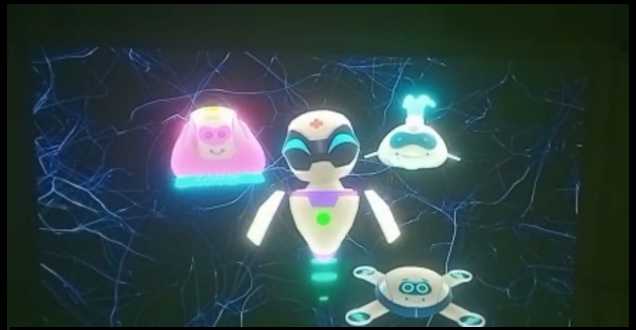
- To create a more welcoming environment and a differentiated experience, the first room with virtual reality, augmented reality, and pediatric interaction was installed for CT procedures.
- The interaction begins with an augmented reality game, where the children interact with MADA, a little robot that will be with them throughout the exam.



In this interaction, the children need to help MADA to find the BLIPES (dolls) hidden in eggs.

Methods

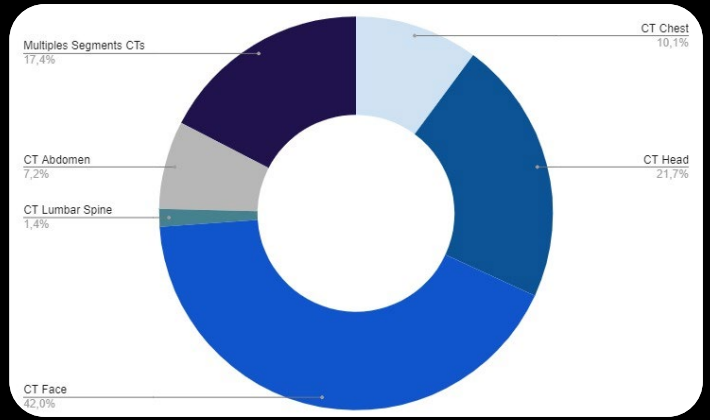
The children then are taken to the CT exam room and enter a virtual environment where, through augmented reality and projections on the ceiling, receive instructions from MADA and can simulate entering a spaceship.



Results

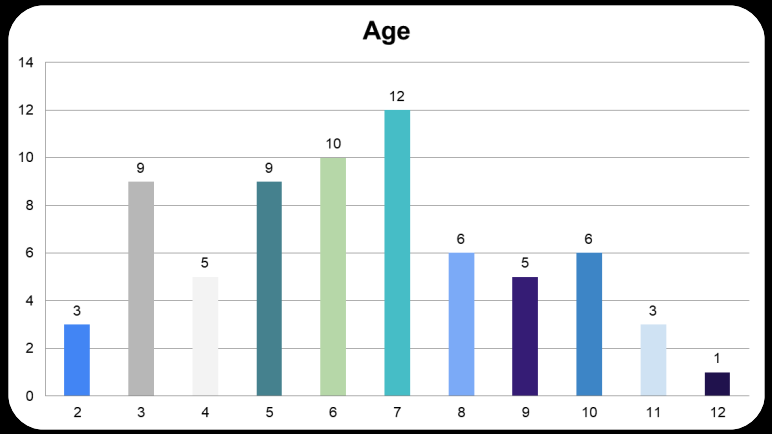
- The project was launched in February 2022, and 69 patients aged between 2 and 12 years were tested in the new setting.
- 9.7 average satisfaction score (from 0 to 10).
- Through the satisfaction survey “Ambiance and digital personalization in examination rooms and preparation of computed tomography for pediatric care” we could evaluate the improvement of this new experience from the point of view of the children and family.

Procedure



Proportion of tests performed according to the anatomical segment

Age



Age distribution of project participants

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Results

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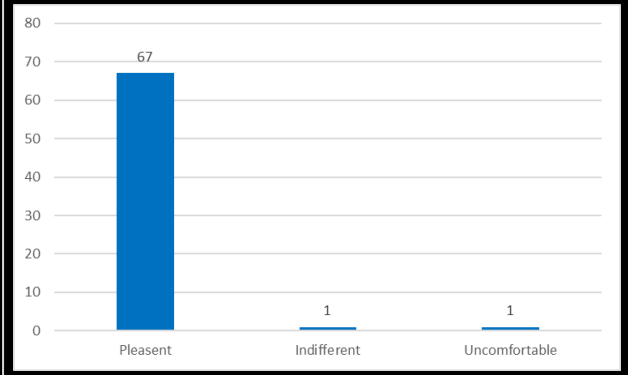
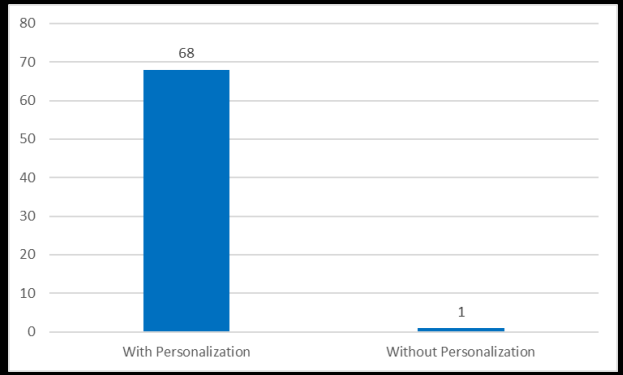
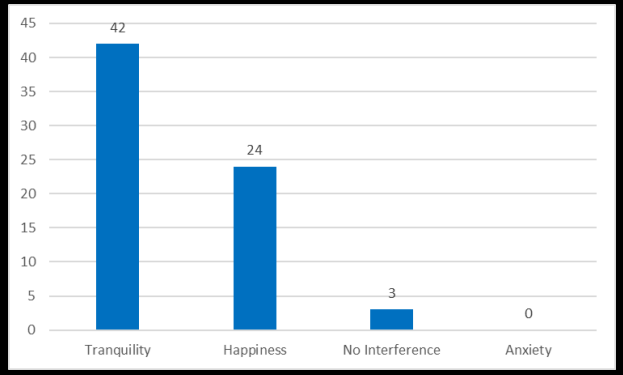
What is your opinion about the environment and personalization of the exam room? (pleasant / indifferent / uncomfortable).



In this graph it was observed that approximately 97% (n=67) of the patients felt in a pleasant environment.

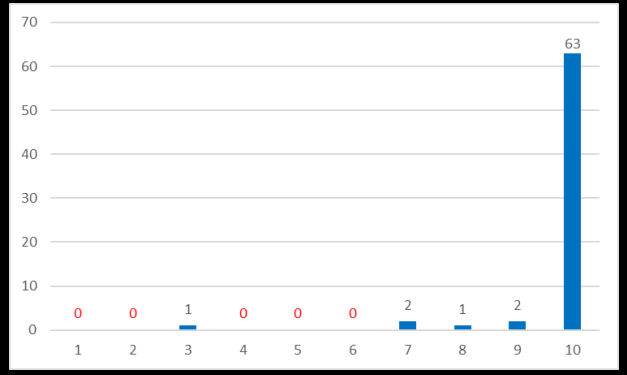


The setting and digital personalization brougth what feeling to the patient? (tranquillity / happiness / no interference / anxiety)



In this graph, it was observed that approximately 95.6% (n=66) of the patients felt calm (60.8%) and happy (34.7%) with the setting and digital personalization

On a scale of 0 to 10, how satisfied are you with the setting and personalization? (0 being dissatisfied and 10 being completely satisfied)

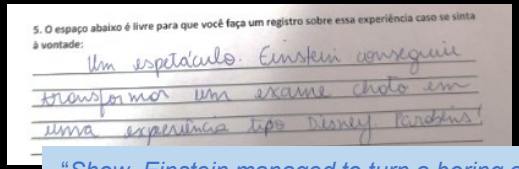


In this graph, the scale of patient satisfaction was measured in relation to the setting and digital personalization of the room. The average satisfaction was 9.7, representing 91.3% of patient satisfaction with a score of 10 (completely satisfied)

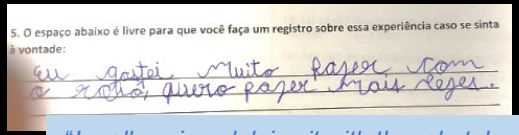
If you could choose, the CT scan would be with or without setting and personalization?

In this graph, it is observed that 98.5% (n=68) of patients prefer the room with setting and digital personalization.

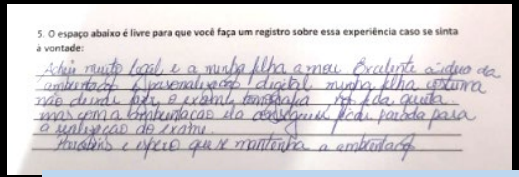
Results



"Show. Einstein managed to turn a boring exam into a Disney-like experience! Congratulations!"



"I really enjoyed doing it with the robot. I want to do it more often!"



"I thought it was really cool and my daughter loved it. the idea of digital ambiance and personalization is excellent, my daughter usually doesn't let the tomography exam be performed, she doesn't stay quiet. With the setting, she was able to stay still for the exam. Congratulations and I hope the atmosphere continues"

Limitations

- Although we did not perform comparisons before and after the new concept of the personalized digital ambiance of the CT room, we can already notice a positive reaction from the patient and parent's perspectives.
- We see as a potential bias the differences of care in the setting by the tech and nursery staff.
- As the number of examinations increases over time, we expect to be able to measure other indicators such as anesthesia rates, total time in the CT room, and image quality.

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Conclusion

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- The use of an immersive and interactive ambient with augmented reality games in the prep room and CT scanner is a powerful tool to enhance pediatric patient experience
- There are lots of potential regarding radiation dose exposure reduction, less risks related to anesthesia / sedation, and better, more diagnostic images
- Technology development is one of the key steps to achieve a patient centered care, transforming stressfull events in a delightful experience

Acknowledgements

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Thank You!

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