

Development of the educational App, Bees in My Garden, as an innovative tool for bees learning about bees



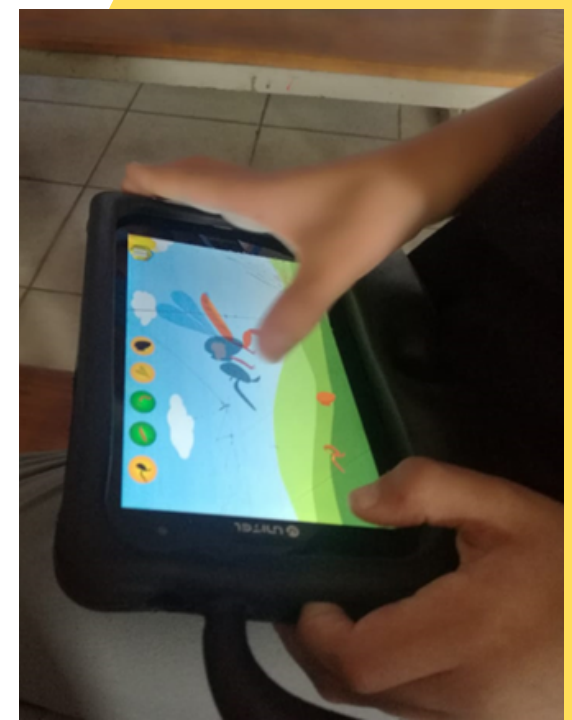
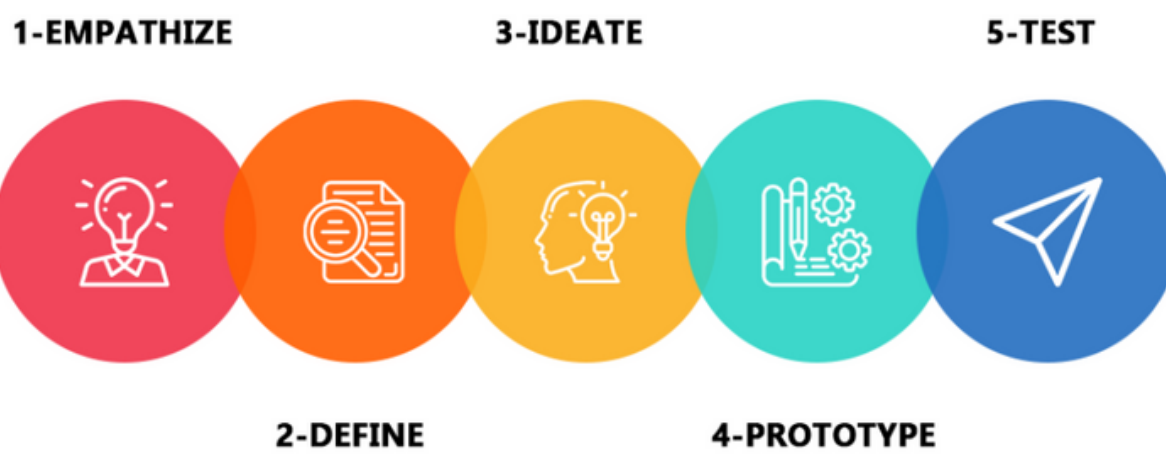
Paola Hernández Ching, Rafael Calderón Fallas, Beatriz Zepeda Ramírez
1 Centro de Investigaciones Apícolas Tropicales, Universidad Nacional

INTRODUCTION

The Tropical Beekeeping Research Center (CINAT) of Universidad Nacional, Costa Rica receives approximately 15 training requests on bees each year from mainly educational centers. Additionally, CINAT visits rural areas throughout the country where it is necessary to raise awareness among children about the importance and preservation of bees. However, the development of these activities requires a lot of logistics and adaptation of didactic material, which is a limitation for carry out these activities permanently.

METHODOLOGY

The Design Thinking (DT) methodology was used for the development of the application: empathize, define, ideate, prototype, and test. The problem to be addressed was analyzed, generating the thematic cores, and the application prototype was developed, which was validated with the target population in an educational center, allowing for improvements to obtain the Minimum Viable Product (MVP).



RESULTS

- The thematic axes of the app were divided into: **Bee Morphology, Main Contributions of Bees, Bees Face Dangers: Let's Learn About the Main Threats, and Hive Derivatives.**
- Apina (*Apis mellifera*) and Asalia (*Tetragonisca angustula*) are the two characters who, through interactive dialogues, present each game module and motivate participants to learn.
- A teacher support guide was developed for learning about bees, based on the third thematic axis on main threats, with activities for classroom work.
- <https://repositorio.una.ac.cr/handle/11056/26029>

CONCLUSIONS

- DT was a fast and effective tool for the process of ideation and prototyping quickly and economically.
- The MVP and the validation process allowed adjustments to be made to the necessary adjustments for the final version of the App.
- It is necessary to perform more tests on students using the App and the guide to validate the learning about bees.



- Conocidas como orugas de polilla.
- Es la única plaga que afecta tanto a las abejas adultas como a las crías.
- Reduce los niveles de miel y polen almacenados.
- Los excrementos y secreciones de las larvas provocan cambios de coloración y fermentación de la miel que provocan el rechazo de los panales por parte de las abejas.
- Son plagas que se alimentan de la cera de los panales y los destruyen.
- Son ácaros que se adhieren al cuerpo de las abejas y les causan heridas, impidiéndoles volar o hacer miel.
- Se alimentan de los productos de las colmenas: miel, polen y crías.
- Pueden vivir en los panales sin causarle ningún daño a las abejas.
- Aunque es una plaga, su vida en los panales provoca un incremento en la producción de miel.

