

Design and Analysis of Item Finder game

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Abstract— *Item Finder is a 3D mobile game that aims to improve the cognitive skills of users through dynamic object classification. Players must identify, categorize, and drag different 3D objects into a specific hole depending on pre-set categories like animals, birds, vehicles, planes, insects, and more. The overall goal is to combine fun with learning, stimulating attention, memory, and logical thinking in a rich game environment. Through the use of drag-and-drop mechanics, the game offers a haptic and intuitive interface that is accessible to users across all age groups. Every level of the game offers a new challenge with different combinations of objects and categories, increasing in complexity step by step. This allows for continued user engagement while encouraging mental stimulation and skill acquisition.*

Item Finder was created with a 3D game engine designed for mobile platforms, providing efficient performance, responsive controls, and nice-looking models. It shows how uncomplicated but valuable gameplay can be utilized for learning, making it an effective resource in formal and informal learning situations. This project is also an educational game design case study, integrating game mechanics with the principles of cognitive science. It adds to the emerging field of game-based learning by offering a lightweight, usable, and fun mobile game that invites players to think, respond, and learn. The abstract outlines the game idea, fundamental mechanics, development tools, teaching value, and future developments.

I. INTRODUCTION

Over the past few years, games have become increasingly popular as a means of education and cognitive growth. With the advent of smartphones and tablets, mobile games have transitioned from mere entertainment to efficient learning tools, behavior training, and mental skill development. Educational games, or "edutainment," combine interactive elements with formal learning to make skill acquisition fun. Item Finder is a 3D mobile game that aims to enhance object recognition, classification, and memory using interactive visuals and gameplay.

Players identify and classify 3D objects—like animals, autos, or aircraft—by dragging and dropping them into the proper slots. Active learning is facilitated by this hands-on activity, visual discrimination is strengthened, and rapid decision-making is encouraged. In contrast to passive memorization, Item Finder encourages interaction and motivation. Its bright, easily differentiated graphics engage users while incrementally increasing difficulty tests cognitive speed and flexibility.

The intuitive interface makes the game playable by both kids and adults. Parents and educators can utilize it to help young children reinforce learning, and the game also provides relaxed mental exercise for adults. The game's design creates opportunities to expand into education, therapy, and geriatric care. It is able to be translated to learning a language, learning STEM principles, or learning about culture by modifying object categories and themes.

Timed levels, distractor items, or additional layers of classification complexity could be added as future features. Multiplayer modes and leaderboards would further increase user interaction. From a UI/UX standpoint, Item Finder values simplicity and responsiveness, providing instant feedback through animations and audio that reward good behavior and correct errors in a gentle manner, providing a satisfying and informative user experience.

II. BACKGROUD LITERATURE

The evolving domain of mobile gaming has introduced several approaches to enhance cognitive development, user engagement, and educational merit through interactive processes. Different studies have discussed the potential of mobile games in augmenting learning outcomes, especially visual-spatial skills, categorization, and user experience. For example, Granic et al. (2014) investigated the cognitive impact of video games, focusing on their potential to enhance users' problem-solving and

visual attention. This aligns with Item Finder game objectives that support object categorization through the convenient drag-and-drop method. Gee (2003) theorized in favor of video games as the best possible learning spaces according to their ability to provide challenges in context-relevant, meaningful environments, thereby learning through doing.

The above theory supports Item Finder's mechanics by which the users receive instant feedback within the sorting process.

Moreno and Mayer (2007) pointed out that multisensory learning is especially important, suggesting that instruments taking advantage of several senses lead to better retention. Item Finder employing 3D visual prompts as well as tactile buttons fulfills this strategy. Regarding usability on mobiles, Zhou and Lu (2011) reiterated that easier-to-use interfaces minimize cognitive load as well as concentration in learning apps. Item Finder's minimalistic design helps achieve this by keeping players' focus on gameplay. Anderson et al. (2010) proceeded with how feedback and reinforcement were central components of learning programs, which Item Finder addresses through immediate correction of correct and incorrect sorting actions. Cheng and Yeh (2009) explored categorization games in early childhood education, proving that interactive categorization games improve logical thinking and object recognition. In the same line, Al-Azawei et al. (2017) highlighted inclusive learning technology design with the suggestion that control simplicity increases game accessibility to individuals with diverse needs. These studies in general support the Item Finder design approach as an accessible, learning, and fun mobile application.

III. PROPOSED METHODOLOGY

The development of Item Finder-an interactive 3D categorization-based mobile game-is rooted in a game-first approach to stimulating user engagement by means of fun learning. The strategy is centered on modular design, real-time interaction, and efficient asset utilization to enhance high usability, visual appeal, and performance.

Choosing a Technology Stack: The game was developed using Unity as the game engine due to its robust support for 3D graphics, physics, and cross-platform deployment. The scripting of game mechanics and logic was carried out with C#.

Blender was used for modeling and animating the 3D objects which were then categorized under themes like animals, birds, vehicles, planes, and insects. Android SDK tools were used for mobile deployment and optimization. Game Logic and Feature Integration: Basic features include object spawn, drag-and-drop, category recognition, and feedback mechanisms. The game checks whether objects are dropped in the correct "hole" based on their category and provides feedback visually and audibly. Modular code was used for each category such that new themes can easily be implemented in future updates.

Performance Optimization: Level loading and object pooling algorithms were implemented to reduce memory usage and offer better performance on low-end hardware. The use of light-weight textures and mesh models with optimized algorithms also contributed towards performance efficiency.

IV. RESULTS

Successfully designed and deployed an end-to-end mobile game where users drag and drop 3D objects into appropriate categories, enhancing object recognition, classification, and decision-making skills. Developed an intuitive, visually engaging interface optimized for various screen sizes and Android devices, ensuring smooth performance with minimal lag. Integrated responsive 3D models across categories like animals, cars, and insects. The game offers strong educational value for young learners and received positive feedback for its usability and fun. Built with scalability in mind, the modular architecture supports future additions such as new object categories, timed challenges, and multiplayer functionality.

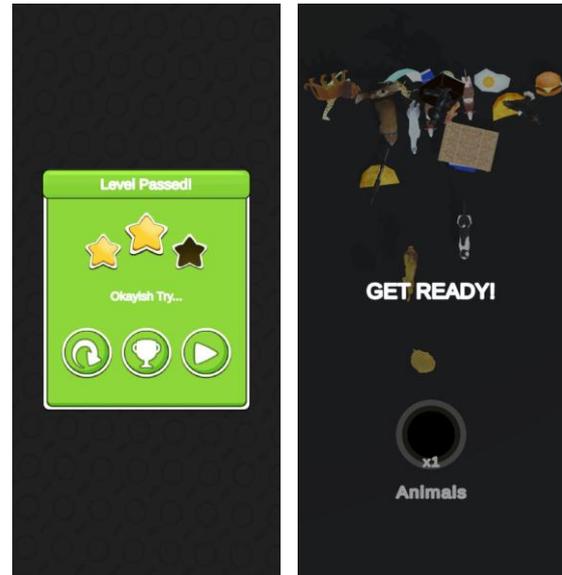
V. CONCLUSION

Item Finder is a mobile game that effectively combines entertainment with education by using drag-and-drop gameplay to sort 3D objects into categories like animals, birds, and vehicles. Designed with a user-friendly interface and responsive graphics, it appeals especially to young learners while enhancing skills like recognition, memory, and decision-making. Optimized for Android devices, the game offers smooth performance and has received positive feedback for its design and challenge level. Its modular

architecture allows for future features like timed challenges and multiplayer modes. Item Finder demonstrates how interactive mobile apps can make learning engaging, accessible, and fun.

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VI. APPENDIX

