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# Cerebrex Ultimate

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## Short Game Description

*Cerebrex Ultimate* is a serious educational videogame with the objective of improving the cognoscitive processes of players, specifically in the numeric, visuospatial, memory and rational areas. Players are faced with a variety of minigames which need to be completed in order to obtain materials, collectibles and virtual money. Materials can be used to obtain new equipment for the player's avatar. The game uses high-end 2D graphics, music and thematic game elements to immerse the player in the Mayan culture.

## Game Overview

*Cerebrex Ultimate* is a browser based game (also available on Android) that includes 12 minigames in total, each minigame is of one minute duration and are categorized by area. The four areas of *Cerebrex Ultimate* were chosen among the main cognoscitive areas because they can be easily implemented as game mechanics. From a learning perspective, each minigame was designed to contribute to the respective area's cognoscitive processes. All minigames can be replayed indefinite times in order to improve the game score, a daily test mode challenges the player with a group of four randomly selected minigames from each area. Players need to complete the daily test mode in order to register their best scores in the player ranking list, this list include the best scores from players of the same school and can be filtered either by grade or year.

Statistics are stored on the game data base and include a dedicated interface to present the data to the players. All players can access this interface and can check their performance on each minigame, the recent scores and the dates of the scores. The statistics interface features multiples views, a graphic with all four areas shows the best score forming a blue diamond that illustrates the overall balance, graphics for each area can be viewed as well.

A very important aspect of the game is the theme, a Mayan theme was used to emphasize on the cultural aspect. The Maya was chose since the game was developed in Guatemala, it was mean to be used as a way of identifying oneself with the historical culture of the country. Although the theme is supposed to appeal to local players, the game is multilanguage and players around the world can learn more about the Mayan culture while playing.

## The Game Elements and Core Mechanics Game Feedback and Progress

A game progress system was designed as one of the main game elements to keep players immersed in the game. The system implements experience points (XP) which are needed to level up, an exponential equation was used to calculate the XP needed for the next level, making each level more difficult to reach. A progress bar indicates the total XP needed for the next level as well as the current XP earned, the maximum player level is 40.
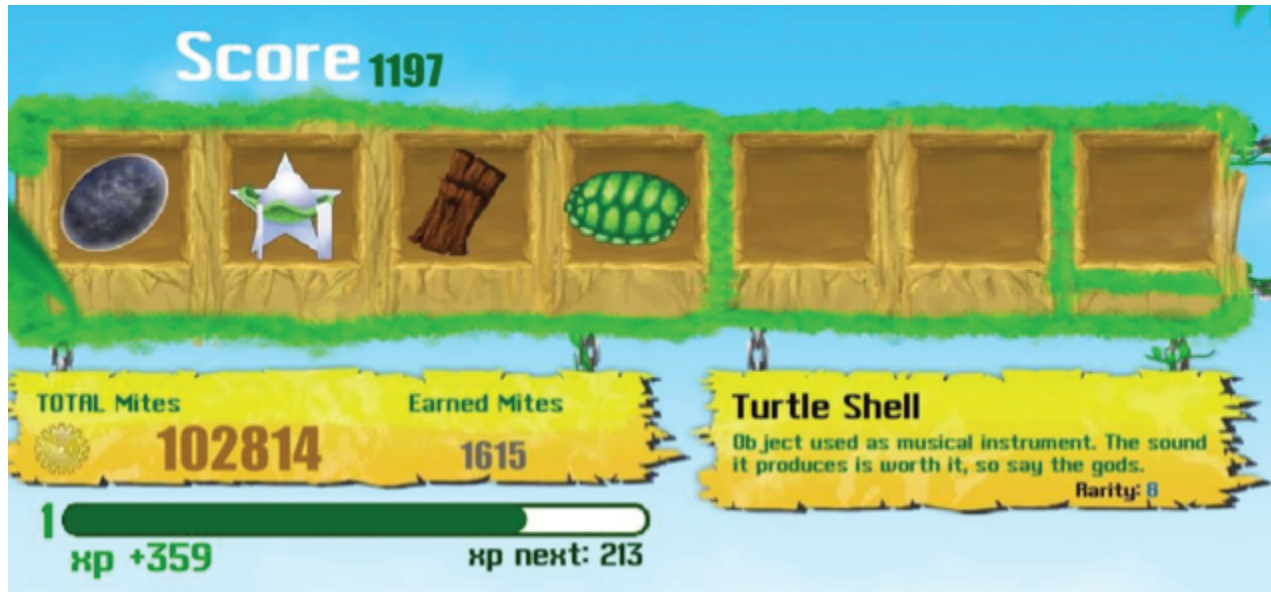


*Figure 1. In-game screenshot of the XP progress bar in the rewards interface.*

## Relics and Virtual Money

The relics are collectible objects that players can obtain by completing the minigames, players can view their relic collection on the player profile interface as well as sell them to earn virtual money. A total of 28 relics exist on the game and there is no limit in the number of relics that a player can own. Each relic has its own level of rarity, it determines the probability of the player to actually get it as reward at the end of a minigame. Performance in minigames determine the number of relics earned and the rarity dictates which relics are given as reward.

The virtual money is called "Mites" and introduces an economy system into the game. Mites can be earned by either completing minigames or selling relics, the higher the rarity level of a relic the higher its selling price is. The mechanic includes selling and buying items, this requires the player to manage the game money responsibly, deciding which items are the most necessary and which items can be sold are all part of systems thinking.

*Figure 2. In-game screenshot of the relics collection interface.*

## The Player Avatar and Equipment

The avatar is the player's representation within the game and a way of self-identification. The pieces of equipment are objects that introduce customization into the game and can be equipped to the avatar in order to change his appearance.

Equipment is the most important game mechanic since it allows the player to change the game rules, thus having a direct impact on game dynamics given that it could totally change the drop ratios for relics and money earned. *Cerebrex Ultimate* has game rules like the duration of each minigame, the score given per hit, score lost per miss and the relic drop ratio based on the rarity level. All the mentioned game rules can be altered by using different pieces of equipment, each piece of equipment has a different ability and can be purchased at the game shop in exchange of Mites and relics, more powerful equipment requires relics of higher rarity level and more Mites. All these game mechanics introduces a whole new level of systems thinking into an educational game.

## The Game Balance

All the game mechanics fit together with the final objective to keep the player engaged while playing an educational game. The money management, planning and strategy required to obtain the best equipment is part of the design to create a game world in which the player can achieve a sense of progression, responsibility and autonomy. Balancing the game mechanics such as the drop ratios, amount of money given, the power of each piece of equipment and item prices was the most difficult task in the design process, even at the end it might not be perfect.

## Acknowledgments