

The Brave Little Troll

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ABSTRACT

In this paper, we tell about our project, a game designed for helping deaf children to learn rhythm.

Categories and Subject Descriptors

K.3.1 [Computers and Education]: Computer uses in Education – *computer-assisted instruction*; K.8.0 [Personal Computing]: Games.

General Terms

Design, Human Factors.

Keywords

Learning game, rhythm learning, game design, learning disorders, deaf and hard of hearing.

1. INTRODUCTION

The Brave Little Troll computer game is a joint creation between Media Lab Helsinki and the Finnish Association of the Deaf. The game is an educational tool designed for deaf and hearing-impaired (DHI) children aged 4 to 7. It aims to improve children's abilities in identifying and producing rhythmic patterns before they commence school. This supports language perception and the early development stages of reading and comprehension.

2. THE BRAVE LITTLE TROLL

The Brave Little Troll aims at highlighting the characteristics of learning disorders experienced by deaf and hard of hearing (DHH) children. It has been scientifically proven that disorders in perception of rhythm are linked with difficulties in learning. Rhythm helps in grasping and understanding the various time intervals both in our day to day activities as well as in learning: we breathe, walk and read in specific rhythms. According to studies [Karma 1989, 1998; Overy 2003, 2008; Meronen 2004], the difficulty in identifying or producing time intervals may be related to dyslexia or other language disorders that cause learning difficulties.

As rhythmic exercises can help in sensing these various time intervals, the game provides an engaging, effective and encouraging way for the DHH children to learn rhythm [Kirriemuir and Mcfarlane 2003]. The rhythmical concepts are embedded in the computer game built on Terttu Martola's exercises and Russ Palmer's music-therapeutic methods. Their teachings are based on the idea that people can feel rhythm through their bodies and understand rhythm visually. Both

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therapists have focused on linking rhythm with physical education to improve children's abilities to observe their visual environment, music, and culture. Similar methods have been used in UK (Naomi Benari), Sweden (Annika Salmonsson) and Norway (Aase Lyngvær Hansen).

To meet the needs of deaf children, the game functions without language or sounds: it makes musical concepts accessible without audible impulses through transforming them into a visual form. Thus, the game is used in redesign the learning environment of these children; it is purely based on visual and kinetic logic, instead of auditive one, helping DHH children to overcome mental barriers to learn music, and thereby, increase their motivation to practice rhythm.

To further strengthen children's investment in learning, the game utilises the power of stories [Gee 2003]. The troll takes the player into a journey of different kinds of rhythms that situates player's actions into a meaningful context. The game play follows a story in which a little troll-boy wakes up when vultures attack his village. They steal the adult villager's orb hearts – which represent their inner rhythm. In the morning the village is in chaos: the villagers are unable to perform their morning chores without rhythm. The troll decides to save the adult villagers. During the journey, the player needs to produce various rhythm patterns in order to guide the brave troll to the stolen orb hearts.

A progressive game play introduces various rhythms, moving from basic rhythm patterns to more complex ones through different activities. In the initial game level the player needs to follow the vultures to a faraway island by rowing a boat following a constant rhythm. If one fails, the rowing stops. On completion of each challenge the troll is given an orb heart and becomes one step closer to saving the village adults. This cycle of integration of old and new rhythm skills is repeated throughout the game: the child needs to follow a monkey, jump across a wild river, ride along a dangerous mountain path, and climb up a castle wall progressively moving from easier to more complex rhythms. This repetition of actions and rhythms is especially important for children, who love and learn through it [Höysniemi 2006].

The Brave Little Troll game provides instant visual feedback on player's actions through animation that clarifies the concept rhythm. The game uses a rhythmic indicator and an animation style to provide the user with strong visual cues throughout the game. The rhythm indicator uses a colour code and cue bar. Green dots indicate when the player needs to press the key to move the character and obtain points. The animation style follows the game rhythm; once the player presses a key, the character will leap forward and then pause until the key is pressed for the next movement. This motion highlights the rhythm pattern and is more

effective than keeping a constant pace for the character's animation. Thus the animation style will follow the rhythm concept so that players see the movement pattern in the character animation, further reinforcing their learning. This system aids playability and allows players to understand the rhythm as a more simplified visual pattern.

The Brave Little Troll is an important educational tool and raises a number of pedagogical issues concerning the perception of rhythm by DHH children, learning in the context of gaming and designing for the Deaf community. Through further user testing, research and ongoing development of the game in conjunction with physical interaction, the OSATA ("Knack") project aims to raise awareness for such issues, develop accessible tools and find pedagogical solutions to aid deaf or hearing-impaired children.

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