

Introduction

Two-dimensional graphics is used in the majority of current 2D games [Figure 1]. However, 3D virtual environments are more compelling. Previous research^[1] found that females tend to choose easy and fun games rather than challenging games. While there are many serious games aimed at the educational function, these games need realistic graphics to attract users. Realistic graphics may also enhance a user's understanding of the game.



Figure 1. Mario Forever

We have build a 2D game that uses 3D characters. The physics and game play have been restricted to occur in a single 2D plane. As shown in figure 2, the goal of the game is for Lerpz to find a white ball after jumping over the spaceship. If the Lerpz touches the spaceship, the player will lose the game.

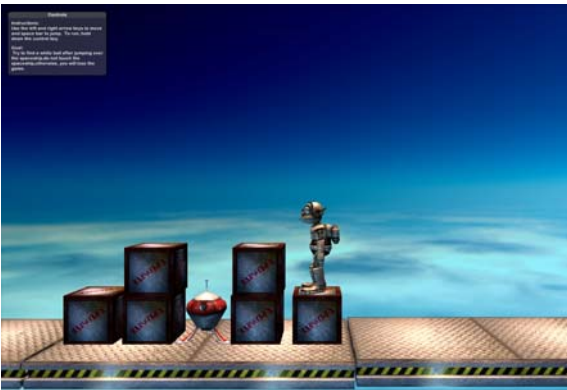


Figure 2. Lerpz, a 3D character in a 2D environment

Note that the environment above appears to be 3D, but it really is 2D. The objects are in 3D.



Figure 3. 3D character

The character, Lerpz, is a Maya character with animations, so it can jump, run, and walk. We thank Unity3d^[2] for the character.

We used the latest game engine, Unity3d^[2], to build our game and take advantage of 3d objects. We put in some light effects for the character's clothes to have a metal gloss [Figure 3].

We also used particle systems to make the game more realistic. A particle system can be used to simulate anything from fire, smoke and explosions to star-fields. In our game, the particle systems [Figure 4] can produce a flame-like effect, and a dusty effect.



Figure 4. Particle systems

Conclusions and Future Work

It has been stated that "the crucial extra dimension is the key to a whole new breed of game ". 3D graphics not only adds an extra dimension, but also adds complexity to a game. A better way maybe to use the 2D-environment/3D-objects paradigm as shown above. This results in the ease of 2D game play, and the beauty of 3D graphics, which meets the need of games for girls and educational games. From an intuitionist point of view, 3D characters lead to funny and high graphic quality game. However, more experimental data is needed from future research that compares males and females playing 2D-environment/3D-objects games.

References

1. Ziemek, Tina K., 2006. "Two-D or not Two-D: Gender Implications of Visual Cognition in Electronic Games", Proceedings of the 2006 Symposium on Interactive 3D Graphics and Games, pages 183-190.
2. www.unity3d.com
3. Rouse, R. 1998. Do computer games need to be 3D?, ACM SIGGRAPH Computer Graphics 32, 2, 64-66.