Chapter 14

Hybrid Representation: Embodied Pedagogical Agent Interface Design

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ABSTRACT

This chapter discusses the design of embodied pedagogical interface agents. The ultimate aim of the discussion is to suggest categorical or thematic design guidelines for pedagogical agents. The intent of the guidelines is to encourage multimedia designers to go beyond the current “one size fits all” mentality and encompass issues of race and gender in a way that provides meaningful learning experiences for a greater number of persons. The discussion will consider 43 participants’ self-construction of embodied pedagogical interface agents to identify issues of race, gender, and other design characteristics. Grounded theory methodology was employed to provide additional insight into the design and creation of each participant’s pedagogical interface agent. Four agent designs are included as appendices for reference.

INTRODUCTION

The computer interface can be simply described as the arrangement of information on a computer screen that is easy to understand and manipulate with symbolic icons, pull-down menus, and a mouse. An interface agent, or avatar, is an image which can represent a player in online games, chat rooms, etc. and which can be moved around the screen using the mouse or keys. It may be important to note this research does not investigate avatars found in Internet programs (e.g., Yahoo Messenger, Second Life, etc.) or those utilized in online gaming (e.g., Tomb Raider, Doom, etc.). The agent types investigated for this research are called embodied (human-like) pedagogical
interface agents that contain the rules of a game or program, much like a tutorial. I did not investigate avatars found in Internet programs (e.g., Yahoo Messenger, Second Life, etc.) or those utilized in online gaming (e.g., Tomb Raider, Doom, etc.). Used in “real-time,” embodied pedagogical agents are designed to include the constructs of social interaction, guidance, and feedback. These conversational traits can also include non-verbal gestures and body language. The goal of an embodied pedagogical agent is to facilitate a better understanding of concepts by utilizing various teaching strategies within an interactive learning environment (Cassell, 2001, 2002; Johnson, Rickel, & Lester, 2000; Rist, André, & Müller, 1997).

It is my belief that if based on human social interaction, the animated behaviors and responses of a constructed agent fall within the same socially constructed paradigm of identity of the user that created them. In addition, because race and gender are integral aspects of identity, it is my assumption that by examining these issues we may gain insight into effective design characteristics and a broader, or more comprehensive, view of the value students place on interface agents within multimedia tutorials.

To examine the design and utilization of interface agents within a framework focusing on issues of race and gender, this chapter begins with a statement of the problem and the primary research question. The chapter then turns to an overview of a brief history of pedagogical interface agent design, theories of computer-based learning and instructional multimedia design. I then provide a basic review of the literature discussing cultural referencing in multimedia. Next, research methods, data collection, and data analysis strategies used in the research are discussed. The chapter concludes with a discussion of issues raised and the summary conclusion. For readers new to the field of artificial intelligence and computerized interface agents, a glossary of terms is located at the end of the chapter.

**STATEMENT OF THE PROBLEM**

There is a limited amount of research in the Artificial Intelligence (AI) field which explores issues of gender or race in the design of embodied interface agents. Therefore, the purpose of this research is not to examine the tutorial construction design or the internal architecture of embodied interface agents, but more to look at the outward design and identity of the agent. As such, the purpose of the project is to examine the student’s self-construction and design of embodied pedagogical interface agents to identify issues of race, gender, and other design characteristics.

**Research Questions**

In order to explore the intersections of race, gender, self-representation, and students’ perceptions of the relatively new field of embodied pedagogical interface agents, the research was guided by a primary research question followed by three sub-questions.

**Primary Research Question**

What are the factors (perceptions) underlying the self-construction of pedagogical agents?

**Sub Research Questions**

1. What perceptions underlie and influence a student’s choice of external features in his or her self-constructed embodied pedagogical interface agents (hair color, eye color, clothing, jewelry, scenic background, etc.)?
2. What perceptions underlie a student’s choice of gender with his or her self-constructed embodied pedagogical interface agents (male, female, androgynous)?
3. What perceptions underlie a student’s decision for the race or ethnicity of his or her self-constructed embodied pedagogical interface agents?