



Avatars, Student Friend, Lecturer Foe? The Use of Avatars to Support Teaching and Learning

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1.0 INTRODUCTION

Embodied intelligent agents (avatars) are increasingly being conceptualized and incorporated in interactive educational technology with the aim of making the learning process more engaging for learners. Researchers have proposed the use of avatars to reduce the overheads involved in delivering online education, to monitoring certain course activities and to delegate certain instructor tasks to avatars (Johnson et al., 2000, Songa et al., 2004, Canole, 2002).

In the 1990s some avatars were developed to support learners e.g. Herman the Bug (Lester et al., 1999), Steve (Soar Training Expert for Virtual Environments) (Rickel and Johnson, 1999) and Adel (Agent for Distance Learning) (Shaw et al., 1999). However, the limited evaluations of these implementations were largely quantitative using short-term interactions with experimental systems still under development (Moundridou, 2002, Dehn and Mulken, 2000, Buisine et al., 2004). A more holistic approach to evaluation, incorporating qualitative and quantitative techniques, may be more appropriate. Specifically, this research was conducted in a Malaysian University that had been using various avatars in e-learning environments for over 5 years. Therefore, we aim to provide additional insights into learners' and educators' perceptions of the utility of educational avatars in interactive multimedia learning environments. The results of the research will be useful to practitioners and researchers of avatar development. The key outcome of the research is a conceptual design and evaluation framework for the incorporation of avatars in educational technologies.

2.0 METHODOLOGY

Data collection was undertaken by the second author who is an academic member of staff at the institution and a native Malaysian, this 'insider' perspective expedited data collection and enabled a deeper understanding of the issues raised. The research design process was executed in five phases:

2.1 The first phase – Planning & Preparation

This study is concerned with interpreting human action and perceptions, therefore the epistemological and methodological approach is interpretive and qualitative (Klein and Myers, 1999). Three seed research questions were explored:

- *What roles can avatars effectively assume in on-line learning environments?*
- *When, how and for whom would those roles be initiated?*
- *Do social and cultural factors influence the interaction between the members and avatars?*

A supporting conceptual framework was developed comprising of learner characteristics (Sabry and Baldwin, 2003), technology, learning environment, culture, learning process attributes (Canole, 2002) and learning outcomes (Khalifa and Lam, 2002).

2.2 The Second Phase - Fieldwork

The fieldwork consisted of 21 video recorded in-depth interviews with lecturers, postgraduates and undergraduates. Avatars that interviewees used included AliceBot, BonziBuddy, Steve and Cosmo. Simulated propositions were presented to the interviewees with the aim of stimulating a response and any areas of disagreement were revisited. Conclusions or summaries were then drawn concerning the interviewees' points of view.

2.3 The Third and Fourth Phase – Summarizing and Aggregating the Data

The data was summarized and coded by categories using qualitative data analysis (QDA) software. The outcomes of this phase were summarised in a role-ordered matrix, an effects matrix, a conceptually clustered matrix and a cultural meta matrix. Table 1 is an extract from a role-ordered matrix which shows a subset of emergent roles.

Avatar Roles	Types of Members		
	Lecturer	Post Graduate	Under Graduate
Personal Assistant (PA)	Pros: Routine laborious tasks. Answer the FAQ. Issues: Don't overrule me.	Pros: Search material in a more effective way. Issues: Prompt speed & effectiveness	Pros: Quite optimistic and forward looking? Issues: Accurate search engine based on my interests required.
Tutor/Demonstrator (PT)	Pros: Explain in different ways. Issues: Must complement me in my absence.	Pros: Useful when learning new tools. Issues: Not impressed by looks, requires service	Pros: 24/7 service, interactive, guiding assignments. Issues: Sustain the member's interest.
Lecturer (L)	Pros: Help new lecturer. Issues: Will be a threat. Can't beat F2F.	Pros: Able to get quick advice Issues: Unlikely to provide required depth of response	Pros: One-to-one. May overcome shyness Issues: Social ability
Counsellor/Advisor (C)	Pros: None stated. Issues: May sacrifice student-lecturer relationship	Pros: Advice on general research matters. Motivation support. Issues: Previous experience essential.	Pros: Advise on career opportunity & personal matters. Issues: Knowledge first then appearance.
Peer/Buddy (P)	Pros: None stated. Issues: None stated.	Pros: None stated. Issues: None stated.	Pros: Companion when lonely. Issues: None stated.
Entertainer (E)	Pros: To alleviate boredom. Issues: None stated.	Pros: None stated. Issues: None stated.	Pros: None stated. Issues: None stated.

PA = Searching for academic information, scheduler, reminder service, reply to e-mail.
PT = Tutoring, error identification, demonstrate, experiments.
L = Q&A, clarification, conceptual and motivational discussion.
C = Give advice on academic matters.
P = Quick confirmation/reference, social chatting/discussion.
E = Virtual entertainer during free hours, relaxation.

2.4 The Fifth Phase – Construction of the Explanatory Framework

Evaluation framework and supporting QDA derived node models (see figure 1).

3.0 RESULTS

Table 2 highlights a number of key findings, abstracted from the matrices.

3.1 Avatar Roles

In principle lecturers were willing to delegate laborious, routine ‘low-risk’ tasks to avatars e.g. managing appointments. The major barrier being the time required to gain familiarity with, and train the agent. For more advanced roles it was recognised that a more constructivist, learner-centred approach to education would benefit students and that, theoretically, an avatar could operate as the ‘guide-on-the-side’, e.g. an avatar explaining subject matter in an alternative way to support the student’s learning style. Issues of trust and loss of concentration were raised as were the possibility that avatars may tarnish the image of the lecturer, effect lecturer-student relationships or pose a potential threat to teaching careers.

Postgraduates were not interested in avatar aesthetics, they focussed on context specific advanced functionality. Undergraduates focussed on more informal avatar roles to help them overcome feelings such as shyness and inferiority, they also emphasised repeated one-to-one interaction on the same topic within a confidential environment and interaction at the intellectual level of the undergraduate – a personalised user profile.

3.2 Social and Cultural Influences

The interviewees proposed that customisation of language, looks and communication styles be incorporated into avatars. Also, with respect to the Malaysian context, culturally there is a reluctance to query academic authority. The respondents saw avatars as an opportunity to

act in a less reserved fashion and adopt a more critical style of interaction.

Social factors included the ability to personalise avatar interaction dependent on a student’s profile. Interviewees proposed that avatars use informal, friendly language, communicating at the intellectual level of the user and taking the role of tutor, counsellor or buddy rather than the more authoritarian lecturer stance.

3.3 Avatar Design Framework

A summary of the multiple academic and student perspectives was developed using the QDA NVivo Modeller (figure 1).

4.0 DISCUSSION AND CONCLUSIONS

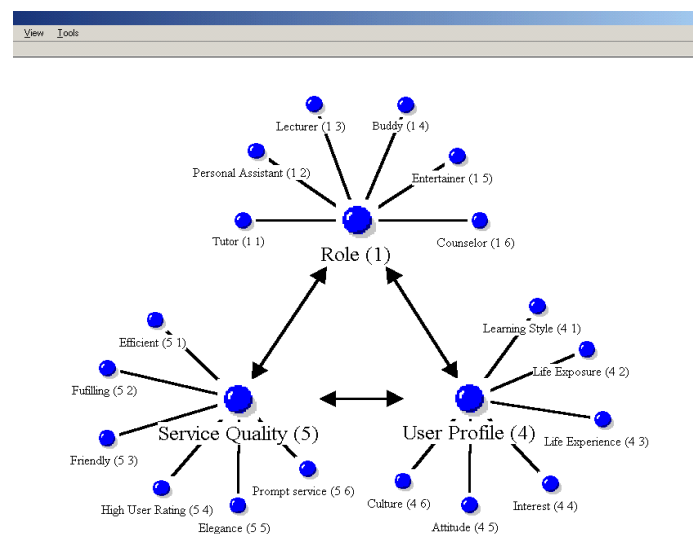
A number of issues arise from this research:

- A range of educational avatar roles were identified: Tutor, Personal Assistant, Lecturer, Buddy, Entertainer and Counsellor. As with any autonomous agent, the avatar must be able to react dynamically with its environment whilst maintaining a coherent dialogue with the learner. So, as a learner or educator begins to interact with multiple avatars how can a consistent dialogue model be maintained?
- Population of avatars. To provide multiple perspectives several lecturers may be required populate avatars collaboratively (e.g. to provide alternative pedagogical models on a specific topic), incurring significant set up costs. However, lecturers may prefer avatars to present their material in their style. There is a dichotomy here between the utility of providing multiple perspectives and the likelihood of adoption by academics
- All types of respondents expressed the desire for control. The challenge is to create an model that satisfies both the lecturers’ desire for avatars to provide direction and the students’ desire to maintain confidentiality and control.
- Quality assurance issues, if educational avatars are ultimately to be autonomous, proactive and socially agile then clearly defined quality assurance procedures need to be established to ensure longer term pedagogical purity.
- Development of user profiles. Key features include learning styles (e.g. visual, auditory or kinesthetic learners) educational background and personal interests. Yet, how would a user profile be captured?

Table 2. Summary of key findings

	Seed Research Questions	Key Findings
1	<p>How can avatars effectively play their role in e-learning environments?</p> <ul style="list-style-type: none"> • How can this technology assist/support you in teaching/learning? • What are the roles that can avatars play in e-learning environments? • What are the factors that are important in avatar interaction? <p>Type of Matrix Used: Role-ordered matrix</p>	<ul style="list-style-type: none"> • The expected roles played by avatars varies from one user to the other. Ranges from simple to complex depending on the user’s needs. • The suggested roles were Personal Assistant, Tutor/Demonstrator, Lecturer, Counsellor/Advisor, Buddy and Entertainer. • The avatar owner would require absolute control over their avatar’s service, especially on critical tasks.
2	<p>When, how and for whom are avatars useful?</p> <ul style="list-style-type: none"> • How do you foresee this technology can support the member in effective learning? • How will it contribute to the effectiveness of learning? • Will it contribute to the efficiency of learning? How? <p>Type of Matrix Used: Effects matrix</p>	<ul style="list-style-type: none"> • Service quality is the primary factors, looks are secondary. • Service quality is revealed in terms of efficiency, depth of fullness and friendliness as reflected by high user ratings. • Elegance will attract members and may help enliven communication.
3	<p>How do social and cultural factors influence the interaction between the members and the avatars?</p> <ul style="list-style-type: none"> • How does this technology help in overcoming the culture of reluctance to ask questions due to shyness/inferiority complex/fearfulness? • How does culture influence the perception of the visual look of avatars? <p>Type of Matrix Used: Conceptually clustered matrix, Cultural meta matrix</p>	<ul style="list-style-type: none"> • Social and cultural factors are part of the members’ background that makes them perceive avatars differently. • They shape the members preference, which includes language, looks and communication styles. • The inclusion of Asian values e.g. language and looks were mentioned but more out of national pride, superseded by service quality.

Figure 1. Framework for educational avatar design



The issues raised above highlight the speculative nature of this field and may act as a foundation for further longitudinal research.

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