The Benefits of Interactive Online Characters

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Abstract

Research about interactive characters suggests substantial opportunities for them to enhance online experiences. Automated characters take advantage of social responses that are natural reactions to interactive media. They can be perceived as realistic and well-liked social partners in conversations that simulate real-world interactions. Characters can express social roles, emotions, and organized personalities that match learning goals, company brands, and transaction needs. Characters can increase the trust that users place in online experiences, in part because they make online experiences easier.

This paper is a brief summary of the role that interactive online characters can play in automated teaching and commerce applications. The paper begins with a brief review of major conclusions from psychological research that has examined human responses to interactive technology. Subsequently, important benefits of interactive character interfaces are reviewed as they apply to online learning and business.

The Major Points:
(1) Human-Media Interactions Are Fundamentally Social
(2) Character Interfaces Bring Social Intelligence to Online Interactions

Social competence is critical for success in teaching, commerce and interpersonal relations. This is a well-documented fact in education, business and psychology. Social intelligence – in the form of facial and emotional expressions, gestures, and speech and language abilities – is the essence of personalized and effective communication. Social intelligence determines engagement, attention, learning, persistence in relationships, and subjective evaluations of experience.

The same social competencies that facilitate human-human interaction also determine the success of human-media interactions. A significant body of research shows that when people interact with media – and especially with computer-based media that are interactive – the social intelligence of presentations is critical. Compelling social interactions are as important in online transactions as they are to teachers or company representatives in real life. The reason is that the human brain is not specialized for 21st century media; people are not able to discount social presentations as unreal just because they appear on a screen. Rather, "closeness" counts. Interactive media engage brain systems evolved for other purposes; namely, the evaluation of social experience. New media offer primitively compelling simulations of social interaction, using interactive

pictures of social actors and social places that are real enough to suggest a full range of natural human responses.

Social intelligence in automated interactions is good business. Psychological responses to mediated social interaction affect important metrics in teaching and business. Socially intelligent interfaces increase memory and learning (and make online education more effective). Social interfaces are persuasive (and increase up-sell, cross-sell and conversion rates). They are arousing (and motivate users to stick with interactions longer). They are engaging (and minimize "churn" by encouraging users to return over time). They increase trust (and make people feel more secure and comfortable about disclosing personal information online). They promote continuity across interactions (by welcoming people back to interactions using information from prior conversations). They create feelings of friendliness and liking (and support generalized positive feelings toward organizations that sponsor the interactions). They increase a sense of personalized experience (and make people feel special and not like they're one user among a million).

Adding interactive characters to online experiences is an effective method to gain control over the presentation of social intelligence. People naturally respond to all online interactions as a social experience. Placing a character in an interface makes the social foundation of mediated interaction explicit. Characters give designers, instructors, marketers and relationship managers an important tool to create compelling and easily understood interactions. Online transactions become social conversations. Difficult procedures can be explained. The web is less lonely. Technology is easier to use.

Character interfaces can benefit from important new technologies that make social interfaces practical. Rich online social experiences need not exhaust connection and computer bandwidth. Compelling interactive characters can now be photographed, edited, compiled, filed, and distributed in shorter time periods than it takes for non-interactive video and film. Interaction models can be constructed that guide conversations in planned directions or that allow characters to guide natural language exchanges. Flexible tools exist that allow non-technologists to construct and quickly alter character presentations so that information can be updated in learning and business applications.

Ten Benefits of Character Interfaces

1. Characters make explicit the social responses that are inevitable.

Social responses to interactive media are inevitable. Even without characters, human-computer interaction is sufficiently human-like that people will respond online in ways that fundamentally mirror social interaction in real life. With interactive media, people take turns in conversations, receive information personalized for the moment, listen to people speak (with written words, recorded voices, and synthesized speech), and give input that is expected to change the course of an interaction. These are all simulations of human-human interaction, causing people to subconsciously think socially.

This means that computer interfaces are successful or not depending on social performance. Interfaces need to be polite, express emotions appropriately, acknowledge other people that share the interaction, demonstrate enthusiasm, persuade, congratulate and critique. Characters can do these things well. Numerous studies show that interactive characters offer an excellent opportunity for designers to gain control of social presentations and responses, turning them into familiar and socially intelligent conversations. Character interfaces, when executed well, have a better chance of success in online conversations because they put a familiar face on computing intelligence. People know how to respond and what to expect next. There is no prior knowledge necessary about how to interact.

People expect that learning and business contexts will be social. Characters acknowledge this immediately. Good teaching online can depend as much on enthusiastic, engaging, and personal presentations as merely knowing the right material. Online business transactions can depend on confident recommendations, help with finding information, answers to questions, and meeting customer needs as much as having the right product or price.

2. Interactive characters are perceived as real social actors

Everyone understands that computer generated characters are not real people; however, characters can still cause automatic social responses *as if* the characters were real. The ability of mediated representations of people to engage audiences is as old as pictorial media. For well over a century, people in motion pictures have taught, aroused, persuaded, and informed all types of audiences. The default and automatic assumption people make about mediated characters is that they are real. This is the essence of the success of traditional media. It is clear that characters can encourage people to learn, to persuade them to buy, arouse them to fear, generate sympathy, and motivate action, among thousands of other responses.

Computer controlled characters only heighten responses because new media characters can be presented with more graphic and interactive realism, including three-dimensional representations, high definition displays, and synchronization of facial movement and speech.

Several studies show that people automatically accept pictorial representations of people as real, even though they understand otherwise when given time to think. The "willing suspension of disbelief" that some people think is a necessary prerequisite to enjoyment of media is in fact rare because it requires sustained and thoughtful evaluation. What is more likely is an automatic assumption that all representations that look human (a faint hint of two eyes and mouth is enough in classic psychological experiments), should be treated as real.

3. Interactivity increases the perceived realism and effectiveness of characters

Interactivity in mediated versions of learning and business is a critical component of realism. Even a visual display perceptually indistinguishable from the reality it represents (e.g. a perfect full-motion hologram) could be dismissed, if over time it showed no ability to recognize input from another person. This is especially true when user responses are the main reason for the interaction, as is the case of automated learning and business applications. Teachers need to know whether students understand material, whether learners need to go faster or slower or need to change the difficulty of material. Sellers need to know if buyers have questions, understand terms, or are interested in follow-up.

Each of these situations requires that designers have the ability to *change* what a character says and does, contingent on user input and needs. When characters appear to hear and listen, realism is high. When realism is high, the value of the automated interaction relative to the "live" counterpart is also high, and at a small fraction of the cost.

Interactivity has four important qualities that can all be built into conversations using interactive characters. Interactivity depends on (1) the user's ability to modify content based on their personal input, (2) in real time, (3) using a range of responses, and (4) frequently during an interaction. Characters can influence all of these criteria. Characters can ask questions and provide options that will change an interaction. The speed with which changes can be accomplished technically now fits comfortably within the natural cadence of online interactions (i.e. computer and connection speeds are sufficient to simulate lags in natural conversation). Characters can offer responses by indicating clickable answers to a question or by helping users compose natural language input that can be more accurately parsed. And characters signal that users may give input frequently because that is the expectation people have for real conversations.

4. Interactive characters increase trust in information sources

Human relationships, especially those focused on important life decisions and events, are built on trust. Professionals who most successfully direct these events (e.g. teachers, doctors, financial advisors, counselors) display social intelligence when they emphasize, above all other social attributes, credibility, reliability and objectivity. When people participate in important conversations, the trust they attribute to companies and organizations is as dependent on the individuals that represent those entities as they are on abstract evaluations of the larger organization.

Online interactions can benefit from the same emphasis on social responsibility. Trust is paramount in almost every customer interaction – when there is money at stake, when there are performance evaluations during training, when convincing a customer about the superiority of a product or when asking for disclosure of sensitive information. Repairing trust in these contexts, once it is lost, is almost impossible.

The presence of a character can increase and sustain trust. One factor is mere presence. Research shows that when characters guide interactions (i.e. buying books and trading stocks online), people trust the information more than in identical interactions without characters. This is because humans are conditioned that social presence is useful and preferred, especially in situations where errors are likely and consequential. People think that the presence of a character increases the likelihood of completing a task successfully because there will be opportunities to ask questions and confirm actions.

Characters also have value beyond mere presence. Characters can add specific information to conversations that increases trust. Appropriately acknowledging points in the interaction that might be worrisome to a user can increase trust, for example, when people make large purchases, provide highly personal information, or confront a major error. Credibility is also be enhanced by choosing a character that is consistent with the task at hand, for example, a playful character for a site that sells toys or a serious character for retirement planning. When trust is paramount, there are important social rules that can be used to express sensitivity, to gather private information or to formulate a more delicate persuasive appeal appropriate to the moment. Presentation of these rules is more explicit with a character than with lesser forms of social presence.

5. Characters have personalities that can represent brands

Personality is critical in learning and business. When personalities are compelling and well-matched between source and receiver, communication is effective. When personality is ambiguous or changes unpredictably during an interaction, communication is compromised. This is well documented in communication contexts from the classroom to business contact centers. The reason that personality is important is that it allows people to form expectations about how social actors will behave. Predictability is a key factor in allowing people to understand and feel comfortable with communication partners. Personality allows people to place others in familiar categories related to communication styles. In short, personality allows people to make a complex social world simpler.

We often assume that personalities are unique and complicated, and that social intelligence means having "a lot" of personality. Both of these assumptions, however, are misleading. Based on a large body of research in psychology, personalities can be described with relatively few attributes and they can be effectively adapted over time to increase the strength and output of a relationship. One of the most effective treatments of personality is to make them consistent. In the case of human-human interaction, this is relatively easy, because there is one brain that controls everything that someone says and does. In the case of automated online interactions, however, personality is a far more difficult venture. Instead of one person in control, there are more likely several authors. These are the different people, from technologists to marketers, who determine what is said, what is shown, how an interaction unfolds, and whether personality is consistent across different parts of a presentation.

Characters provide an effective method to organize personality when a design team creates an interaction. Characters can be constructed with backstories that guide character behavior, consistency of visual appearance, and language styles – all of the features that determine personality consistency in real people. In addition, personalities can be constructed that match corporate brands. Just as real people in teaching, advertising, retail, and customer care are selected and coached to present personalities matched to their organizational role, automated characters can be constructed that reflect a brand. The personality of an automated character is one of the strongest and most reliable methods to consistently promote brand awareness through predictable appearance and scripting of speech and behavior. And unlike real-life counterparts, characters never have a bad day or deviate from the script.

6. **Characters can communicate social roles**

Like personality, social roles help people simplify and quickly understand a social relationship. Social roles – organized and consistent presentations that communicate features of occupation, information specialties or affiliation – mark our social essence. They describe those features of ourselves that say the most about us and say it quickly. Socially intelligent people effectively use social roles to focus others on the personal qualities most important in an interaction.

Interactive characters can have social roles every bit as influential as those assigned to real people. These roles, when made obvious, can be used strategically to simplify automated transactions and maximize their effectiveness. A social role, for example, can summarize the activities a character will perform. A character focused on selling, for example, should take on a different role (that of salesperson) than one designed to disseminate information (the roles of teacher or customer service representative). Characters, through costume and behavior, can let people know who they are and whether they will relate to users as equals or experts. For example, research shows that when characters are labeled (and costumed) as specialists, people think they are better at performing specific tasks than when a character is presented in an ambiguous or generic role.

One important role in online applications is that of teammate. When customers feel that they are working on the same team with a character, for example, a wide range of positive feelings and behaviors accrue. Customers who feel that they are part of a team enjoy the interaction more, reciprocate more by helping in the interaction, and feel more responsible to jointly own problems that occur and to help to solve them.

7. **Characters can effectively express and regulate emotions**

Emotions play a role in every human transaction, and with good reason. At any given moment, the level of emotional arousal – defined as action readiness for responses appropriate to the moment – can influence attention, memory, and behavior. However much people like to think that teaching and business decisions are free of emotions, this

is wrong. Emotional intelligence is a critical component of intellect. Emotions are powerful cues about what is important and about the intensity with which people should pursue information presented to them. Emotions are the engine for behavior.

The management of feelings is critical for effective teaching and business communication, and this includes communication with technology. Emotional responses – including reactions to error messages, pictures of human faces, arousing pictorial content, and delivery of bad news – are common elements of automated transactions. Research shows that negative experiences are much more memorable and actionable than positive ones, so automated systems should never concentrate solely on the upside. The downside can hurt, and often more than the upside can help. Ignoring the influence of emotions at best misses an opportunity to channel emotional energy to the business purpose of a transaction. At worst, ignoring emotions can easily lead to the same energy being applied to bad feelings, rejection, and business failure.

Characters provide an opportunity for designers of online interactions to deal explicitly with emotional experience. Facial expressions can be matched with the purpose of an exchange (e.g. a smile when encouragement is required, an expression of uncertainly when information is lacking). Facial expressions signal to users, more quickly and completely than words alone, what responses are appropriate. When emotional expressions are built into interactive dialogue, they are convincing signals that the presenter is tuned into the moment. Facial expressions can change with the changing place in the dialogue, indicating that the character is paying attention and can help. In this sense, interactive characters have a significant advantage over video and film characters that are scripted with a linear delivery that can only assume, but never really know, user emotions at key moments in an interaction.

8. Characters can effectively display important social manners

Socially intelligent interactions are polite. This certainly includes the most basic rules of politeness (appropriate greetings, deference, gestures, tone of voice, and the like), but it also includes more sophisticated manners that add significantly to any conversation. Good manners include saying things that are relevant to a conversation, making quality statements that are accurate, giving the right amount of information, allowing an appropriate amount of time to consider a partner's comments, and being clear even when, on occasion, clarity may compromise precision. When interactions fail on these levels, people feel uncomfortable, negatively influencing a broad range of evaluations.

Characters offer an effective method to communicate politeness. Characters can initiate and end conversations (and all the better if they can do this with benefit of information from previous conversations with the same person). Quite importantly, characters can apologize. Almost all automated interactions will confront moments where there is no certain next step (a pitfall of real as well as computer-based interaction). Error handling is critical at these moments, and characters are well-suited to this task. Research shows that even simple apologies can significantly diffuse negative responses. An apology with a subsequent plan of action works even better.

The importance of delivering polite responses is universal; however, the exact rules for how to express politeness can differ by culture. Current character technologies make it possible to offer different character utterances, gestures and behaviors for similar places in an interaction model. For example, a placeholder in an automated interaction for "greet users" can be filled with anything from a long, formal introduction to a quick and casual "hello."

The consequences of failing to consider cultural differences are as true for technology as they are for people. If a customer perceives that an automated transaction has turned sour because of a cultural insensitivity, there is little likelihood of forgiveness because a machine instead of a real person made the mistake. Rather, people will be offended and with the same results that befall relationships in real life.

9. Characters can make interfaces easier to use

When confronted with a technical problem about how computers work, many people don't consult a manual. It's simply more convenient to ask somebody. One reason is availability. It may take less time to find a friend than to find the right page. Another reason , however, goes beyond saving time – people are often easier to use.

The same can be true for interactive characters. There are two important reasons characters make interfaces simpler. First, it's far more obvious *where* to go for help. People can look to the character to solve problems just as they would travel down a hallway to visit a trusted friend. This precludes navigating hidden information. All we need to know is that the answer likely resides with a particular person. Characters offer the same certainty when they are consistently available in the same interface location. Second, characters suggest that the information exchanges will use *natural* language and/or speech. This can be done via written options provided by a character in a dialogue window, spoken options using text-to-speech translations, or conversational exchanges using a natural language input window. In all of these cases, the information exchange is natural and consistent with the presence of another social actor.

One example result from a recent study indicates the power of a character when moderating search inquiries. When a character asked people to type search requests into a window, people used, on average, three more words in their requests (averaging about 7 words per inquiry) compared to identical requests made without a character. Character suggest that a conversational style is appropriate, resulting in higher liking for the interaction on the part of the user, and better accuracy for the engine generating the required results.

10. Characters are well liked

The importance of personal relationships in real-world teaching and commerce is not controversial. In general, people like to learn and conduct business with other people present. This is not only convenient and often necessary; it's also desirable. Culturally, we are taught from youth how to be social. Psychologically, our brains are evolved to

facilitate social relationships. The design of schools, training facilities and businesses reflects the desirability and necessity of social experience.

The same positive evaluation of social experiences applies to interactive characters. Research shows that over 90% of people can find a character in interactive sessions that they prefer over no character at all. It takes only five choices to provide a character that is liked. But even when a single character is presented, only 15% of users dislike the character and those people can usually be accommodated by allowing them to opt out of character interactions in favor of other forms of navigation. Characters have also been shown to sustain liking across sessions (up to six months in length), making them appropriate for relationships that persist over time; for example, in the case of an instructional character giving lessons over multiple sessions. It is also important to note that a large majority of *all* users like characters; characters are not just for children and novices.

While most people like other people and like interactive characters, there is a catch. *Which* other people and characters matters a lot. There is usually a list of *some* other people that would be preferable to loneliness, and the same is true for interactive characters. A downside lurks, however. Almost all of the character research shows that there is usually one character that is evaluated more positively than no character at all, and at least one that is evaluated as worse. This means that attention needs to be given to character casting, character choice, and creative execution. Everyone that can name a character who bugs them can also name a replacement that sounds attractive. In answer to this problem, technologies that power character interfaces are effective to the extent that they allow for rapid development of multiple characters (for pretesting with users and to provide choice in a final product), and also allow interaction to proceed without the character in the few cases where no social presence is preferred.

References

1. Ball, G. & Breese, J. (1998). Emotion and personality in a conversational character. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.
2. Bates, J. (1994). The role of emotion in believable agents. *Communications of the ACM*, 37(7):122-125.
3. Becheiraz, P. & Thalmann, D. (1998). A behavioral animation system for autonomous actors personified by emotions. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.
4. Bickmore, T. and Cassell, J. (in press). "'How about this weather?' - Social Dialogue with Embodied Conversational Agents." Proceedings of the AAAI Fall Symposium on Socially Intelligent Agents. North Falmouth, MA, 2000.
5. Cassell, J. (in press). "Not Just Another Pretty Face: Embodied Conversational Interface Agents." *Communications of the ACM*.
6. Cassell, J. and Bickmore, T. (in press) "External Manifestations of Trustworthiness in the Interface" Communications of the ACM 43(12).
7. Cassell, J. & Thórisson, K.R. (1999). The power of a nod and a glance: Envelope *vs.* emotional feedback in animated conversational agents. *Applied Artificial Intelligence, 13* 519-538.
8. Cassell, J, Bickmore, T., Campbell, L., Vilhjalmsson, H., and Yan, H. (to appear). "More Than Just a Pretty Face: Conversational Protocols and the Affordances of Embodiment." Knowledge Based Systems.
9. Elliott, C., Rickel, J., and Lester, J. (1999). Lifelike pedagogical agents and affective computing: An exploratory synthesis. In Wooldridge, M. and Veloso, M., editors, *Artificial Intelligence Today*, pages 195-212. Springer-Verlag, Berlin.
10. Fogg, B.J. & Nass, C.I. (1997). Silicon sycophants: Effects of computers that flatter. *International Journal of Human-Computer Studies, 46*.
11. Isbister, C. & Layton, T. (1995). In J. Nielsen (Ed.), *Advances in Human-Computer Interaction, Volume 5*. Norwood, NJ: Ablex Publishing Corporation.
12. Hietala, P. and Niemirepo, T. (1998). The competence of learning companion agents. *International Journal of Artificial Intelligence in Education*, 9(3-4):178-192.
13. Isbister, C. & Nass, C.I. (1998). Personality in conversational characters: Building better digital interaction partners using knowledge about human personality preferences and perceptions. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.
14. Laurel, B. (Ed.). (1990). *The Art of Human-Computer Interface Design*. Reading, MA: Addison-Wesley.
15. Lee, E-J. & Nass, C.I. (1998). Does the ethnicity of a computer agent matter? An experimental comparison of human-computer interaction and computer-mediated communication. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.
16. Lester, J.C., Converse, S.A., Kahler, S.E., Barlow, S.T., Stone, B.A., and Bhogal, R. (1997a). The persona effect: Affective impact of animated pedagogical agents. In *Proceedings of CHI '97 (Human Factors in Computing Systems)*, pages 359-366, Atlanta.
17. Lester, J.C., Converse, S.A., Stone, B.A., Kahler, S.E., and Barlow, S.T. (1997b). Animated pedagogical agents and problem-solving effectiveness: A large-scale empirical evaluation. In *Proceedings of Eighth World Conference on Artificial Intelligence in Education*, pages 23-30, Kobe, Japan.
18. Lester, J., Towns, S., Callaway, C., & FitzGerald, P. (1998). Deictic and emotive communication in animated pedagogical agents. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.
19. Martin, S.A. & Knight, J.M. (1986). Social facilitation effects resulting from locus of control using humans and computer experimenters. *Computers in Human Behavior, 1*.

20. Massaro, D.W. (1998). Perceiving Talking Faces: From Speech Perception to a Behavioral Principle. Cambridge, MA: MIT Press.

21. Nass, C. & Gong, L. (in press). Maximized modality or constrained consistency? Proceedings of the AVSP 99 Conference, Santa Cruz, CA.

22. Nass, C.I., Moon, Y., Morkes, J., Kim, E-Y., & Fogg, B.J. (1997). Computers are social actors: A review of current research. In B. Friedman (Ed.), *Human Values and the Design of Computer Technology*. Stanford, CA: CSLI Publications.

23. Nass, C., Fogg, B.J., & Moon, Y. (1996). Can computers be teammates? Affiliation and social identity effects in human-computer interaction. *International Journal of Human-Computer Studies, 45*.

24. Nass, C., Moon, Y., Fogg, B.J., Reeves, B.J., & Dryer, D.C. (1995). Can computer personalities be human personalities? *International Journal of Human-Computer Studies, 43.*

25. Nass, C., Steuer, J., & Tauber, E.R. (1994). Computers are social actors. In *CHI '94 Conference Proceedings.*

26. Reeves, B. & C. Nass (1996). The Media Equation: How People Respond to Computers, Television and New Media Like Real People and Places. Cambridge University Press.

27. Reeves, B., and & C. Nass (2000). Perceptual Bandwidth: What Happens to People When Computers Become Perceptually Complex? *Communications of the Association for Computing Machinery*.

28. Reeves, B. (2000). Social Issues and the Effects of High-Bandwidth Interactions. *Proceedings of the Internet2 Socio-Technical Summit*, 81-89.

29. Rickel, J. and Johnson, W. L. (1999). Animated agents for procedural training in virtual reality: Perception, cognition, and motor control. *Applied Artificial Intelligence*, 13(4-5):343-382.

30. Rickenberg, R. & B. Reeves (2000). The Effects of Animated Characters on Anxiety, Task Performance, and Evaluations of User Interfaces. *Proceedings of the CHI 2000 Conference*, Amsterdam, Netherlands.

31. Ritter, S. (1997). Communication, cooperation, and competition among multiple tutor agents. In *Proceedings of the Eighth World Conference on Artificial Intelligence in Education*, pages 31-38.

32. Stone, B.A. and Lester, J.C. (1996). Dynamically sequencing an animated pedagogical agent. In *Proceedings of the Thirteenth National Conference on Artificial Intelligence*, pages 424-431, Portland, Oregon.

33. Suthers, D. (1991). A task-appropriate hybrid architecture for explanation. *Computational Intelligence*, 7(4):315-333.

34. Taylor, I.C., McInnes, F.R., Love, S., Foster, J.C., & Mervyn, J. (1998). Providing animated characters with designated personality profiles. *Proceedings of the 1998 Workshop on Embodied Conversational Characters*.

35. Towns, S., Callaway, C., Voerman, J., and Lester, J. (1998). Coherent gestures, locomotion, and speech in life-like pedagogical agents. In *Proceedings of the Fourth International Conference on Intelligent User Interfaces*, pages 13-20, San Francisco.

36. Wang, W.-C. and Chan, T.-W. (1997). Experience of designing an agent-oriented programming language for developing social learning systems. In *Proceedings of Eighth World Conference on Artificial Intelligence in Education*, pages 7-14.