On-screen characters: their design and influence on consumer trust

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Abstract

Purpose – Previous research has focused on how trustworthiness can be evoked by the physical design of on-screen characters (OSCs) within the e-commerce interface. The purpose of this study is to investigate whether or not the OSCs representation, along with user differences, influence, how likeable, appropriate and trustworthy they are.

Design/methodology/approach – A web site was created for a simulated online bookseller and 183 people from various countries participated in the experiments. OSC representations were tested under four conditions in the main experiment: facial appearance (human-like vs cartoon-like) and gender (male vs female).

Findings – The results suggest that the human-like characters are more likeable, appropriate and trustworthy in general terms. However, when perceived capabilities of OSCs are measured, a mismatch can occur between expectations and capabilities of the human-like OSCs. In fact, cartoon-like OSCs, especially female, had more positive effects on the web site interface.

Research limitations/implications – This study was limited to simulations of on-screen scenarios. Future work, with access to the huge database required, could investigate the effects of truly interactive OSCs. Larger national sub-samples would permit generalisations about cross-cultural differences.

Practical implications – For e-tailers and web designers, this study suggests critical design variables and response-moderating variables that mediate the effects of OSCs in e-retailing. It helps to understand customers’ interaction needs in establishing and maintaining para-social relationships, potentially increasing purchase intentions and persuasion.

Originality/value – The efficacy of different representations of OSCs to retail situations has been little investigated previously; this study measured how likeable, appropriate and trustworthy different OSC design formats are to different customer types.

Keywords Electronic commerce, Trust, Character user interfaces, Gender

Paper type Research paper

An executive summary for managers can be found at the end of this article.

Introduction

With products and services sold increasingly over the internet, it has been suggested that elements of the user interface design have a significant influence on customer perceptions of vendor trustworthiness (Cheskin Research and Studio Archetype/Sapient, 1999; Egger, 2000; Kim and Moon, 1998; Kolsaker and Payne, 2002; Roy et al., 2001). Perceiving a website as trustworthy will cause customers to recognise it as more attractive, reveal more intimate information, and become more likely to purchase (Bickmore and Cassell, 2001). Thus, on-line sellers must understand how the specific characteristics of their online presence may potentially, or actually, affect customers’ trust (Kolsaker and Payne, 2002).

Many studies have been performed to investigate the impact of interface design on the customer’s initial trust perception of the online vendor. A more specific line of research has recently started to focus on the development of on-screen characters within the interface. Many aspects of e-selling present the consumer with a far less tangible experience than is the case in a physical outlet. The lack of interaction with sales/service personnel is one area of greater intangibility in the virtual buying experience.

Given the significance of interpersonal communication in influencing retail sales (e.g. Crosby et al., 1990; Keillor et al., 2000), introducing an onscreen character with whom the prospective customer can interact could address at least some of the problem. It is possible that onscreen virtual characters can serve a boundary-spanning role in building relationships with customers in what may be otherwise perceived as an intangible, impersonal experience. Further, their interactive characteristics, e.g. ability to combine non-verbal and verbal cues, would be important in trust building (Isbister and Nass, 2000; Bickmore and Cassell, 2001).

The implementation of such onscreen characters could help in electronic customer relationship management to help
establish, enhance, and maintain long-term mutually beneficial relationships. Generally, there are seen to be advantages to both customers and sellers. Customers are thought to engage in relational market behaviour because they want to simplify their buying and consuming tasks, obtain “special treatment” benefits, simplify information processing, maintain cognitive consistency and to reduce uncertainty in outcome (e.g. Bendapudi and Berry, 1997; Marshall et al., 1979; Sheth and Parvatiyar, 1995).

For retailers in bricks and mortar stores, building relationships with customers is associated with increased loyalty and purchasing (e.g. Reynolds and Beatty, 1999) and thus, savings made through customer retention and reduced transaction costs (Gummesson, 1987; Reichheld, 1996; Tynan, 1997).

There is a significant reason to believe that introducing onscreen characters should enjoy a measure of success. Callcott and Lee (1995) point out that there is a very long tradition of “humanising” animals, objects and concepts to illustrate human experience evident from fable and oral tradition, e.g. Aesop’s fables circa 600BC, and that the distortion of human characteristics often make human caricatures more attractive and engaging. Companies have used synthetic characters for over a century to present a “personality” that customers can connect with; early characters were often personifications of the product or of animals, e.g. the Michelin Man created in France in 1897.

Callcott and Lee (1995) describe this history from the late 1800s and how such advertising characters played a significant role in gaining consumer trust during the movement towards mass production of products (Morgan, 1986) and how companies recognised and used customer feelings of a personal relationship with these characters. The application of synthetic characters as company “spokespersons” in advertising campaigns has been enhanced by advances in animation making it possible for them to “speak” for the product and provide visual demonstrations. Thus, synthetic “spokespersons” are a widely used and familiar concept to customers with “remarkable endorsement power in modern commerce” (Stafford et al., 2002)[1].

Moreover, the appearance and behaviour of synthetic characters is controllable. Their appearance can be subtly changed to appeal to contemporary audiences, e.g. Betty Crocker, a visual character first created in 1939 for General Mills products, has been changed five times to reflect current ideas of the perfect homemaker (Callcott and Lee, 1995). As salespersons, synthetic characters can deliver untiringly polite and knowledgeable service; as company representatives, there should be no unplanned embarrassments. Contrast the continuing efficacy of Betty Crocker or Fred Flintstone (Callcott and Lee, 1994) with the effects of bad publicity concerning Madonna on Pepsi Cola sales (Tom et al., 1992) or the continuing uncertainty about its founder on the Martha Stewart Living Omnimedia company (Crawford, 2004).

However, choosing the exact set of characteristics that a synthetic spokesperson should represent may not be simple. Given the wide number of situations where spokespersons are used in advertising, plus the diverse range of spokespersons used, it is not surprising that there is no universal agreement in the literature on the relative importance of various characteristics (see Stafford et al. (2002) for a discussion of the spokesperson literature). Ohanian (1990) writes that “the positive characteristics of a communicator” influence their persuasive effects. These characteristics have been broadly identified as a personal component of the spokesperson consisting of trust and perceived expertise (Hovland et al., 1953; McGuire, 1969; Ohanian, 1990); along with an interpersonal component that encompasses perceived similarity, attractiveness and likeability (McGuire, 1969; Ohanian, 1990). However, as Stafford et al. (2002) point out, even the disparate findings in the literature concerning the relative significance of these aspects still endorse the central tenet that they are critical to the credibility of the spokesperson.

There are already widespread implementations of on-screen characters within computer-based environments today. Some of them are used as advertising factors, others are presented as assistants to help customers in performing tasks. Research has also been initiated on the impact of interaction with computers and on-screen characters (e.g. Cassell et al., 2000; Lester et al., 1997; Parise et al., 1995). As might be expected from the discussion above, Parise et al. (1995) demonstrate that the representation of the on-screen character need not be either realistic or human to invoke responses and collaboration. However, the use of on-screen characters may not succeed in all situations and, in some cases, the limitations of the software and/or communication technology may contribute to customer irritation (Spencer, 2003).

Dehn and van Mulken (2000) point out that there still is some controversy and inconsistent results about the efficacy of animated agents in user interfaces. For example, Koda and Maes (1996) report that a system with an animated agent was rated more positively on likeability compared to a system without an animated agent; in contrast Sproull et al. (1996) found the reverse. Given the literature on the relationship between user personality and preferences for computer behaviour, it is believed that users may respond differentially to the characters, and the effect of the on-screen character appears to be domain-specific and depends on customers’ personal preferences.

So far, although the motivational benefits of onscreen characters in other areas have been demonstrated, e.g. in education (Lester et al., 1997), the potential of employing synthetic characters for relationship building within e-tailing has been little utilised. Moreover, for retailing there is some debate whether relational strategies are appropriate and would lead to sustainable advantage in retail sectors associated with less detailed information gathering and where the primary drivers could be price competitiveness and product range (e.g. Egger, 2000). We would argue, however, that in the context of online purchasing, uncertainty and intangibility will still be high enough for the interpersonal touch to be of potential value to many customers.

Thus, the objectives of this study are not only to investigate whether it is necessary to have an on-screen character but also to determine what types of characters are appropriate on a specific website. Furthermore, we examine whether there is a difference in the perception of trust according to different characters’ appearances, and what attributes of the appearance are most important for this perception. In particular, this study will investigate whether the facial appearance and the gender of an on-screen character influence its perceived efficacy by users, particularly in its perceived trustworthiness.
The trust relationship in the virtual marketplace

In electronic transactions, online vendors and their customers often do not know each other, and they may be located in different parts of the world. Customers therefore have less control over the actions and data during their transfer (Kolsaker and Payne, 2002; Roy et al., 2001). These uncertainties can reduce the perceived security and reliability, thus the confidence of customers. This particularly applies to the feelings of security in conducting financial transactions. Kolsaker and Payne (2002) have argued that perception is as important as reality in the online environment, and the success of business-to-consumer (B2C) relationships may be largely dependent upon customers’ perceptions of the transaction environment, in terms of whether they can trust it. Thus, it could be assumed that a greater proportion of consumers would be more willing to buy online if trust could be assured (Merrilees and Fry, 2003).

It has been argued that e-vendors have used a variety of strategies to establish and maintain a trusting relationship with their customers. Previous studies have demonstrated the possibility of manipulating the user’s relationship with a system using a wide range of behavior. For example, Egger (2000) proposed a “MoTEC” model, which identified the factors that influence the development and maintenance of trust in the domain of B2C e-commerce.

Customers usually judge the trustworthiness of the “pure” e-vendor simply and initially by its website, focusing on such things as its construction, the information provided, and its interface design. Thus, it could be assumed that a website interface often directly affects the perceived trustworthiness of the system (Egger, 2001). Moreover, trust is a dynamic concept which will evolve through time. Trust can be reinforced if it is established successfully at the first interaction. Thus, the first impression of a retailing website may strongly affect the development of trust, and effective communication may facilitate trust maintenance (Egger, 2000). Kim and Moon (1997) have also investigated specifically which graphic elements of usability or content design were most likely to communicate trust in cyber-banking interfaces. Although their test application was specific to the Korean user population, it constitutes a good basis for developing a trust specific model, and has demonstrated the connections that could be established between the physical design factors and emotions elicited by such factors.

On-screen characters are employed to function in roles that require or encourage users to interact with them, or discuss their problems (e.g. Lucy, a cyberguide in http://my.cctc.com/), or give out their credit card numbers. Because on-screen characters are able to induce feelings of trust within users, and influence users’ decisions at the time of using the system, the perceptions aroused by these characters should be systematically incorporated into the design strategies used in their development (Kim and Moon, 1997).

The dilemmas of on-screen character representation

The concept of on-screen characters can be developed in a number of different ways under different circumstances, and they are able to improve the electronic customer relationships in many different respects, such as providing natural assistance, giving on-line customers intuitive perspectives on data, and making interactions easier and more natural (Isbister and Nass, 2000). Although these characters vary greatly in their capabilities and task domains, they have a common feature, which is to increase the effectiveness of the interaction between the user and the system, in order to engender positive experiences using the system (Bickmore and Cassell, 2001).

However, in many situations the on-screen characters may not be of the customers’ choosing or not even in the customers’ interest (Dowling, 2001). The efficacy of on-screen characters is testable by empirical research. From the positive point-of-view, these characters offer a new style of interaction. Their likeable behaviors can make a retail web site more engaging and motivating, making customer interaction with the website much smoother. From the negative point-of-view, on-screen characters may hamper human-computer interaction, not least by increasing download times. Their use may also lead to wrong expectations about the system’s behavior, or lead the customers to mistake the characters’ activity for system activity. Such misinterpretations by online customers may cause the interaction to become less efficient (Dehn and van Mulken, 2000). Thus, it is not enough simply to state that the use of characters in the interface guarantees successful human-computer interaction (McBreen and Jack, 2001). It is also difficult to make comparisons and draw general conclusions, since different methodologies have been used in different studies (Dehn and van Mulken, 2000).

Human-like and cartoon-like characters

During the communication between a computer and a human, the information style presented by the computer will impact upon the human’s attitude and response toward the computer system (Dowling, 2001). If a mismatch between realism in appearance and the apparent knowledge level of the characters is revealed through the character’s representation, it may have an adverse effect on acceptance and trustworthiness of the character, which may extend to the whole system (Dowling, 2001).

Certain characteristics of on-screen characters, which include a degree of anthropomorphism or personification, and the ability to respond flexibly to new situations, are commonly acknowledged as desirable (Dowling, 2001). Takeuchi and Nagao (1993) found that users have a preference for conversing with a system that has a facial appearance rather than a system that lacks a facial appearance. Koda (1996), Lester et al. (1997), McBreen and Jack (2001) and Walker et al. (1994) also agree that on-screen characters with strong visual presence and facial expression could be more engaging and motivating for the user. However, e-retailing is arguably a form of self-service, as not all customers seek social relationships with retailers (Reynolds and Beatty, 1999), and many customers may prefer less personal relationships.

As Dowling (2001) pointed out, “the more visually realistic the representation, the higher the expectations of the user” (p. 30). Since the conversational skills of today’s characters are still limited, a conflict may occur between the ability of the character and the users’ perceptions of that ability, which may result in users becoming frustrated with a mismatch, and therefore failing to exploit the full potential of the system.
It has been argued that users may be more tolerant of the limitations of a character if they are aware of the fact that it is “only” a computer program (Dowling, 2001). To lower users’ expectations of the conversational skills of on-screen characters, the use of characters that are more sketchily represented has been suggested (Dowling, 2001). Masterton (1998) proposed the inclusion of a degree of anthropomorphism rather than full personification, intended to deliver characteristics of a system without suggesting the possession of full human capabilities, for example, through an abstracted embodiment or cartoon-like graphic. This is because the communication abilities of cartoon-like characters could be expected to match the technical abilities of the current system (Bartneck, 2001, 2003). Thus, it might be more appropriate to have cartoon-like characters in the interface, rather than completely human-like characters (McBreen and Jack, 2001).

Gender differences
Having found high levels of concern about trust in the on-line environment generally, few have sought to identify gender differences of the characters in relation to the decision-making process. Males and females appear to have particular differences in online attitudes and behaviour (Sheehan, 1999). Regarding security of online payment, Sheehan (1999) suggested that women displayed higher levels of concern than men. Women are more likely to see trust, security and confidentiality as elements of a good online relationship. However, Kolsaker and Payne (2002) found that both men and women appear to be equally concerned about security of payment.

Istibster and Nass (2000) found that people would prefer the personalities of on-screen characters to be similar to their own. This similarity has held true in measures ranging from general preference to successful long-term relationships. Thus, character designers may need to consider what message a male character and female character may deliver to male and female customers.

The conceptual framework of the study
In the light of the above studies, this study will focus on two dimensions of on-screen characters that appear to have major effects on users’ perceptions of on-screen characters’ efficacy, especially in regard to trustworthiness:

1. Character facial appearance (human-like character or cartoon-like character).
2. Character gender (male character or female character).

The influences of trustworthiness may not be equally effective across all types of users. Many studies have shown that users differ greatly in terms of their readiness to trust a web site, and users react differently to on-screen characters, based on their own personality and other dispositional traits (Egger, 2001; Lester et al., 1997; Shelat and Egger, 2002). Users’ expertise in information technology (IT), network experiences, or the time they spend using a site, may also affect the extent to which that site will be perceived as reliable and trustworthy. Therefore, the user’s gender, age, income, education level, occupation, internet experience, time using and expertise, may all combine to act as response moderators when considering user perceptions of efficacy, in particular, trustworthiness.

There are three dimensions that could be used to measure the perceptions of efficacy: likeability, appropriateness, and trustworthiness. This is because a close association between these dimensions may exist. In many situations, however, people may like a character but not trust it, for example, a human-like lovely teenage female character displayed in an insurance company web site or an anti-aging cosmetic product website, may be attractive but not inspire confidence. Likewise, people may not like or trust a character but agree that the character is appropriate to use on the web site. For example, businessmen may not be interested in or trust the cartoon-like characters, but they may consider a cartoon-like character is appropriate in a toy or children’s book web site.

Likeability may relate to users’ emotional feelings about the characters’ appearance, and these feelings are largely related to users’ personality. Appropriateness of the characters indicates that the characters deliver the right message at the right time to the users, which can be used as a measurement of the expertise in the field of affective perceptions (Bartneck, 2001). This study is expected not only to examine the efficacy of different appearances on these three dimensions, but also to look at their interdependencies, for example, whether characters’ likeability or appropriateness will predict the trustworthiness accorded to them.

A model has been developed that identifies the factors that could well have an effect on users’ perceptions of an on-screen character’s efficacy, in relation to users’ demographic and other characteristics of Internet use (Figure 1). It is not possible within the scope of this paper to explore all the potential response moderators but the influence of respondent gender is examined.

Research design
Quantitative methods are the major research techniques used in this study. A questionnaire based on the literature was developed for this experiment, to collect the quantifiable responses. However, several preliminary steps were undertaken before conducting the main experiment. The research design in this study consists of six stages, shown in Figure 2.
On-screen character design

Four types of character (see Table I) were included in the experiment. In order to ensure that the most appropriate characters were examined in this experiment, a pre-test was conducted, measuring the lifeliker and femininity/masculinity of the characters and selecting the most appropriate characters for the experiment. For this reason, the researchers first created 16 characters in total, based on four types of categories (four characters in each category), by Adobe Photoshop 7.0.

At the character design stage, the similarities of the character styles needed to be measured, in order to provide a fair and comparable test. Thus, care was taken to ensure that the same amount of information was given to the user for all characters. At the same time, the differences between the characters also needed to be considered in their design, in order to give a range for selection. Figure 3 presents the 16 characters in four categories, with each character being numbered for ease of reference.

Pre-test and selection of on-screen characters

In conducting the pre-test, a questionnaire including 16 characters was used to collect data about respondents’ perceptions of the lifeliker and the masculinity/femininity of each of the characters. The mean values of each measure give an indication of respondents’ perceptions of the characters. For each type of character, one representative character was selected, achieving balance between the two experimental treatments.

A total of 20 respondents took part in this pre-test. They are all internet users, but have diverse backgrounds, ranging from university student to manager and doctor. From the results of the pre-test, four characters (A-1, B-1, C-3 and D-2) were selected from the original 16, and given names: Jenny, David, Helen, and Mike. They represented each type of character investigated in this study, and were tested in the next stage of experiment. The four characters are displayed in Figure 4.

Scenarios design

Five scenarios were created for this experiment by HTML and JavaScript. The four characters selected from the previous pre-test were in the scenarios. A bookseller web site called “easylife.com” was created for the scenarios. The on-line payment process was used as the main background web page, because the online payment procedure involves the most sensitive issues of online trust. The five scenarios had the same contents and functions, differing only with regard to the visual on-screen characters. Scenario 1 presented the usual payment process that is without a character. Scenarios 2 to 5 include one of each type of character (see Table II).

Each scenario took about one minute. In the scenarios, instead of filling personal details in several boxes in a static payment site, the customers are able to communicate bi-directionally with the character, which acts as an assistant in this site helping the customer to finish his/her payment process.

Table I

<table>
<thead>
<tr>
<th>Type</th>
<th>Facial appearances of characters</th>
<th>Gender of characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td>Human-like</td>
<td>Female</td>
</tr>
<tr>
<td>Type B</td>
<td>Human-like</td>
<td>Male</td>
</tr>
<tr>
<td>Type C</td>
<td>Cartoon-like</td>
<td>Female</td>
</tr>
<tr>
<td>Type D</td>
<td>Cartoon-like</td>
<td>Male</td>
</tr>
</tbody>
</table>

Figure 2

Figure 3

On-screen characters design

Pre-test and selection of on-screen characters

Scenarios design

Piloting the questionnaire

Administering the questionnaire
process quickly and accurately. However, such a real interaction requires a very large information database to support any questions that customers may ask. It will also be unconvincing if the character is not able to give accurate answers in the experiment and such failure may even be interpreted as lacking sympathy with the user. Thus, the scenarios were created to closely resemble the communication context of a character and a customer. Instead of actually communicating with a character, the respondents only needed to watch the scenarios that showed a simulated communication between a character and a customer. They did not need to input any data.

Questionnaire design
A search was made of relevant pools of terms to establish those most suitable for the measurement of likeability, appropriateness and trustworthiness. Five items to measure the dimension trustworthiness were derived from Ohanian (1990). Items for the other two dimensions were derived mainly from Bartneck (2001), Cassell et al. (2000), Isbister and Nass (2000), Kim and Moon (1997) and McBreen and Jack (2001). Each of the terms shown in Table III was related to each of the four characters and respondents indicated their levels of disagreement/agreement on a seven-point scale. Subsequent reliability analyses indicated that the terms are suitable scale items, with Cronbach alpha levels in excess of 0.8 in all cases.

The questionnaire consisted of six parts, and took approximately 20-30 minutes to complete, which included the time to watch the five scenarios. The major parts of the questionnaire were the measurements of characters, which can be divided into three sections: the first measures the perceptions of each type of character across three dimensions, the second examines the perception of differences between a website with one type of the character and one without a character, and the third has a manipulation check of the four characters comparing with the pre-test. The respondents were required to assess the web site that provides the five scenarios, and to watch each scenario before filling in the questionnaires.

Apart from obtaining the ratings of characters, the questionnaire also aimed to study the online purchase behaviour and preferences of the respondents. Thus, questions concerning online frequency, online purchase methods, and personal preferences are also included, in order to examine of how these may influence (moderate) perceptions of the characters and web sites. The last section of the questionnaire was focused on personal particulars, such as the gender, age, status, income, occupation, and the level of education of the respondent. From the information collected from this section, further moderating influences can subsequently be examined.

Piloting the questionnaire
A pilot study was conducted in order to ensure that the design of the questionnaire and scenarios was practical and feasible. Ten respondents were observed filling in the questionnaire, without intervention by the researcher. The time they spent and any confusion or hesitation they displayed during the completion were carefully recorded. A discussion about the questionnaire and scenarios was then conducted with each respondent. Other, basic questions were also given to allow the respondents to write down their opinions or suggestions about the questionnaire and scenarios. This process resulted in several minor modifications to the questionnaire and scenarios, to achieve a better understanding of the questions.

Sampling and administration
The sample was drawn from a population of internet users since participants were required to visit a specially constructed internet shopping site, “Easylife.com”, so needed to have internet access. Convenience sampling was
used, since the study was essentially exploratory, but a diverse population was sought in terms of age, sex, occupation, and nationality. Such differences in nationality were expected to help the results of this study to have international applicability.

A total of 400 questionnaires were distributed by post, e-mail or by hand to four main groups of people, all of whom were judged likely to be interested in e-commerce:

(1) Questionnaires were sent by post or e-mail to students from the University of Manchester.

(2) Employees were contacted via the University News website and invited to request a questionnaire, which was then sent by e-mail or internal post.

(3) Questionnaires were delivered by hand to households in a selected residential area of South Manchester. This area was expected to contain a high proportion of diverse internet users, consisting of professionals, young families and retired people, with a high proportion of broadband subscribers. Altogether, 150 questionnaires were distributed in this way, together with a covering letter explaining the purpose of the study.

(4) Questionnaires were posted or e-mailed to contacts in a number of Asian countries, including China, Malaysia and Singapore. They were made aware of the sampling objectives in terms of age, gender and occupations.

As an incentive, participants were invited to enter a prize draw with three cash prizes totalling £100. Questionnaires were returned anonymously; names for the prize draw were submitted on separate sheets so that they could be immediately separated from the questionnaire data. Pre-paid envelopes were provided with the questionnaires distributed in the UK. Reply envelopes with appropriate international postage affixed were provided to respondents in Asia. In total, 189 questionnaires were returned, a response rate of 47 per cent. Of these, four were returned too late to be included in the analysis and a further two had incomplete responses. This left 183 questionnaires available for analysis.

Of the 183 participants, 105 were male (57.4 per cent) and 78 female (42.6 per cent). The age range was skewed towards the younger groups, which is broadly reflective of internet usage (McGoldrick, 2002): 18-24 (31.7 per cent); 25-34 (50.8 per cent); 35-44 (9.8 per cent); 45 plus (7.7 per cent). The vast majority of participants (82.5 per cent) were aged under 35.

Due to the nature of the sampling methods used, students were well represented and accounted the majority of the 18-24 year olds. The rest of the sample included administrators, home-makers, IT engineers, managers and teachers. The university-recruited participants included a strongly multi-national mix, further supplemented through international recruitment. A number of nationalities were represented, the largest groups being Chinese (43.7 per cent) and British (35 per cent).

Main results

A measure of users’ online purchase behaviour

In order to test the association between users’ online purchase behaviour and their demographics, multi-dimensional chi-square was used. The results showed that there were no significant relationships between respondents’ online behaviour and their gender or status. However, there were some relationships between respondents’ online behaviour and their age (using online payment: $\chi^2 = 8.111$, df = 3, $p = 0.044$) and income (using on-line payment: $\chi^2 = 11.041$, df = 3, $p = 0.012$).

People aged 25-34 were more likely to use online payment methods than other age groups. This can be explained by the fact that this age group has more disposable income and is usually independent of family, therefore has more opportunity to shop online. The age group 18-24 has the highest percentage never making online purchases. Their unstable incomes may allow them only to play as online surfers, not as online shoppers. Moreover, the results demonstrated that the average income of respondents who have used online payment (mean = £20.326) is higher than for respondents who have not purchased online (mean = £9.909).

Manipulation check for the four characters

In the pre-test, Jenny, David, Helen and Mike were selected from 16 characters by choosing the most indicative ratings of their likeliness and masculinity/femininity amongst 20 respondents. The same questions were included in the main experiment, in order to perform a manipulation check for their outcome consistency.

Four paired sample t-tests are employed in order to further compare the likeliness of human-like characters with cartoon-like characters (Jenny with Helen, and David with Mike), and compare the masculinity/femininity of the female character with the male character (Jenny with David, and Helen with Mike) in the main experiment. The results showed that the likeliness and masculinity/femininity of the four characters are significantly different, as intended.

Evaluation of the four characters

In order to estimate the reliability of the scale items, a coefficient alpha (Cronbach’s alpha) was used to examine the consistency of the measurements; they were all above 0.8 (see Table III). Table IV summarises a series of analyses exploring differences in the likeability appropriateness and trustworthiness of the four characters, using paired t-tests and two forms of ANOVA. A one-way ANOVA was firstly deployed, the within-subject factor having four conditions: Jenny, David, Helen and Mike. The hypotheses were that there would be character-induced effects upon perceptions of likeability, appropriateness and trustworthiness. Each of these three tests demonstrated highly significant differences, although of a lesser magnitude in the case of trustworthiness.

Paired t-tests were then utilised to examine differences between each human-like, cartoon-like male and female pair. The results suggested that there might be some interactions between these four conditions. A $2 \times 2$ ANOVA design was therefore applied, the factor 1 levels being defined by gender. These tests demonstrated a significant interaction with respect to each of the three dependent variables. The human-like characters were perceived as more likeable, appropriate and trustworthy than the cartoon-like characters, the extent of the differences being greater in the case of the male characters.

The interrelationships between the three dependent measurements were also examined through correlation analyses, summarised in Table V. All the coefficients are highly significant but of a lesser magnitude in the case of Mike. However, even the smallest of these coefficients indicates that 52 per cent of the variance in trust could be
In order to test for the effects of characters in situ, a further nine scales were administered for a web site scenario containing no on-screen character, and those including each of the four characters discussed above. Due to the length of the tasks required of the participants, only nine perception scales could be administered after each of the five scenarios. Three of these disagree/agree scales are discussed below, namely:

1. The web site is pleasant.
2. I would trust the payment process.
3. I would be willing to give my payment details.

A meaningful pattern was discovered in respondents’ perceptions of the web site. Although the human-like characters were generally preferred by respondents when they were measured independently, this was not the case when evaluating the character being employed in a web site, as Table VI demonstrates. Cartoon-like female characters were preferred in this interactive situation. It could be argued that investigating the character involved in the web site would potentially require respondents to consider not only the appearance of the character, but also its abilities, since these might be perceived by respondents to match the abilities of the online system. Thus, a degree of anthropomorphism rather than full personification could be suggested, when designing the appearance of characters, because the respondents’ perception of the ability of the cartoon-like characters might be able to match the limitations of the system.

Furthermore, gender identity seems to have opposite effects in each of the human and cartoon appearances. A female character in cartoon-like mode and a male character in human-like mode were expected to make the website more pleasant and trustworthy, thereby increasing respondents’ willingness to give their payment details. Compared with the scenario that employed none of the characters, all four scored significantly higher on each of the three dependant measures.

**Response moderators in the measurements**

One of the objectives in this study was to find out whether different types of user appear to perceive differently the efficacy of the characters with different facial appearance and gender. The measures of the characters and the web site, in regard to the two gender groups, were carried out again by using the same methods and procedures, aiming to examine the differences between the results patterns from female respondents and male respondents.

The results suggest that female and male respondents perceived the characters and the websites similarly. However, the trustworthiness of the characters and users’ perceptions of trust in the web site are not the same. Different patterns from female and male respondents have been discovered. Figure 5 illustrates that female respondents are more likely to trust the human-like characters than the cartoon-like characters, but they perceived the human-like and cartoon-like character...
equally when they were involved in the web site. There is also a greater propensity for female respondents to trust female characters, especially when these characters are used in the website. However, the trust perceptions of the male respondents were different. Figure 5 also shows that a female in a cartoon-like form increases the trust perception from male respondents, but the perception is reduced in female human-like character. Conversely, the male gender decreases the trust perception in cartoon-like characters, but increases the perception in human-like characters.

Discussion

Human-like characters vs cartoon-like characters
The result of this study suggests that human-like characters (Jenny and David) are generally perceived as more likeable, appropriate, and trustworthy than cartoon-like characters (Helen and Mike). This is consistent with the experimental findings of Reeves and Nass (1996) and McBreen and Jack (2001), who discovered that people have a preference to interact with characters that exhibit human-like facial expressions.

However, a different pattern emerges when the perceived capabilities of the characters are involved in the measurement. Dowling (2001) points out that a conflict or mismatch may occur between the ability of the character and the user’s perception of that ability, which will result in the user developing wrong expectations of the capabilities of the characters. Masterton (1998) and McBreen and Jack (2001) suggest using a degree of anthropomorphism rather than full personification, intended to facilitate aspects of the system, without showing full human capabilities. The results of this study can demonstrate the value of such suggestions by showing that cartoon-like, and in particular female characters, have more positive effects on the web site interface than human-like characters.

This result implies that, although human-like characters are perceived to have greater efficacy than cartoon-like characters in general, cartoon-like characters make more positive contributions to the persuasiveness of the web site interface than human-like characters. People seem more likely to trust a cartoon-like character than a human-like character. This especially applies in the context of the online payment process, where a human-like character could even be seen as a threat to privacy, a form of surveillance. Thus, it may be more appropriate to have a cartoon-like character in the interface, rather than have completely human-like characters, especially

![Figure 5](Image)
if the real time interactions are applied in the conversations between customers and characters. When the technology of today’s conversational systems is still limited, the communication abilities of cartoon-like characters can be expected to match the technical abilities of the current system (Bartneck, 2001, 2003).

The relationship between the genders of characters and the genders of respondents
Overall, characters’ gender identity caused opposite perceptions between human-like and cartoon-like characters. Female characters usually had the higher ratings when cartoon-like, while male characters had the higher ratings when human-like. This is also reflected in the findings when the characters are being used in the web site interface. Female cartoon-like characters and male human-like characters make the web site more pleasant and trustworthy, and seem able to increase respondents’ willingness to give their payment details. This is consistent with the findings of McBreen and Jack (2001), which claimed that attitudes to female characters are more favourable, in particular, regarding the perceived competence and helpfulness of the characters.

Moreover, female respondents perceive the trustworthiness of the human-like characters and cartoon-like characters almost equally, but differently between characters’ genders. They are likely to trust female characters more than male characters. However, male respondents are more likely to trust a female cartoon-like character, but less likely to trust a female human-like character. On the contrary, they prefer to trust a male human-like character but not a male cartoon-like character. Thus, there are significant interactions between the genders of characters and the genders of potential customers. These findings suggest that the relationships between these two factors need to be studied in more detail.

Guidance for on-screen characters designers
If the characters will be employed in a real time conversation system, cartoon-like characters are suggested. This is because cartoon images will lower customer expectations toward the skills of the characters, and match the technical abilities of the system. If the characters will be displayed as a representation of the online vendor, human-like characters may be recommended. This is because human images will present a greater similarity to a customer’s personality, which is expected to increase the customer’s interest and involvement toward the web site.

If the potential customers are mostly female, then female characters are suggested, since females are more likely to trust female characters. If the potential customers are mainly male, more considerations should be taken into account, in particular, the trustworthiness of the combination of characters’ facial appearance and gender. Consideration should also be given to allowing a choice of on-screen character.

Moreover, customers’ differences must be considered. According to the results, customers’ online purchase behaviours are mainly influenced by their ages and incomes. The characteristics of their online behaviour, such as time spent online, their interests, and their reference groups, should be considered. The design of the characters must match these characteristics.

Implications and conclusions
As on-screen characters become widespread, the ability for them to establish and maintain para-social relationships with on-line customers will become increasingly important. The study of how to develop and maintain trust relationships through physical design of on-screen characters in user interface will inform the growing ability of online vendors to emulate aspects of humans, in the provision of efficient interaction between humans and computers. This study suggests some crucial variables of physical design features that influence the effects of on-screen characters on the user’s perceptions. Moreover, this study experimentally investigates moderating variables, such as users’ gender, age and income. This knowledge is also crucial for the web site designers and on-screen character designers, because it provides scientific inputs to the art of characterisation within user interface design.

From the vendor perspective, a successful character with appropriate physical design features will make the web site more fun and easier to use. This will result in increasing the possibilities more effectively to target consumers. For example, it can change the representation of the characters according to the gender of the consumer. This will make the interface more approachable and comfortable to consumers and therefore help to improve the relationship between consumers and vendors. The analyses of customers’ differences and their different perceptions also contribute to enhancing electronic customer segmentation and customisation possibilities. This is an important finding since there is little evidence of gender-related differences in the literature regarding the relationships between the character’s gender and the customer’s gender, in particular, relating to the trust issues in the physical interface design. Moreover, this study provides a better understanding of the customer-character interaction needs, which will contribute to the competitiveness of e-commerce. A trustworthy character makes the web site interface more user-friendly and will be able to help the customer to make the best and most appropriate judgements. Customer retention and satisfaction could also be increased through this process.

This study provides some understanding of the perceptions of consumers, not only suggesting more approachable and enjoyable interfaces, but also attempting to match the internal consistency (physical features) and external consistency (expectations) of the consumers. Moreover, from the viewpoint of policy makers, this study may contribute to widening social inclusion in e-commerce by making more user-friendly, accessible, and trustworthy interfaces. For example, some people who do not access the worldwide web or who do not like to purchase online may not be interested in or may worry about the interface. Thus, government or e-commerce policy-makers can advocate the employment of on-screen characters that are likeable, appropriate, and trustworthy representations at the interface. This could increase the motivations of people outside the world of e-commerce, potentially helping to draw them into using e-commerce.

Given available resources, this study was limited to the simulation of on-screen scenarios: truly interactive OSCs would have required a huge database to support that level of functionality. It is also recognised that the sample, while inclusive of different nationals, genders and age groups, is not
representative of a specific internet user population. Nonetheless, it is hoped that it makes some contribution to understanding the interaction needs of customers and to establishing and maintaining para-social relationships, while potentially improving the competitiveness of e-commerce.

Note

1 We would note, however, that the use of trade characters is not without its critics, especially in their use in advertising aimed at children or in reinforcing stereotypes and prejudices (e.g. Fischer et al., 1991).

References


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Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of the article. Those with a particular interest in the topic covered may then read the article in toto to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefit of the material present.

Why it may be useful to have an on-screen character

Many aspects of e-selling present the customer with a far less tangible experience than is the case in an ordinary shop. In particular, the virtual buying experience limits the potential for interaction with sales or service personnel. Given the significance of interpersonal communication in influencing retail sales, introducing an onscreen character with whom the prospective customer can interact could help to reduce the problem.

Companies have created characters for more than a century to present a “personality” that customers can connect with. The Michelin Man, for example, was created in 1897. Advances in animation have made it possible for these characters to “speak” for the product and provide visual demonstrations. Their appearance can be subtly updated to appeal to contemporary audiences. Moreover, unlike “real” personalities who are sometimes used to endorse a product, synthetic characters are untiringly polite and knowledgeable about the product and should cause no unplanned embarrassments.

Choosing the most suitable on-screen character

However, choosing the exact set of characteristics that a created character should represent may not be simple. Part of the reason is the wide range of functions the character may have to perform – from advertising the product to helping the product purchaser to perform a task, for example.

Luo et al. investigate whether it is necessary to have an on-screen character and try to determine what types of characters are appropriate to a specific website. They examine whether there is a difference in the perception of trust according to different characters’ appearances, and what attributes of the appearance are most important for this perception. The study focuses in particular on whether the facial appearance and gender of an on-screen character influence the extent to which customers find the character useful and trustworthy.

The research findings

The study reveals that human-like characters are generally perceived as more likeable, appropriate and trustworthy than cartoon-like characters. However, cartoon-like characters make more positive contributions to the persuasiveness of the website interface than human-like characters. This applies especially in the context of the online payment process, where a human-like character could even be seen as a form of surveillance and threat to privacy.

The study shows that female cartoon-like characters generally have higher ratings than male cartoon-like
characters, but the opposite applies when the characters are human-like. When used in the website interface, female cartoon-like characters and male human-like characters make the website more pleasant and trustworthy, and seem able to increase respondents’ willingness to give their payment details.

Female respondents perceive the trustworthiness of human-like and cartoon-like characters almost equally, but are likely to trust female characters more than male characters. Male respondents are more likely to trust a female cartoon-like character, but less likely to trust a female human-like character. On the contrary, they prefer to trust a male human-like character but not a male cartoon-like character.

Implications for managers
The authors suggest that if the characters will be employed in a real-time conversation system, cartoon-like characters should be used because cartoon images lower customer expectations towards the skills of the characters and match the technical abilities of the system. If the characters will be displayed as a representation of the online vendor, human-like characters may be recommended. This is because human images present a greater similarity to the customer’s personality, and this can increase the customer’s interest and involvement in the website.

The authors suggest using female characters if the potential customers are mostly female. But if the potential customers are mostly male, the trustworthiness of the character’s facial appearance and gender should be taken into account. There may be a case for allowing the customer a choice of on-screen character.

Having a successful on-screen character can help to make a website easier and more fun to use. It can boost customer satisfaction and retention. Ultimately, it could help to draw into e-commerce some of the people who currently do not use it.

(A précis of the article “On-screen characters: their design and influence on consumer trust”. Supplied by Marketing Consultants for Emerald).