

# Increasing social presence of social actors in e-learning environments: Effects of dynamic and static emoticons on children

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## Abstract

The present research aimed to employ dynamic and static emotions as social cues in e-learning environments for computers to be able to convey social presence and increase children's motivation with learning. To understand how children of different gender react to the two types of emoticon in e-learning environment, a math problem-solving practice program was designed to test their reactions. The program features two treatments, dynamic emoticons and static emoticons. A  $2 \times 2$  (emoticon style  $\times$  gender) between-subjects factorial design was adopted for this study. One hundred seventy-three sixth graders participated in this study. Data were collected via questionnaire regarding the perceived social presence and children's intrinsic motivation, and then analyzed by means of two-way ANOVA. The results show that the children in dynamic-emoticon condition perceived a higher degree of social presence and reported greater intrinsic motivation than those in static-emoticon condition. The feelings of social presence created by the computer itself can mediate children's intrinsic motivation. Besides, no gender differences in children's attitudes toward computers were observed. It suggests that the use of dynamic emoticons as social cues incorporating in e-learning environments can enable children to perceive computers on social dimension and lead to increase their motivation with learning.

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## 1. Introduction

Computers are now widely used to assist school children in learning and provide students with practices of particular skills. The focus in the design of computers for children's learning is different from those for adults. In addition to issues of usability, the former needs to improve engagement and motivation for younger users [1,2]. Studies have suggested that the enhancing social presence in an e-learning environment can instill the learner with an impression of a quality learning experience. One benefit is to induce and sustain the learners' motivation [3,4]. This research has mostly focused on the enhancement of social presence to create a successful

learning experience in situations involving learners and instructors in online environments. According to Aragon [5], the social connection is important in an online environment due to the isolated nature of the instructional settings. However, little research has been done on the possibility that a learner could perceive social presence from the computer itself via suitable computer interface design. Such a perception may reduce a learner's feeling of isolation while interacting with a non-human computer-mediated learning environment and lead to the attainment of the instructional goal.

Social presence is defined as "the degree of awareness of another person in an interaction and the consequent appreciation of an interpersonal relationship" [6]. Social presence in a computer-mediated communication environment refers to the user's degree of feeling, perception, or reaction being connected to another intellectual entity, which involves a subjective quality of the communication

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medium related to the concepts of intimacy and immediacy [7,8]. In other words, a medium which provides people with intimate or immediate responses may evoke their social emotional reactions. Such experiences could allow an individual to perceive that another social being exists and is interacting with them. The possibility that social presence can also be created through the computer itself has theoretical and practical implications [9]. Computers could be perceived as a social actor to improve involvement and motivation while a single learner participates in computer learning activity with no instructor involved. This paper focuses on the social presence and specifically the dimension of presence in which people perceive media technology as social actors. The most studies type of social presence is represented by CASA (Computers Are Social Actors) research [10].

CASA is identified by Lombard and Ditton [11] as a conceptualization of presence. It involves social responses of people not to other entities within a medium, but to cues provided by the medium itself. CASA studies have shown that if computers exhibit social cues, people will treat the computers as social actors rather than as inanimate tools. Several empirical studies have demonstrated that people do not respond to a computer merely as a tool; instead, individuals bring to bear a wide range of social rules and behaviors that change their interactions with and attitudes towards computers [12]. Findings from those studies show that people tend to feel that computers are friendlier, more attractive, and more helpful if they exhibit social cues such as teammate label, praise, and active help in controlled interaction [13–15]. These examples have revealed that people's attitudes can be influenced by social attributes of computers and their social response can facilitate a more intimate human-to-computer interaction. This in turn improves the users' attitudes towards computers and motivates them to interact with computers.

The CASA paradigm shows a potential strategy for interface design to improve motivation in a computer-mediated learning environment [16,17]. The paradigm seeks to introduce social cues in user interface design by replicating human-to-human interaction in the context of human-to-computer interaction. Thus, this study attempted to extend the concept of CASA by employing emoticons as social cues in an e-learning environment for children. Emoticons were defined as symbols composed of punctuation marks designed to express some forms of emotion in the form of a human face [18]. With increasing frequency of emoticon usage, recent developments in computer mediated communication make emoticons graphic based, going far beyond the composition of punctuation marks. Indeed, the face, the most important channel of emotional expression, plays a significant role in social communication [19]. Ekman [20] stated that people have the perceptive ability to recognize emotion from facial expression, thus, visual cues involving faces are considered to be the most influential [21].

The symbols of facial expressions have been applied in human-computer interface as the way of communication. The earlier versions of mackintosh operating system had used facial icons of happy Mac and sad Mac, representing the computer to alter the use of its state. The icons prompt computers to be user-friendly and accessible. According to Takeuchi and Nagao [22], presenting human faces in a system helps increase a successful human-computer communication. Thompson and Foulger [23] suggest that emoticons can reduce perceptions of flaming in electronic mail by leading a receiver to view the message as less threatening. As indicated by Rezabek and Cochenour [24], CMC (computer-mediated communication) users often use emoticons as visual cues to expand the meaning of textual electronic messages. Concluded from those studies, emoticons can provide additional social cues beyond what is found in text, which may enhance the exchange of social information and create pleasant interactive experiences for people.

Most research on people's attitudes to emoticons is conducted by using static facial icons as stimuli; however, the facial expression of emotion is a dynamic phenomenon while a static emotion is an unnatural representation. Ekman and Friesen [25] have pointed out that emotion messages are transmitted by rapid signals, instead of static ones, which cause changes in facial expressions. Rapid signals mean contraction of facial muscles and the visible changes in the appearance of the face when these feelings occur. The dynamic display of facial expressions provides unique temporal information about the expressions that is not available in static displays [26]. Although dynamic characteristics of facial expression are mostly overlooked, a few studies examine its effect on the intensity of emotional expressions and suggest that dynamic characteristics of facial of emotion are necessary for full extraction of emotional information from faces [27–29]. In the light of that, the dynamics is important in facilitating the perception of facial expressions. The present paper argued that the use of dynamic emoticons in e-learning environments can enrich the sense of sociability more effectively than the use of static emoticons. This area deserve to be explored further, as the authors hope to employ emoticons as social cues in e-learning environments for children to have better computer experiences and motivation. Accordingly, an experiment was conducted to test the effects of dynamics of emoticon in e-learning environments on children's attitude towards computers, especially in investigating the following questions: (1) if there is a significant difference in the social presence perceived by children between employing dynamic and static emoticons in e-learning environment; (2) if the dynamic display of emoticons has an impact on increasing children's intrinsic motivation with computerized learning, (3) and if there is a correlation between children's intrinsic motivation and the perceived social presence.

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