Impression Management Support System for Teachers in Computer-Mediated Communication

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Abstract. Recently, due to development of Internet technology, online teaching has become very popular. Building good interpersonal relationships between teachers and students is important for the students' performance in online teaching. In this study, we propose an impression management support system for teachers in Computer-Mediated Communication instruction. The system suggests improvements in instruction to teachers to give good impressions and to develop interpersonal relationships with students. As the first step to realize the system, we performed an experiment to investigate impression factors in email instruction. From the experiment, we found that seven e-mail elements which become the factors of the impressions.

Keywords: Teacher support system, Impression management, Computer-Mediated Communication.

1 Introduction

Recently, due to development of Internet technology, online teaching such as distance tutoring has become very popular. Building good interpersonal relationships between teachers and students is important for the students' outcome and satisfaction in online teaching as well as in face-to-face (FtF) teaching [1]. Liu has proposed instructional strategy for achieving positive impression in Computer-Mediated Communication (CMC) instruction to develop interpersonal relationships with students [2]. Walther has indicated that CMC has rich enough cues to form interpersonal impressions [3]. Many studies have also investigated the cues of the impressions such as the emoticons [4], the frequency and duration [5]. Such process by which people control impressions others form of them is called "impression management" [6]. Conventional impression studies have considered that an attitude gives the same impressions to people (Fig 1). On the other hand, we consider that an attitude of a teacher gives the different impressions to students (Fig 2).

In this study, we propose an impression management support system for teachers which adapts to each student in CMC instruction. The system suggests improvements

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in instruction to teachers to give good impressions. Following the system, teachers can control their attitudes to give good impression to each student easily.

In this study, we will consider situation where teachers feedback to students via e-mail to focus on text-based interaction.

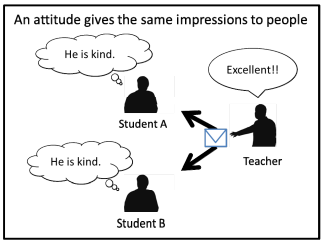

Fig. 1. Conventional framework of interpersonal impressions

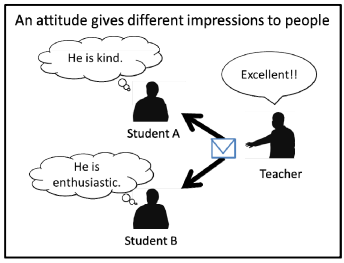

Fig. 2. Our framework of interpersonal impressions

2 Experiment: Investigation of Impression Factors in E-Mail

First of all, we performed an experiment to investigate impression factors in email instruction. We chose fourteen email elements shown in Table 1 as candidates of impression factors, expressed them quantitatively as feature values. We referred to five elements used by Kato[7]: EM, EX, NL, TO, RT, and two elements used by Liu[5]: FR, DU(not used in this experiment because of impression modeling for one email). We added three feature values as the indexes of a Japanese readability: SLA, KR, PIA. We also added four feature values as email instruction elements from the result of the free description questionnaire: PO, CO, EN, CN. We divided these elements into three types: Syntax, Content, and Temporal elements. The appropriateness of the feature values is judged by prediction accuracy of the impression models, not by exploratory data analysis.We produced thirty-six emails following orthogonal array testing method on email feature values. Using the orthogonal array, we can expect that the set of email are balanced samples of the minimum number.

Table 1. Email feature values and the levels

Element Type	Element	Acronym	Level		
Syntax Elements	Emoticon	EM	presence		absence
	Exclamation	EX	presence		absence
	The Number of the Letters	NL	~99	100~249	250~
	Sentence Length Average	SLA	~19	20~31	32~
	Kanji Rate	KR	~29	30~39	40~
	Punctuation Interval Avarage	PIA	~9	10~14	15~
Content Elements	Point Out	PO	presence		absence
	Compliment	CO	presence		absence
	Encouragement	EN	presence		absence
	Calling the Name	CN	presence		absence
	Tone	TO	polite		colloquial
Temporal Elements	Responce Time (days)	RT	2	6	10
	Frequency	FR		NA	
	Duration	DU		NA	

2.1 Procedure

We experimented on 20 graduate students aged 21-24 at a university in Tokyo. The subjects were assumed themselves to be students who had solved an arithmetic problem, and read thirty-six instruction emails from teachers. Then, they classified these emails into some groups based on the similarity of the impressions of the teachers. The number of the groups was at their will.

2.2 Data Analysis

The result of grouping was analyzed by decision tree analysis that is a method to detect the rules of the classification. The procedures of analysis were as follows.

i. Made the decision trees for each subject.
ii. Examined the number of people using each feature value for the email classification (Table 2).
iii. Evaluated classification accuracy for each subject with all feature values.
iv. Reevaluated the classification accuracy while excluding feature values which seemed little influence.
v. Repeated this evaluation until the classification accuracy of all subjects became over 75.0% with as few feature values as possible.

3 Results

Table 2 shows that 19 of 20 subjects used NL (the number of letters) for classification. The order from the second to the fifth is RT (used by 14 subjects), EM (used by 10 subjects), EX (used by six subjects), and TO (used by six subjects). These are the top 5 elements which are used for classification by subjects. The average classification accuracy with the top 5 elements is 84.6%, while the accuracy with all elements is 88.7% (Table 3). With the top 5 elements, classification accuracy of five subjects are under 75.0%. When we add PIA which is the sixth place to the top 5, the average

classification accuracy is 86.1%. When we add PO which is the seventh place to the top 5, the accuracy is 87.2% which is higher than when PIA is added. When we add PO and EN to the top 5, the accuracy is 88.6% which is the highest with as few elements as possible, and classification accuracy of all subjects are more than 75.0%.

Table 2. Email feature values used for classification by each subject

Subject	EM	EX	NL	SLA	KR	PIA	PO	CO	EN	CN	TO	RT
A	○	○	○									
B	○	○	○	○	○				○			
C	○		○								○	
D		○	○				○		○			○
E			○						○		○	○
F			○									○
G	○		○			○			○			○
H			○									○
I	○		○			○					○	○
J			○			○	○					○
K	○	○	○								○	○
L			○									○
M	○		○				○					
N	○	○	○									○
O	○	○			○	○	○				○	
P			○									○
Q	○		○			○						○
R			○									
S			○									○
T			○	○							○	○
The Number of Users	10	6	19	2	2	5	4	0	4	0	6	14

Table 3. Classification Accuracy

	All Elements	EM+EX+NL +TO+RT (Top 5)	Top 5+PO	**Top 5 +PO+EN**	Top 5+PIA
Average Classification Accuracy	88.7%	84.6%	87.2%	**88.6%**	86.1%
The Number of Subjects Less than 75.0% Classification Accuracy	0	5	2	**0**	3
The Number of Elements Used for Classification	12	5	6	**7**	6

4 Discussion

From the results, it appears that these seven elements (EM, EX, NL, TO, RT, PO, EN) become the factors of the impressions in e-mail instruction. Thus, teachers may control their impressions on students by paying attention to these e-mail elements.

Table 2 shows that important elements for classification are different among individuals. For example, Subject A classified the e-mails from the viewpoint of EM, EX, and NL. On the other hand, subject L classified them from the viewpoint of NL and RT. Thus, we must make impression model for each subject.

The average classification accuracy when we add PO is higher than when we add PIA. We think PIA has little influence to impressions, though many subjects used it for classification.

5 Conclusion

In this study, we propose an impression management support system for teachers which adapts to each student in CMC instruction. To realize the system, we performed an experiment to investigate impression factors in email instruction. From the results, we found that seven elements (EM, EX, NL, TO, RT, PO, EN) become the factors of the impressions in e-mail instruction. Now, we investigated image words suitable to evaluate impressions of teachers in e-mail. If we find out the image words, we will analyze the relations between the e-mail elements which are the factor of impressions and impression evaluation. Then we will make impression model and predict the impressions of teachers.

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