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Development and Practical Evaluation of Teaching Materials for Developing English Nonverbal Communication Skills

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Kinect

In business and technology, English is essential across the globe. This system helps Japanese EFL students to develop nonverbal communicative skills which makes up half of communication.

In this research, we specifically focused on facial expression and the nonverbal elements of the voice. When speakers speak, "how" speakers say something becomes just as important as "what" they say. Data were collected under the guise of a mock job interview. Twelve students were interviewed and recorded and later watched by the primary researcher, who assessed the facial expression and head movements using a 5-point Likert scale (1=poor, 5=excellent). Our system connects the interview scorer's assessment with the actual head movements and facial expressions recorded by the Kinect. Users found that they became more aware of their facial expressions after using the system.

Foreign language study

facial expression nonverbal communication L1 L2 difference Kinect mock job interview

(1) In business and technology, English is essential across the globe. Unfortunately, despite the Japanese contribution to the world in these vital fields, Japanese EFL students remain near the bottom in the Test English as a Foreign Language (TOEFL) test score rankings in Asia: Japan is 33rd out of 35 countries overall and exactly last in speaking test results (ETS, 2019). At the junior and high school levels, English education focuses on grammar and vocabulary, but this is not enough to create "communicative competence" (Celce-Murcia, 2008). Competence in language communication depends on two factors: verbal communication (VC) and nonverbal communication (NVC). Communication is difficult enough in the classroom, but with coronavirus and "emergency remote" teaching still happening, more problems exist. There is a plethora of reports based on quick research but sufficed to say many teachers and professors had trouble communicating with their students online (Hodges et al., 2020). NVC cues are essential, but even in a physical classroom with class sizes averaging forty students, it is hard enough to focus on VC, and it is impossible to create one-on-one learning chances for NVC.

(2) VC and NVC create "total communication" (Cooper, 2013). In this study, we specifically focused on facial expression and the nonverbal elements of the voice. When speakers speak, "how" speakers say something becomes just as important as "what" they say (Cooper, 2013). Teaching presentation and interview skills to students is essential to help foster communicative competence (Canale & Swain, 1980). And with the coronavirus and subsequent "emergency remote" teaching at most academic institutions in Japan, it was challenging to teach students these critical soft skills (Hodges al. al, 2020).

(1) Our proposal was for the development develop a software-based system combining facial expression analysis with
speech recognition and gesture recognition, which will improve language teaching in the
Japanese English Foreign Language [EFL] classroom. Due to dramatic improvements in speech recognition engines such as Google and Siri (Ropke, 2019), we concentrated our efforts on facial expressions and movements above the shoulders.
(2) NVC is an important part of "total communication" (Cooper, 2013), or in other words, it allows you to convey the complete thought or idea that you want to convey. The ratio of 93% NVC and 7% VC (Mehrabian, 1972) is often misused. That research by Mehrabian was specifically focused on single highly emotive words (Mehrabian, 1988). Subsequent research has suggested the ratio is closer to 50% VC and 50% NVC (Guerrero & Floyd, 2006).

In this research, data were collected under the guise of a mock job interview. Mock-job interviews have been seen as necessary to boost learners' "confidence and performance" (Hansen, 2009, p.318). We used a mock job interview in our experiment for two reasons: 1] when the subject is sitting down, there is minor variation in the three-dimensional data (x,y,z) we are collecting, and 2] participants are receiving something for their time. Students received both electronic feedback from type A, B, and C data: A] data from the Kinect, B] data from the researcher's scoring, and C] qualitative data from surveys.

12 Japanese 4th-year Kosen (18 years old) students were asked the following questions listed in Table 1 in first Japanese (J1-J6) by the student researcher and then in English (E7-E12) by the primary researcher. These interviews were recorded and later watched by the primary researcher, who assessed the facial expression and head movements using a 5-point Likert scale (1=poor, 5=excellent).

Table 1: Interview Questions

J1.	E7. Why are you applying for this job?
J2.	E8. What are your strengths and weaknesses?
J3. PR	E9. Please tell us why we should hire you.***
J4.	E10. How would you describe yourself in one word?
J5.	E11. Why did you choose that word/sentence?
J6.	E12. Explain what leadership means to you.

The researcher and the Kinect sensor camera collected empirical quantitative data through video and video analysis. Qualitative data was collected through the interview after the results of the analysis and data were explained to the interviewees.

(1) Our system connects the interview scorer's assessment with the actual head movements and facial expressions recorded by the Kinect. Table 2 shows the raw data collected by the Kinect, and Table 3 shows the amalgamated data.
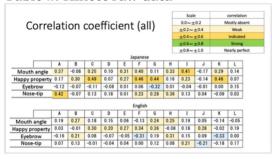
Table 2: Kinect raw data

Correlation coefficient (all)

Scale	correlation
0.0~±0.2	Mostly absent
±0.2~±0.4	Weak
±0.4~±0.6	Indicated
±0.6~±0.8	Strong
±0.8~±1.0	Nearly perfect

Japanese

	A	B	C	D	E	F	G	H	I	J	K	L
Mouth angle	0.37	-0.08	0.25	0.10	0.31	0.40	0.11	0.33	0.41	-0.17	0.29	0.14
Happy property	0.17	0.30	0.49	0.07	0.27	0.46	0.44	0.16	0.23	-0.14	0.46	0.07
Eyebrow	-0.12	-0.07	-0.11	-0.08	0.01	0.06	-0.32	0.01	-0.04	-0.01	0.00	0.15
Nose-tip	0.42	-0.07	0.13	0.18	0.01	0.23	0.28	0.36	0.13	0.04	-0.09	0.03

English

	A	B	C	D	E	F	G	H	I	J	K	L
Mouth angle	0.19	0.27	0.18	0.15	0.06	-0.13	0.24	0.25	0.19	0.05	-0.14	-0.05
Happy property	0.03	-0.01	0.30	0.20	0.27	0.34	0.36	-0.08	0.18	0.28	-0.02	0.19
Eyebrow	-0.16	0.21	0.08	-0.07	-0.05	-0.31	0.19	0.31	0.15	0.09	-0.33	0.00
Nose-tip	0.07	0.13	-0.01	-0.04	0.04	0.00	0.12	0.08	0.21	-0.21	-0.18	0.17

Table 3: Amalgamated data

Results

Evaluation	A	B	C	D	E	F	G	H	I	J	K	L	平均値
日本語	3.77	4.00	4.69	3.49	3.77	3.7	4.25	4.1	4.38	3.41	3.33	3.57	3.87
English	4.55	3.21	3.34	2.94	3.16	2.8	3.78	2.1	4.44	2.42	2.31	2.68	3.14

Happy	A	B	C	D	E	F	G	H	I	J	K	L	平均値
日本語	0.58	0.87	0.59	0.26	0.15	0.70	0.71	0.30	0.64	0.87	0.66	0.14	0.54
English	0.70	0.78	0.63	0.33	0.26	0.7	0.63	0.3	0.33	0.68	0.36	0.59	0.52

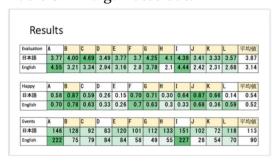| Events	A	B	C	D	E	F	G	H	I	J	K	L	平均値
日本語	146	128	92	83	120	101	112	133	151	102	72	118	113
English	222	75	79	84	84	58	49	55	227	28	54	70	90

Table 2 summarizes the correlation coefficients of the 12 subjects: labeled A to L. The upper table shows the results of the interviews conducted in Japanese, and the lower table shows the results of the interviews conducted in English. There is a better correlation between each parameter and the evaluation value when the interview is conducted in Japanese than in English. Looking at the mouth angle parameter, there seems to be a modest correlation in the Japanese case, but the correlation is almost gone in the English case. Even in the English case, the happy property has a weaker correlation, but it is often more correlated with the evaluation value than the mouth angle parameter. The nasal head coordinates relate in some subjects in the Japanese case but not in the English case.

Table 3 shows the average rating values. The subjects with higher values in the

Japanese interview are highlighted in yellow. Looking at the average of the evaluation values at the top, we can see that the evaluation values are higher in Japanese for all subjects except "A" and "I". It can be said that those who speak Japanese, their mother tongue, speak with more expression than those who speak English. Compared to the evaluation values, the subjects with high evaluation values tend to have high "happy properties". However, it cannot be said that issues with high comfortable property have high evaluation value.

Finally, the number of times the rating value changed during the interview. Since it is thought that when facial expression changes, the evaluation value also changes, we consider the number of times the evaluation value changed as the number of times the facial expression changed. Comparing the average rating value and the number of times the facial expression changed, we can see that the higher the rating value, the more the facial expression changed during the interview.

In the questionnaire, interviewees showed a positive response to the experiment and the system. Table 4 shows some of the answers.

Table 4: Post-analysis answers by students

Anon 1: *I got to know how I look like especially in facial expression.*
Anon 2: *I need to smile more. My face was too serious sometimes. Also I nodded too much.*
Anon 3: *Maybe the machine was counting how many times I avert my eyes which could be rude. By watching the video, I can improve an attitude of the interview.*
Anon 4: *I'd like to know if my attitude changed from the beginning to the end. If it was a long interview, I would've got tired and smiled less...*

In conclusion, our system is helpful to students preparing for interviews and presentations. Awareness of one's facial expression is an essential step toward realizing what you are trying to communicate and what you are communicating.

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