

## The Relationship between Internet-Use Tendency and Communication Skills of Students in a Japanese University

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### Abstract

The use of electronic communication tools is a necessity for daily interpersonal communication (IC), especially among the youth. This study focused on the relationship between internet-use and communication skills of Japanese students at university A, and further endeavored to design an educational program to improve the communication skills of nursing students for patient care. A total of 1393 students in academic years 1-4 from four different faculties of the university participated in this questionnaire-based study. In addition to behavioral indexes (frequency, time, frequented used items) related with internet-use, the questionnaire was complemented with communication skill indexes (ENDCOREs). The relationships between the internet-use tendency and communication skills were elucidated in three aspects: 16 items on self-expression; 17 items on relationship with others; and 11 items on balance with reality. The effective response rate was 92.0% (total: n=1056). The results revealed four clusters: Cluster 1 (Excellent Communication Type), 2 (Poor Expression Type), 3 (Responsive Type), and 4 (Poor Communication Type). Based on Pass analysis, Cluster 1 showed a strong causal relationship between accommodation of others and position acquirement; Cluster 2 failed to have in-depth contemplation and trust for others; Cluster 3 portrayed a strong causal relationship existed between factors (accommodation for others and decision-making) and internet-use tendency. Cluster 4 indicated effects of interpersonal relationship extension and non-daily relationship on communication, and exhibited low accommodation ability with others. The causal relationship between communication and internet-use in modern young people confirmed that the various correlational aspects of these events in the respective clusters proved that the relationship was non-unilateral but rather mutually correlational in the outcome.

### 1. Introduction

Recent years have seen the use of the internet, smart phones, mobile devices, and other electronic devices for communication becoming ubiquitous. Use of electronic communication tools is a daily necessity for interpersonal communication (IC), especially among the youth. While these tools can reduce tension and anxiety between different parties, and self-intentional involvement may flourish in selective/intimate IC via emails, text-chat, Facebook, Twitter, etc., these modes of communication are not only unhelpful in cultivating face-to-face (FtF) interpersonal relationships, but also disadvantageous in molding behavior in human relationships, subsequently nurturing mere 'diluted' or superficial interpersonal relationships.<sup>1</sup> In a study on interpersonal relationships of young people using mobile-phone emails, Miyake has demonstrated that these electronic tools/events influence interpersonal relationships in young people: viz. increased indirect/virtual communication has directly diluted and molded poor behavior and unwanted mannerisms of the young in on-site FtF communication.<sup>2</sup> As a result, internet-use has inflicted unfavorable influence on personality and social development in youth, who

frequently engaged in internet-use or online communication.

In nursing, character building or personality development through interpersonal relationships between nurses and patients is importantly a professional need. IC skills are necessary for caregiver-patient communication to provide clinical needs efficiently as well as achieve better and more desirable clinical outcomes for shorter hospital stay faster recovery. Without exception, nurses are influenced by internet/online communication, as this medium has infiltrated various aspects of our lives, and has – in fact – grown to become a personal/professional necessity. In a previous study on the buffering on child-rearing stress of nursing mothers who use the internet, child-raising anxiety has been found to be attenuated via the use of internet for matters that concerned the nursing mothers: i.e. timely on-demand information can be easily retrieved when it is urgently needed.<sup>3</sup> In addition, in cases where interpersonal relationships cannot be established due to low IC skills, enhancing IC via the use of low-anxiety media such as the internet, may improve the ability to develop useful interactive communication skills. In other words, internet-use per se does not affect IC;

rather the approach and manner of using the internet will determine the outcome of IC.

As such, it is necessary to investigate the appropriate future form of internet-use and encourage versatile adaptation to virtual communication in order to generate the most useful outcome: i.e. a more comfortable communicative lifestyle. Our present study therefore focused on the relationship between internet-use and communication skills of students in a Japanese university, and further endeavored to design an educational program to improve the communication skills of nursing students for patient care.

## 2. Methods and subjects

### 2.1 Subjects

A total of 1393 students in academic years 1-4 from four different faculties (literature, education, economics, nursing) of university A participated in the study, which was conducted between June and July of 2013. The study was questionnaire-based: viz., questionnaires were distributed to and then collected from students of aforesaid four faculties (Table 1).

### 2.2 Data collection

Explanation of the purpose and filling in of the questionnaire in the study were performed during class breaks to avoid disturbing the educational routine program. Participating students were briefed on the purpose and methods using written notes and oral explanation; participation was voluntary, and students were free to enter or terminate their participation during the study without any obligation or consequences whatsoever. Additionally, participants were further informed orally or in writing that they were not obliged to write their names or personal particulars on the questionnaires, and that it was a randomized blind study with results subjected to statistical verification without individual identification. Students who participated in the study were asked to place their answered questionnaires into a drop-box after having filled in the questionnaire. Data from the completed questionnaires were then analyzed, and were then stored without being used elsewhere.

### 2.3 Investigated items

Apart from the internet-use related behavioral indexes (frequency, time, frequented used items),<sup>4</sup> the questionnaire was complemented with communication skill indexes (ENDCOREs).<sup>5</sup> The relationships between the internet-use tendency and communication skills were elucidated.

### 2.4 Investigation content

Each of the three aspects in behavior - (1) 'self-expression,' (2) 'relationship with others,' and (3) 'balance with reality' of internet-use - involved 3 factors as follows: (1) self-expression included 3 sub-factors (self-presentation or SP, self-disclosure or SD, self-objectivity or SO) comprising 16 items; (2) relationships with others contained 3 sub-factors (position acquisition or PA, interpersonal relationship extension or IRE, aggressive speech and behavior or ASB) comprising 17 items; and (3) balance with reality involved 3 sub-factors (withdrawn with non-personal relationships, dependent relationship, infrequent/non-daily relationship or I/NDR) comprising 11 items. As the communication skills index ENDCOREs was deemed to be too demanding for participants, a condensed version with 30 items was used instead.

The communication skills index ENDCOREs was composed of 6 factors: self-control (SC), expression ability (EA), decision-making ability (DMA), self-assertiveness (SA), accommodation for others (AO), and relationship adjustment (RA). The first three were considered basic skills, while the subsequent 3 factors were categorized as interpersonal skills. As opposed to basic skills, interpersonal skills require a higher level of communication. Altogether, there were 24 items in the questionnaire. The special features of factors are regulated by certain systems as follows: (i) the output/expression system accounted for EA and SA, (ii) the response system contained the DMA and AO, while (iii) the management system involved factors of SC and RA.

### 2.5 Statistical analysis

With regard to categories of the special features related to IC skills, the causal relationships between the respective factors related to frequency of use or communication were analyzed accordingly. As a substantial amount of data from more than 1000 participants was involved, categorization and analysis of IC skills were performed using the non-stratified technique of cluster analysis. Thereafter, the groups extracted by cluster analysis were subjected to Pass analysis using internet behavioral indexes, and the casual relationships were elucidated.

## 3. Results

### 3.1 Collection results

Effective responses were obtained from 1056 participants (male: 228, female: 821; non-response: 7), yielding an effective rate of 92.0% (Table 2). In the four academic levels, year-1 (n=254), -2 (n=411), -3 (n=217), and -4 (n=174) students yielded effective response rates of 24.1, 38.9, 20.5, and 13.9%, respectively. As for the faculties concerned, literature (n=321), education (n=147), economics (n=249), and nursing (n=314) respective produced effective response rates of 30.4, 13.9, 23.6 and

29.7%, respectively (Table 1). The number of questionnaires collected was 1148 (response rate: 82.4%).

### 3.2 Cluster extraction of factors related to communication skills

Based on data on IC skill indexes verified by the cluster analysis, 4 clusters were extracted: i.e. Cluster 1, 2, 3, and 4. Mean scores for each of the different IC factors for the clusters are listed in Table 3. The number of participants and special features of the clusters are listed in Table 2.

#### 3.2.1 Cluster categorization

**Cluster 1:** Scores for all IC skill factors were high, and the total scores were excellent (Table 2), demarking a cluster of high-achievers. The scores for DMA and AO were impressive: i.e. typical of high-achievers in the response system (refer to 2.4). In other words, this

extended cluster of participants exhibited excellent IC ability in response to others. Cluster 1 was thus categorized as the Excellent Communication Type.

**Cluster 2:** The scores for Cluster 2 were next to Cluster 1 (Excellent Communication Type), demonstrating that Cluster 2 participants were second to Cluster 1 in executing IC. However, EA and SA scores of the expression system in Cluster 2 were lower than those of Cluster 3. Note that although Cluster 2 portrayed high IC ability on the whole, they were poor at expressing their own intention and assertion/opinion to others. Cluster 2 was thus categorized as the Poor Expression Type.

**Cluster 3:** Participants in Cluster 3 exhibited the highest number of students with high IC ability. As such, this cluster closely represented the IC ability of the average university students in general. In the response system, factors such as DMA and AO coincided with Cluster 1 (Excellent Communication Type): viz., the ability to response to others was well manifested. Cluster 3 was

Academic year	1	2	3	4	Total
Faculty	Yr-1: M (F)	Yr-2: M (F)	Yr-3: M (F)	Yr-4: M (F)	M (F)
Arts	43 (95)	19 (98)	3 (52)	7 (22)	72 (267)
Education	6 (18)	19 (76)	2 (8)	5 (13)	32 (115)
Economics	7 (7)	45 (77)	27 (39)	15 (32)	94 (155)
Nursing	5 (70)	8 (67)	9 (75)	8 (72)	30 (284)
Total	61 (190)	91 (318)	41 (174)	35 (139)	228 (821)

Table 1: The faculties, male (M) and female (F) of participants of academic years (Yr) 1-4 enrolled in the study. The effective response rate was 92% with 7 invalid questionnaires.

IC skill factors	Cluster			
	1 (n=207)	2 (n=268)	3 (n=409)	4 (n=172)
SC	21.06	19.27	16.33	14.49
EA	19.62	14.28	16	11.66
DM	22.14	18.38	17.33	13.52
SA	19.76	14.29	15.77	11.04
AO	22.74	21.47	17.88	16.35
RA	22.09	19.88	16.61	14.58

Table 2: Relationship between clusters (1-4) and communication skill-related factors. Of a total of 1148 answered questionnaires, effective responses were obtained from 1056 with a loss of ineffective 92 participants. Self-control (SC), expression ability (SE), decision-making (DM), self-assertiveness (SA), accommodation for others (AO), and relationship adjustment (RA) are the interpersonal communication (IC) skill factors.

thus categorized as the Responsive Type

Of the 4 clusters, Cluster 4 had the lowest scores: i.e. scores for all 6 factors were respectively lower than those of other clusters, indicating that participants in this cluster had poor IC ability. Scores especially for the expression system factors, such as EA and SA, were low: i.e. levels resembling that of Cluster 2 (Poor Expression Type) where they were poor in showing their self-intention and SA to others. As such, Cluster 4 was categorized as the Poor Communication Type.

### 3.2.2 Pass analysis of individual clusters

To monitor causal relationships between the frequency of internet-use and IC skills in each of the 4 clusters, internet-use behavior indexes were used for the Pass analysis. The results are schematically illustrated in Fig. 1-4.

**The Excellent Communication Type (Cluster 1):** Based on Pass analysis, participants in Cluster 1 fit in the model conformity with the highest degree (CFI=0.996, RMSEA=0.041). A strong causal relationship between the internet-use behavior index (especially in terms of PA in the aspect on relationship with others) and IC ability was established. Although a mutual relationship between AO and position acquirement (PA) was obtained, a positive correlation with a Pass coefficient of 7.51 was noted in PA derived from AO. As such, a high IC ability with others affected PA in internet-use behavior. Additionally, a negative correlation with a Pass coefficient of -4.83 was obtained in PA from RA. In other

words, high RA ability in communication cancelled out the effect of PA in internet-use (Fig. 1).

**Poor Expression Type (Cluster 2):** Based on Pass analysis, Cluster 2 fit in the model conformity well (CFI=0.997, RMSEA=0.032). A strong causal relationship between SD as well as SO (in aspect SE in internet behavior indexes) and IRE (in aspect of relationship with others) in communication was obtained, indicating a strong causal relationship with a Pass coefficient of -10.67 in RA from IRE. In other words, internet-use with IRE as a measure attenuated RA in communication. Additionally, SD in internet-use also attenuated SA in communication, as indicated by a Pass coefficient of -7.34 in SA derived from SD. Although there was mutual causal relationship between SO and SA, a Pass coefficient of -7.28 in SA from SD (a value slightly higher than the Pass coefficient in SA derived from SO) implied that poor SA affected SO during internet-use (Fig. 2).

**The Responsive Type:** Pass analysis performed on data obtained indicated a high degree of model conformity (CFI=0.997, RMSEA=0.038). SD (in aspects SE) and IRE (in aspect of relationship with others of internet-use behavior indexes) indicated a strong causal relationship with communication. A Pass coefficient of 5.67 in accommodation of others from IRE implied that internet-use with IRE was a measure of enhanced AO. Moreover, a Pass coefficient of 4.56 in AO from SD implied that SD in internet-use also elevated AO. However, a Pass

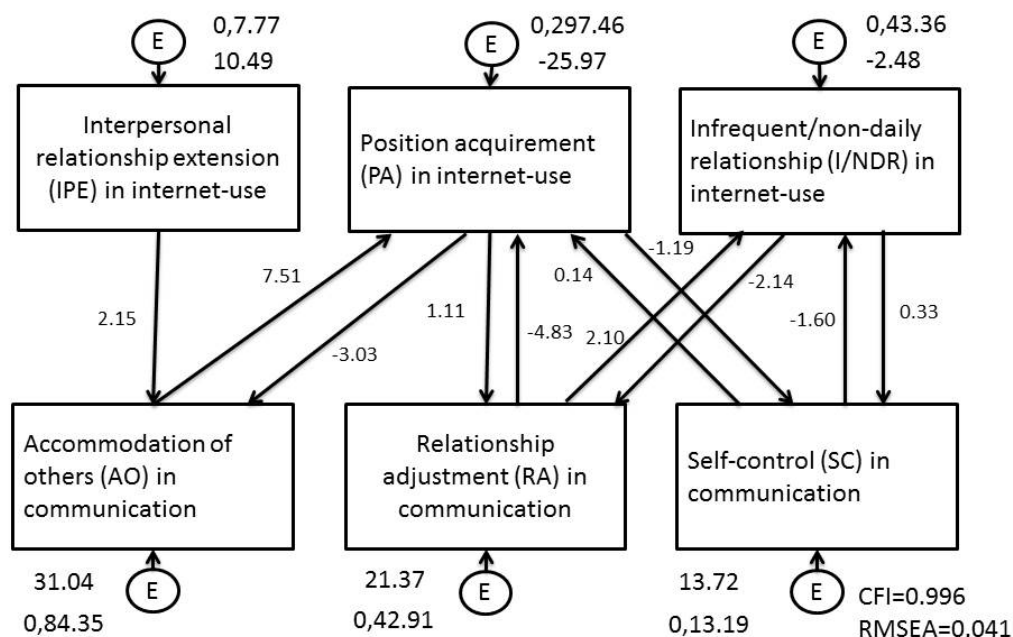


Fig. 1: Communication skills and factors affecting the Excellent Communication Type (Cluster 1) in internet-use and communication. Alphabet E with arrow shows effect being exerted.



coefficient of -4.89 in DMA from SD suggests that SD in internet-use attenuated DMA (Fig. 3).

**Poor Communication Type (Cluster 4):** In a similar tendency, Pass analysis yielded a high degree of model conformity in Cluster 4 as well (CFI=1.000, RMSEA<0.001). IRE (in aspect relationship with others) and I/NDR (in aspect reality balance) in internet-use behavior indexes exhibited a strong causal relationship in communication. A Pass coefficient of -23.69 in IRE from AO indicated a negative relationship: i.e. poor AO affected internet-use when IRE was adopted as a measure in communication. Additionally, a Pass coefficient of 14.77 in IRE from RA implied a positive relationship: viz., low RA ability affected internet-use when IRE was used as a measure in communication. Furthermore, although a causal relationship existed between I/NDR and RA, a Pass coefficient of -10.30 in RA from I/NDR (a value slightly higher than that of I/NDR from RA) implied that I/NDR in internet-use attenuated RA ability in communication (Fig. 4).

## 4. Discussion

### 4.1 Excellent Communication Type (Cluster 1)

A strong causal relationship between accommodation for others (AO) and position acquirement (PA) was observed in the Excellent Communication Type. As position may be defined as an individual or an event existing as a member or a part of a group/organization or body, PA in the present context is then defined as a 'position' in internet which is being pursued or desired. If AO

indicated a positive correlation with self-accommodation, two balancing acts are conceivable: viz., mutual adjustment between self and others was required for smooth IC; however, when a balance is not established, mutual adjustment is difficult between self and others in executing communication.<sup>6</sup> In other words, this cluster is said to be able to perform simultaneously high self-accommodation ability. The importance of self-accommodation is that one feels a sense of being accepted/accommodated by others.<sup>7</sup> However, with advent of the ubiquitous use of mobile phones, the internet, and electronic devices, modern young people intend to display poor IC ability in direct FtF communication.<sup>2</sup> As a result, it is difficult for them to cultivate elements of virtue such as mutual trust and/or a sense of security: viz., not believing in being accepted/accommodated by others. As such, participants may feel a need to seek a place/position via virtual communication tools, such as the internet, in order to enhance self-accommodation. However, as a negative correlation in PA had been derived with relationship adjustment (RA), participants manifested high RA ability with others without taking action to acquire a place/position on the internet. In this case, if participants exhibited high RA ability with others in FtF communication, they would harbor high self-accommodation even without elevating self-accommodation on internet-use.

In short, a strong causal relationship existed between communication and internet-use: viz., an equilibrium must be established between internet-use and

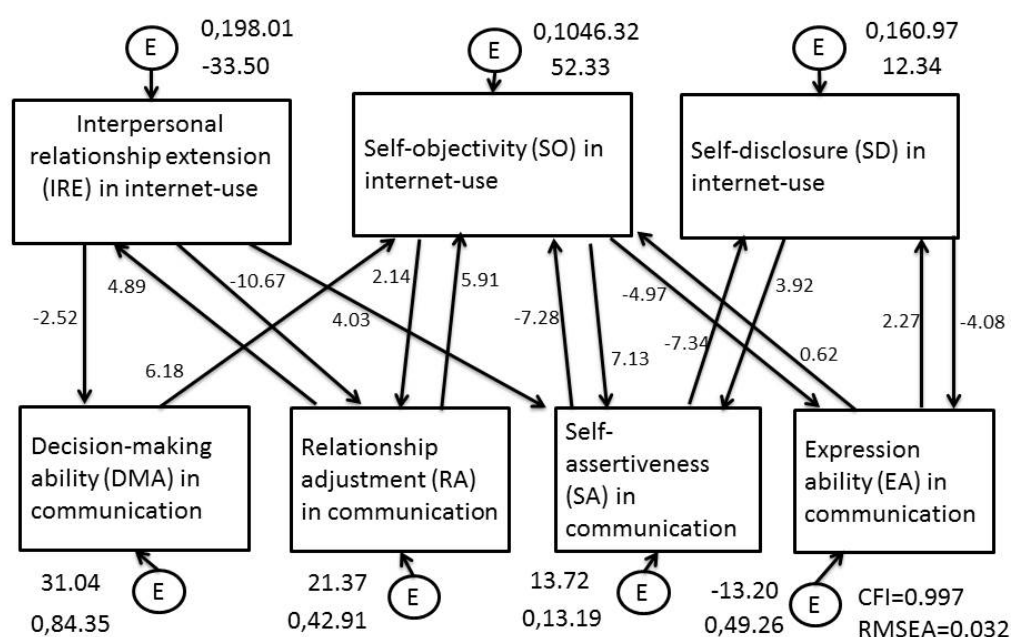


Fig. 2: Communication skills and factors affecting the Poor Expression Type (Cluster 2) in internet-use and communication. Alphabet E with arrow shows effect being exerted.

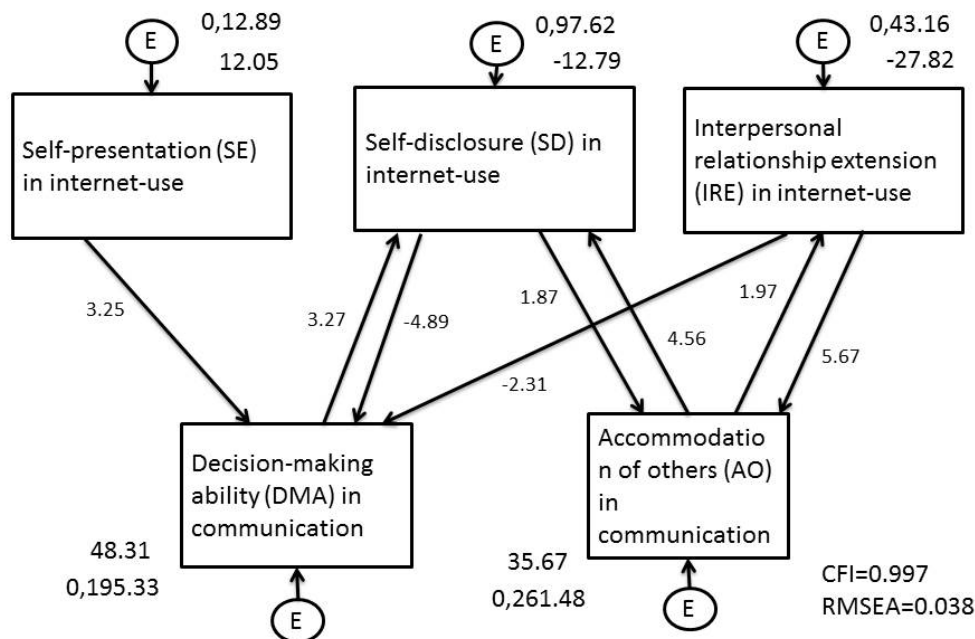


Fig. 3: Communication skills and factors affecting the Responsive Type (Cluster 3) in internet-use and communication. Alphabet E with arrow shows effect being exerted.

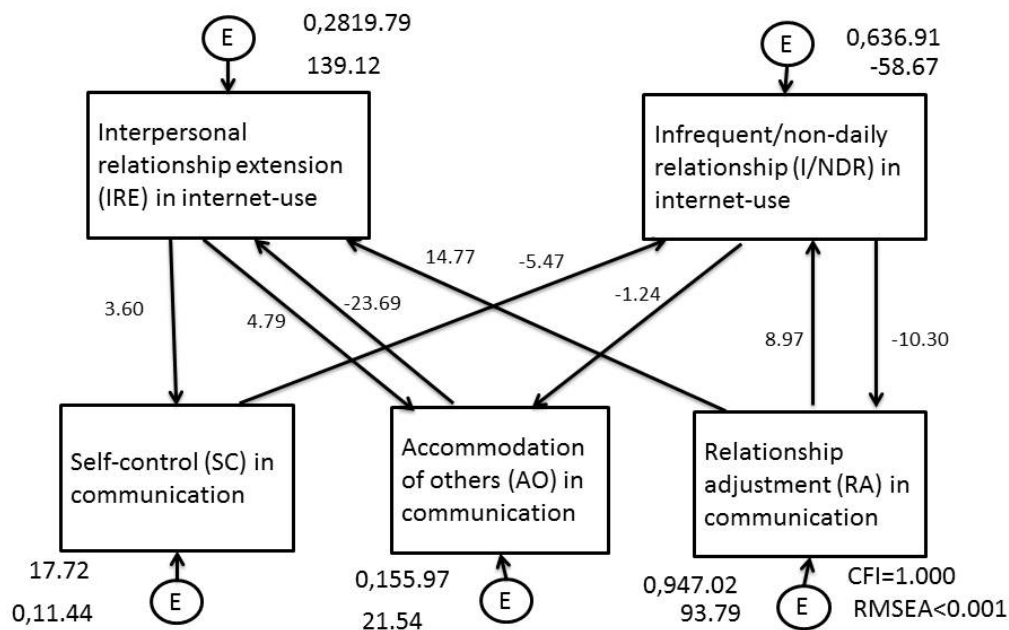


Fig. 4: Communication skills and factors affecting the Poor Communication Type (Cluster 4) in internet-use and communication. Alphabet E with arrow shows effect being exerted.

communication.

#### 4.2 Poor Expression Type (Cluster 2)

The reasons for self-expression (SE) include creating mutual trust with others, consideration for others, inward-looking, specific characters, confidence in verbalization of self-feeling, etc.<sup>8</sup> Inward may be defined as in-depth contemplation. This cluster failed to have in-

depth contemplation and trust for others, resulting in a tendency of being unable to express themselves to others. As a consequence, self-assertiveness (SA) exhibited strong causal relationships with self-disclosure (SD) and self-objectivity (SO). SD may be defined as transmission of information related to self to others via language/words or other transmission acts/behaviors: i.e. self-disclosed information via a social-networking site

(SNS) on the internet. Although information disclosure via SNS messages without direct FtF communication facilitates SD, SE in FtF situation may be difficult for these participants as they have become used to non-FtF communication and lack confidence in SE, resulting in attenuated SA in communication. In addition, providing in-depth contemplation for others may induce indifference towards others. Objectivity may be described as viewing and analyzing an event without taking a specific standpoint/position. As such, SO during internet-use may be defined as the state surrounding/governing a person is calmly understood by the individual in question. In other words, those who showed in-depth contemplation for others without SA were affected by their calm or indifferent SO during internet-use.

These are aspects that attenuate expressed abilities of people via internet-use: i.e. the IC ability of Poor Expression Type participants was affected by internet-use.

#### 4.3 Responsive Type

In Cluster 4, strong causal relationships existed between the sub-factors (such as AO or DMA) and internet-use tendency. A positive effect on AO was exerted by interpersonal relationship extension (IRE). Items emphatically quoted for smooth interpersonal tasking in a study on high-school students focused on factors such as word-use, consideration for the feelings of others, emotional expression, etc.<sup>9</sup> Relationship extension (RE) in internet-use often exploits the use of SNS. In non-FtF online communication, exchange of messages is mediated via 'impressions' based on word use and sentence construction without actually seeing the face/appearance of the talking party. As such, caution is required in internet communication, where exchange of information is done without actually seeing the facial expressions and emotions of the talking party.

In short, IRE in internet communication requires accommodating others' feelings, thus improving responder's attitude and posture in communication. Moreover, DMA was affected negatively by SD in internet-use. (DMA in the present context may be defined as the ability to interpret feelings of the other party in communication: specifically, the ability to interpret involves not only words but also facial expression and intonation, etc. of the FtF talking party) The ability to interpret and sense on-site atmosphere and/or situation in IC is an important element. However, the ability to accurately interpret feelings of the other party in an online exchange of information may be difficult. Therefore, SD on the internet may attenuate DMA in

actual FtF scenarios. In other words, although communication skills may be elevated by internet-use, negative effects on IC skills also cannot be denied.

#### 4.4 Poor Communication Type

In Cluster 4, effects of IRE and infrequent/non-daily relationship (I/NDR) on communication were observed. Different from the Responsive Type (Cluster 3), Cluster 4 (Poor Communication Type) exhibited low AO, which thereby strongly influenced IRE in internet-use. On the whole, university students in Japan are known to exhibit poor awareness when communicating with first-time and non-intimate acquaintances such as part-time workmates as well as third-party (friend of a friend) relationships. As Cluster 4 participants performed poorly in FtF communication on the whole, they harbored poor awareness in such scenarios more intensely than other clusters. Actually, they might falsely believe or misinterpret that IC over the internet via IRE could actually be established without any on-site FtF communication. Moreover, a strong negative correlation in RA was observed to have established with I/NDR. In the present context, I/NDR is defined as a relationship not happening on a daily basis, or which is assumed not to be normal or correct: i.e. online use is less than daily or only occasional. In other words, occasional internet-use may attenuate relationship adjustment (RA) ability in FtF communication. Observations thus far confirmed that internet-use concurrently bifurcates the outcome of communication skills: lowering communications skills on one hand and elevating them on the other. All in all, infrequent internet-use may be correlated to attenuation of IC skills. As such, a decrease in RA ability in communication may be related to infrequent or occasional internet-use.

As such, infrequent/non-daily internet-use may attenuate communication skills on one hand, and communication skills may be reinforced via consistent internet-use on the other.

#### 5. Conclusion

A causal relationship between communication and internet-use in young people in modern times was confirmed. Various correlational aspects of these events in the respective clusters proved that the relationship was non-unilateral but rather mutually correlated. Furthermore, although internet-use influenced the communication skills of the modern internet-indulging youth, a balance between mechanical and human mediated communication is required to be equilibrated for concurrent development, as both are required for efficacious and convenient communication and neither

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can be eliminated while attaining and maintaining our present convenient lifestyle. The special features of communication skills involving internet-use are essential for interactively useful communication, and it is also clear that communication skills are improved via internet-use. Further studies to clarify these interactive relationships in internet-use are warranted.

### Competing Interests

Authors have declared that no competing interests exist.

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