

Elementary school students' awareness of the use of artificial intelligence chatbots in violence prevention education in South Korea: a descriptive study

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Purpose: This study aimed to identify students' awareness of the use of a chatbot (A-uC), a type of artificial intelligence technology, for violence prevention among elementary school students. **Methods:** The participants comprised 215 students in the fourth to sixth grades in Chuncheon, South Korea, and data were collected via a self-reported questionnaire. **Results:** The mean A-uC score was 3.43 ± 0.83 out of 5 points. The mean scores for the 4 sub-dimensions of the A-uC tool were 3.48 ± 0.80 for perceived value, 3.44 ± 0.98 for perceived usefulness, 3.63 ± 0.92 for perceived ease of use, and 3.15 ± 1.07 for intention to use. Significant differences were observed in A-uC scores ($F=59.26$, $p < .001$) according to the need for the use of chatbots in violence prevention education. The relationships between intention to use and the other A-uC sub-dimensions showed significant correlations with perceived value ($r=.85$, $p < .001$), perceived usefulness ($r=.76$, $p < .001$), and perceived ease of use ($r=.64$, $p < .001$). **Conclusion:** The results of this study suggest that chatbots can be used in violence prevention education for elementary school students.

Key words: Artificial intelligence; Education; Students; Violence

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INTRODUCTION

With the advent of the Fourth Industrial Revolution, artificial intelligence technology has become a key component of modern society [1,2]. Artificial intelligence is actively used in our daily lives, and its use is rapidly spreading across various fields. Therefore, the coexistence of humans and artificial intelligence technologies has become indispensable [3,4].

Chatbots are one of the most common artificial intelligence-based tools in daily life. The term "chatbot", which is a compound word combining "chatting" and "robot", was first coined by Mauldin in 1994 [5]. Unlike general messengers, chatbots can communicate with a user and machine through text or voice in a similar manner to humans [3,6]. Their distinguishing characteristic is their interactivity and ability to exchange messages with virtual conversation partners and provide appropriate answers or information related to users' questions [7]. Since chatbots interact in a way that resembles human conversations, they are a natural fit for teaching and

learning situations in which interactions between students and teachers or peers are frequent [8].

Chatbots were mainly used in the service area initially; however, with the recent development of machine learning technology, flexible conversations with chatbots have become possible, and the scope of their use is expanding to education [1]. Many attempts have been made to introduce new education tools to influence changes in the education paradigm. In other words, since access to a diverse and vast knowledge base is now broader than ever, the demand has increased for changes in the traditional school education paradigm with a focus on teacher-centered knowledge transfer [3].

The South Korean government recently suggested a policy initiative whereby all citizens can receive artificial intelligence-based education. This education initiative will be implemented in kindergartens, elementary schools, middle schools, and high schools in the 2022 curriculum and will be implemented in full starting in 2025 [9]. As a result, many researchers are now examining the possible use of chatbots in

education. In particular, the development and application of artificial intelligence and media are currently major topics in remote classroom environments [3].

Due to the increasing availability of chatbots, opportunities to use them in education are also increasing [6]. Education using chatbots can be used as a learning aid due to the possibility of interactive exchanges through voice and text [10]. School violence has increased in frequency in recent years, and violence prevention education is urgently needed [11]. According to a survey on school violence among elementary, middle, and high school students, elementary school students had the highest incidence of school violence, which has been recognized as a problem [12]. Existing violence prevention education for elementary school students is limited in its ability to provide feedback to students due to the common one-way lecture format. A chatbot, however, can interact conversationally, and students can voluntarily engage in repeated learning and actively participate in further education.

As an effective education initiative for the prevention of school violence, a chatbot could help facilitate learning and improve concentration by providing an enjoyable experience that incorporates fun elements in a 2-way conversation rather than a 1-way lecture or videos [13]. However, no studies have been conducted on the application of chatbots to prevent school violence, particularly among elementary school students. Therefore, this study investigated elementary school students' awareness of the use of chatbots (A-uC) prior to their implementation in elementary school education for the prevention of school violence.

This study aimed to explore elementary school children's A-uC in violence prevention education. The specific purposes were as follows: 1) to measure the degree of A-uC across four sub-dimensions (perceived value, perceived usefulness, perceived ease of use, and intention to use), 2) to identify the differences in A-uC according to the participants' characteristics, and 3) to identify correlations between the participants' intention to use chatbots with the other three sub-dimensions (perceived values, perceived usefulness, and perceived ease of use).

1. Theoretical Framework

The extended technology acceptance model (ETAM) [14], which provided the theoretical base for this study, is a framework through which external variables that can affect the adoption or acceptance of new technologies in the technology acceptance model (TAM) can be identified [15]. Davis's (1989) TAM [15] is useful for examining users' motivations for acceptance and attitudes when new and innovative technologies are introduced. The model combines both reasoned be-

havior theory and planned behavior theory, and it is widely used in artificial intelligence research as a predictive model for whether consumers will accept new technologies. The main finding of the TAM was that perceived usefulness and perceived ease of use were the motivations that most influenced attitudes toward technology adoption and the most important factors in determining system use [15]. In this study, based on prior research and literature [7], perceived value were added as an external variable related to the intention to use. Perceived value refer to the degree of professionalism, reliability, and empathy of the chatbot.

Therefore, the model in this study posited that perceived value (comprising the sub-categories of professionalism, reliability, and empathy), perceived usefulness, and perceived ease of use influenced users' motivations related to their intention to use chatbot systems (Figure 1).

METHODS

Ethics statement: This study was approved by the Institutional Review Board (IRB) of Hallym University (No. HIRB-2022-043). Informed consent was obtained from all participants.

1. Study Design

This study used a descriptive design with a self-reported questionnaire to identify the degree of A-uC for violence prevention education for elementary school students and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [16].

2. Participants

The participants were students in the fourth to sixth grades of N Elementary School in Gangwon-do. The upper grades of elementary school correspond to the concrete operational stage of Piaget. In particular, since students at these grade levels are able to understand abstract words such as "think", "feel", and "realize" and can express their abstract inner emotions [17], this grade range was selected when enlisting research participants to measure the degree of A-uC. After explaining the purpose and process of the study and obtaining permission from the school principal, the study was conducted with the consent of both the students and their parents. Using G*Power 3.19 [18], the minimum sample size based on a median effect size of .25, a significance level of .05, and power of .80 using one-way analysis of variance (ANOVA) was 159 people. The 215 participants included in this study met the required number of subjects.

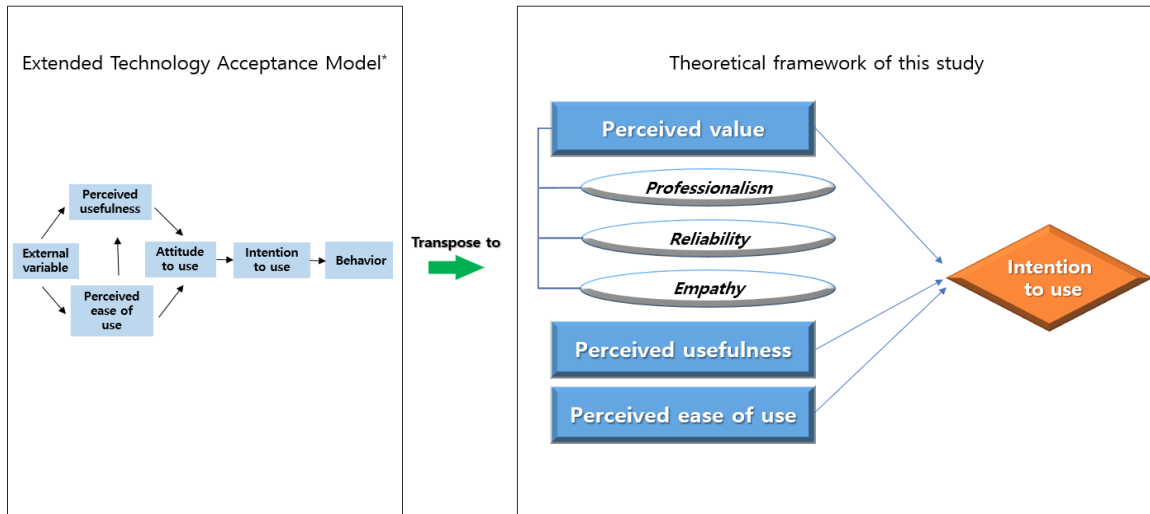


Figure 1. Theoretical framework of this study. Adopted: Venkatesh V, Davis FD. A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*. 2000;46(2):186-204 [14].

3. Measurement

The A-uC tool was modified and supplemented based on previous studies that used the ETAM [14]. Based on the ETAM, the researchers identified items across the following four sub-dimensions: perceived value, perceived usefulness, perceived ease of use, and intention to use. The questions were modified to make it easier for elementary school students to provide answers, and a total of 22 items were included. After the researchers formed the questionnaire items, the content validity index (CVI) of the items was determined based on input from six experts (two elementary school teachers and four child health nursing professors). The content validity test resulted in a CVI of 90%. The Cronbach's α value of all of the items was 0.96, and it was in an acceptable range (0.86-0.91) for all four sub-dimensions. All items were rated on a 5-point Likert scale (1 for "not at all" to 5 for "strongly agree") with a higher score indicating a more positive A-uC.

The perceived value of the chatbot service was defined in this study as "the consumer's perception of the functional, psychological, and economic benefits obtained through the service." The perceived value sub-category comprised 11 items across three further sub-categories (professionalism, 3 items; reliability, 4 items; empathy, 4 items). Cronbach's α for the items was 0.91 in this study.

This study defined perceived usefulness as the "evaluation of the degree to which new information technology or services can be used to help users and improve work efficiency". The perceived usefulness sub-dimension comprised four items, and Cronbach's α was 0.86.

This study defined perceived ease as "believing that using a

particular skill does not require great effort". There were three items for perceived ease of use, and Cronbach's α was 0.77.

Intention to use was defined as the "user's attitude toward new technology and willingness to use technology or services". This sub-category contained four items, and Cronbach's α was 0.88.

4. Data Collection

Data were collected from July 1 to July 22, 2022. After obtaining permission from the school principal, structured self-reported questionnaires were distributed with the cooperation of the classroom teacher and school nurse. Since the participants were minors, consent was obtained from their parents or guardians via their responses to a school letter prior to data collection. The school nurse explained the study's purpose to the participants, including that the data would only be used for the purposes of the study, and that there would be no disadvantage for non-participation. After the explanation, the questionnaires were distributed to students who voluntarily agreed to participate and signed a written consent form. The questionnaire took approximately 15 minutes to complete, and a small gift of approximately 5 dollars was provided to those who participated.

5. Data Analysis

The collected data were analyzed using IBM SPSS for Windows (version 25.0; IBM Corp., Armonk, NY, USA). The participants' general characteristics were analyzed using percentages, means, and standard deviations. The differences in

A-uC scores according to the participants' general characteristics were analyzed via the independent t test and 1-way ANOVA with a post-hoc test (Scheffé test). The correlations between intention to use and the other three sub-dimensions were analyzed using the Pearson correlation coefficient.

RESULTS

1. Participants' Characteristics

Of the 215 participants, 71.2% were sixth-graders, 19.5% were fifth-graders, and 9.3% were fourth-graders. More than half of the participants were male (51.2%). Most of the participants lived in a nuclear family structure (81.9%), and the remainder lived with extended family (18.1%). Only 15 students (7.0%) had experienced school violence. Among the students who had experienced violence (n=15), a majority of the perpetrators were peers (86.7%) as opposed to older students (13.3%). The most common resources for information regarding violence prevention were schools (82.3%), parents (28.9%), and smartphones (25.6%), with multiple responses allowed for this item. Most of the participants received violence prevention education at school (96.7%), followed by their parents (25.6%). Most of the students (80.0%) had no experience with a chatbot. A total of 50.2% of the respondents answered that they were unsure whether chatbot-based education is necessary for violence prevention education, while 38.1% answered that there was a need for chatbot-based education and 11.6% answered that there was not. The participants showed a wide range of curiosity and interest related to chatbot-based education, with a total of 34.9% and 57.2% reporting high curiosity and interest, 30.7% and 25.6% reporting moderate curiosity and interest, and 34.4% and 17.2% reporting low curiosity and interest, respectively (Table 1).

2. The Degree of Awareness of Chatbot Use across the 4 Sub-dimensions

The mean A-uC score of the participants was 3.43±0.83 based on a 5-point Likert scale. The mean scores for the four sub-dimensions were 3.48±0.80 for perceived value, 3.44±0.98 for perceived usefulness, 3.63±0.92 for perceived ease of use, and 3.15±1.07 for intention to use (Table 2).

3. Differences in Awareness of Chatbot Use According to the Participants' Characteristics

Table 3 shows the differences in A-uC scores according to the participants' general characteristics. There was a significant difference in the A-uC score according to the need for the

Table 1. Characteristics of Elementary School Students Who Participated in This Study (N=215)

Characteristics	Categories	n (%)
Grade	4	20 (9.3)
	5	42 (19.5)
	6	153 (71.2)
Sex	Male	110 (51.2)
	Female	105 (48.8)
Family type	Nuclear	176 (81.9)
	Extended	39 (18.1)
Experience of violence	Yes	15 (7.0)
	No	177 (82.3)
	Unsure	23 (10.7)
Perpetrator of violence (n=15)	Peer	13 (86.7)
	Older student	2 (13.3)
	Unknown	0 (0.0)
Resources for information regarding violence prevention*	School	177 (82.3)
	Family	62 (28.9)
	Friends	11 (5.1)
	Media (TV, newspaper)	38 (17.7)
	Computer (internet)	31 (14.4)
	Smartphone	55 (25.6)
Other	5 (2.4)	
Place where violence prevention education was received*	School	208 (96.7)
	Parents	55 (25.6)
	TV	32 (14.9)
	Computer (internet)	31 (14.4)
	Smartphone	35 (16.3)
	Other	3 (1.4)
Experience using chatbots	Yes	43 (20.0)
	No	172 (80.0)
Need for chatbots in violence prevention education	Yes	82 (38.1)
	Unsure	108 (50.2)
	No	25 (11.6)
Curiosity about chatbots	High	75 (34.9)
	Moderate	66 (30.7)
	Low	74 (34.4)
Interest in chatbots	High	123 (57.2)
	Moderate	55 (25.6)
	Low	37 (17.2)

*Multiple responses; TV, television.

Table 2. Degree of Awareness of Chatbot Use Across the Four Sub-dimensions among Elementary School Students (N=215)

Variables	n	M±SD
Chatbot awareness (5-point Likert scale)	22	3.43±0.83
Perceived value	11	3.48±0.80
Professionalism	3	3.68±0.80
Reliability	4	3.63±0.89
Empathy	4	3.19±1.00
Perceived usefulness	4	3.44±0.98
Perceived ease of use	3	3.63±0.92
Intention to use	4	3.15±1.07

M, mean; SD, standard deviation.

Table 3. Differences in Awareness of Chatbot Use According to Characteristics of Elementary School Students (N=215)

Characteristics	Categories	Sub-dimensions																	
		Awareness of chatbots			Perceived values			Sub-categories of perceived value			Perceived usefulness			Perceived ease of use			Intention to use		
		M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)	Reliability	Empathy	M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)	M±SD	t or F (p)
Grade	4	3.62±0.91	0.80	3.70±0.87	1.30	3.78±0.76	0.78	3.78±0.96	0.46	3.56±1.11	2.05	3.56±1.03	0.17	3.75±0.89	0.25	3.36±1.24	1.13	3.29±0.99	(.776)
	5	3.50±0.73	(.449)	3.57±0.68	(.275)	3.79±0.66	(.460)	3.68±0.71	(.630)	3.29±0.92	(.132)	3.44±0.87	(.845)	3.57±0.84	(.776)	3.29±0.99	(.326)	3.29±0.99	(.776)
	6	3.39±0.84		3.43±0.82		3.64±0.84		3.59±0.93		3.11±1.00		3.43±1.01		3.63±0.95		3.08±1.06		3.08±1.06	
Sex	Male	3.39±0.83	-0.89	3.46±0.82	-0.51	3.64±0.83	-0.83	3.55±0.93	-1.35	3.23±1.01	0.58	3.34±1.01	-1.58	3.58±0.88	-0.93	3.10±1.09	-0.70	3.10±1.09	
	Female	3.49±0.83	(.375)	3.51±0.78	(.613)	3.73±0.74	(.405)	3.71±0.85	(.178)	3.15±1.01	(.563)	3.55±0.95	(.115)	3.69±0.95	(.355)	3.20±1.04	(.484)	3.20±1.04	
Experience of violence	Yes	3.62±1.06	0.42	3.62±0.98	0.38	3.64±0.96	0.04	3.65±0.96	0.05	3.58±1.22	1.75	3.58±1.29	0.17	3.50±1.27	0.15	3.54±1.19	1.19	3.54±1.19	
	No	3.41±0.83	(.660)	3.46±0.80	(.682)	3.69±0.81	(.957)	3.62±0.91	(.956)	3.13±0.99	(.177)	3.44±0.96	(.843)	3.13±1.02	(.859)	3.10±1.07	(.560)	3.10±1.07	
	Unsure	3.48±0.73		3.56±0.69		3.65±0.62		3.67±0.67		3.39±0.93		3.38±1.01		3.34±0.86		3.26±0.97		3.26±0.97	
Experience using chatbots	Yes	3.64±1.06	1.79	3.61±1.01	0.97	3.88±0.85	1.78	3.75±1.11	0.86	3.27±1.20	0.53	3.77±1.11	2.46	3.79±1.07	1.26	3.46±1.31	1.84	3.46±1.31	
	No	3.38±0.76	(.074)	3.45±0.74	(.336)	3.64±0.78	(.077)	3.59±0.83	(.394)	3.17±0.95	(.602)	3.36±0.93	(.015)	3.59±0.88	(.208)	3.07±0.99	(.072)	3.07±0.99	
NCVPE	Yes ^a	3.98±0.66	59.26	3.99±0.64	57.86	4.13±0.69	35.62	4.11±0.76	50.16	3.76±0.85	37.03	3.95±0.86	35.25	4.11±0.72	23.80	3.87±0.87	61.60	3.87±0.87	
	Unsure ^b	3.25±0.67	(<.001)	3.33±0.65	(<.001)	3.52±0.71	(<.001)	3.53±0.73	(<.001)	2.99±0.87	(<.001)	3.30±0.83	(<.001)	3.40±0.85	(<.001)	2.88±0.83	(<.001)	2.88±0.83	
	No ^c	2.43±0.66	a > b > c	2.48±0.62	a > b > c	2.91±0.63	a > b > c	2.45±0.70	a > b > c	2.20±0.94	a > b > c	2.39±0.94	a > b > c	3.05±1.07	a > b > c	1.90±0.88	a > b > c	1.90±0.88	

M, mean; NCVPE, need for chatbots in violence prevention education; SD, standard deviation.

use of a chatbot in violence prevention education (F=59.26, $p < .001$). There were significant differences in the Scheffé post-hoc test scores for the three classifications (yes, 3.98 ± 0.66 ; unsure, 3.25 ± 0.67 ; and no, 2.43 ± 0.66).

There were significant differences across the four sub-dimensions of the A-uC tool according to the need for the use of a chatbot in violence prevention education (perceived value: F=57.86, $p < .001$; perceived usefulness: F=35.25, $p < .001$; perceived ease of use: F=23.80, $p < .001$; intention to use: F=61.60, $p < .001$). The Scheffé post-hoc test for all four sub-dimensions showed the highest significance for those who felt that there was a need for the use of a chatbot, followed by those who were unsure and those who did not perceive a need for the use of a chatbot.

4. Correlations between Scores for Intention to Use and the Other 3 Sub-dimensions

Table 4 shows the correlations between scores for the intention to use sub-dimension and the other three sub-dimensions (perceived value, perceived usefulness, and perceived ease of use). Participants' scores for intention to use showed significant positive correlations related to all three sub-dimensions (perceived values: $r = .85$, $p < .001$; perceived usefulness: $r = .76$, $p < .001$; perceived ease of use: $r = .64$, $p < .001$).

Table 4. Correlations between Elementary School Students' Intention to Use Chatbots with Sub-dimensions (N=215)

Variables	Intention to use chatbots	
	r	p
Perceived value	.85	<.001
Professionalism	.63	<.001
Reliability	.75	<.001
Empathy	.82	<.001
Perceived usefulness	.76	<.001
Perceived ease of use	.64	<.001

DISCUSSION

This section discusses the results of this study with a focus on the four sub-dimensions of the A-uC tool based on the theoretical framework developed using the ETAM.

The first sub-dimension, perceived value, contained three further sub-categories (professionalism, reliability, and empathy). Among the service values perceived by consumers, professionalism is directly related to user satisfaction [7]. Since the degree of professionalism was above average and its correlation to intention to use was also significant, the chatbot can be expected to be highly useful in terms of professionalism in education. In TAM-related research, user reliability is a very

important factor for maintaining long-term relationships between users and providers [19]. In this study, the score for the degree of reliability was above the middle level, and its correlation to intention to use was also significant. In the future, students may consider chatbot technology to be a reliable education method for school violence prevention. The score for the level of empathy was also above the middle level, although it was the lowest of the sub-categories of perceived value. Conversely, the ability for chatbots to communicate like humans reportedly helps learners feel as if they are communicating with another person, thereby increasing their learning motivation and immersion. In addition, in a study of the effects of a chatbot that gave health advice, expressions of empathy were preferred over non-emotional advice [20]. This suggests that a higher degree of chatbot personification may correspond to a higher awareness of empathy regarding the chatbot.

The score for the perceived usefulness of chatbot technology among the participants in this study was above average. This is consistent with a study by Huang et al. [21] that included 34 elementary school students in Taiwan and found that conversations with a chatbot were very positive and useful for elementary school students. Other studies [3,22] have also reported that classes that used chatbots had a positive effect on elementary school students' interest, attitude, and confidence related to learning. In a study [23] that measured user satisfaction and the intention to use chatbot services among 216 adults older than 20 years of age, usefulness was also found to have a significant positive correlation with satisfaction. In a recent study that used the TAM to analyze factors affecting consumers' intention to use educational chatbots, perceived ease and usefulness were found to have significant positive relationships with the intention to use educational chatbots [10].

Similar to previous studies, perceived ease of use in this study showed an above-average score and was significantly correlated to intention to use. In a study by Mo [24] that examined awareness of a digital storytelling chatbot for undergraduate and graduate students, the average score for students' awareness based on a 5-point Likert scale was 4.22, and the average usability score was 3.93. Based on the findings of previous studies, chatbots may be a simple and effective option in violence prevention education at the elementary school level. In addition to chatbot technology, a study based on the ETAM examined consumers' intention to use the metaverse, which is a new innovative technology, and reported that the participants' perceived ease and perceived usefulness had a significant positive relationship with their intention to use metaverse technology [25].

Intention to use refers to the willingness of people to use a

technology or service [26,27]. In this study, intention to use was defined as participants' attitudes toward chatbot technology and their willingness to use chatbots as an element in violence prevention education. Davis [15] reported that intention to use is a major variable that determines individuals' motivation to use a technology or system on a routine basis or recommend it to others. When users feel a sense of trust, it can increase their intention to use. In this study, the mean score for intention to use was above average, and the correlations between intention to use and the other 3 sub-dimensions were all significant and positive. Previous studies have confirmed that perceived usefulness and perceived ease of use had significant positive relationships with intention to use [10]. This is likely due to the ease of use of chatbot technology in education and its ability to meet its educational purpose, which has a positive effect on problem-solving since the chatbot experience can be personified through voice recognition and dynamic characters.

As chatbots based on artificial intelligence technology continue to be developed in modern society [28], they are actively being applied in the field of education. Educational chatbots are also expected to increase in terms of their usefulness in educating elementary school students [29]. The results of this study can provide useful evidence related to the possibility of using chatbots in school violence prevention education. In recent studies that examined the use of artificial intelligence chatbots in upper elementary school grade levels, positive educational effects such as interactivity, repeatability, interest, and learning motivation were reported [3,4]. Elementary students in higher grades are able to listen to and discuss other people's opinions to solve problems, enabling self-directed learning. Furthermore, as students' logical thinking skills develop, they are increasingly able to predict dangerous situations and use appropriate language when describing the situation, and they often begin to take an interest in social issues [17]. Therefore, when artificial intelligence is used in violence prevention education, the interactive characteristics and dialogue and negotiation functions of chatbots are educational methods that can interest and motivate elementary school students at higher grade levels.

Given our findings, this study offers several implications for future research. These findings suggest a need to adapt educational methods and integrate artificial intelligence as a new educational method in the context of the Fourth Industrial Revolution [13]. Given elementary school students' high A-uC scores in this study, chatbots are expected to be a useful educational medium for education related to various topics as well as for the prevention of school violence. In addition, to increase utilization, the anthropomorphic element and interest should be discussed when incorporating chatbots into educa-

tion initiatives. This study demonstrates the usability and usefulness of chatbots in school violence prevention education. Follow-up research is expected to contribute to the development and use of specific chatbots and the effects of their use.

In the results of this study that used the ETAM, the average score for the elementary school students' awareness of chatbot technology was 3.43 points, which was above the midpoint of the overall score. However, this result is lower than expected, which may be related to the high proportion of subjects (80.0%) with no experience of chatbot use. No South Korean or international studies have been conducted on the use of chatbots in violence prevention education, so it is difficult to compare the results of this study with those of other studies. However, the results of a study on the use of a chatbot for foreign language education conducted in South Korea showed that students had increased confidence, found their classes to be fun, and wanted to continue learning [3]. These results support those of a study by Holmes [30] that showed that chatbots were an artificial intelligence technology with strong educational potential since they can provide quick and appropriate information through direct verbal and written interactions.

This study had some limitations that must be acknowledged. First, the participants were all recruited from a single locality and consisted mainly of sixth-grade students due to the use of the convenience sampling method; thus, this sample may not be representative of all elementary school students. Future research should use much larger samples by grade level across various regions. Second, 80% of the participants had not used chatbots. As a result, measurements of students' awareness of chatbots may not have been accurate. Therefore, further education on chatbots should be provided to students. Finally, the tool used in this study was modified from those used in previous studies, and further research is needed to verify its validity.

CONCLUSION

This study identified chatbot technology as a useful educational method in violence prevention education for elementary school students. Chatbots, which are a type of artificial intelligence technology, are a method that can be used in various educational fields. Therefore, strategies that can enhance the educational effects of chatbots are needed to increase interest in their adoption.

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Authors' contribution

Conceptualization: all authors; Data collection, Formal analysis: all authors; Writing-original draft, Writing-review and editing: all authors; Final approval of published version: all authors.

Conflict of interest

Shin-Jeong Kim has been an editor of *Child Health Nursing Research* since 2010. She was not involved in the review process of this article. No existing or potential conflict of interest relevant to this article was reported.

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Data availability

Please contact the corresponding author for data availability.

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