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Original Article

Factors Influencing Learning Satisfaction of Migrant Workers in Korea with E-learning-Based Occupational Safety and Health Education

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ABSTRACT

Background: E-learning-based programs have recently been introduced to the occupational safety and health (OSH) education for migrant workers in Korea. The purpose of this study was to investigate how the factors related to migrant workers' backgrounds and the instructional design affect the migrant workers' satisfaction with e-learning-based OSH education.
Methods: The data were collected from the surveys of 300 migrant workers who had participated in an OSH education program. Independent sample *t* test and one-way analysis of variance were conducted to examine differences in the degree of learning satisfaction using background variables. In addition, correlation analysis and multiple regression analysis were conducted to examine relationships between the instructional design variables and the degree of learning satisfaction.
Results: There was no significant difference in the degree of learning satisfaction by gender, age, level of education, number of employees, or type of occupation, except for nationality. Among the instructional design variables, "learning content" ($\beta = 0.344$, $p < 0.001$) affected the degree of learning satisfaction most significantly, followed by "motivation to learn" ($\beta = 0.293$, $p < 0.001$), "interactions with learners and instructors" ($\beta = 0.149$, $p < 0.01$), and "previous experience related to e-learning" ($\beta = 0.095$, $p < 0.05$). "Learning environment" had no significant influence on the degree of learning satisfaction.
Conclusion: E-learning-based OSH education for migrant workers may be an effective way to increase their safety knowledge and behavior if the accuracy, credibility, and novelty of learning content; strategies to promote learners' motivation to learn; and interactions with learners and instructors are systematically applied during the development and implementation of e-learning programs.

1. Introduction

In Korea, the demand for migrant workers began to increase rapidly in the mid-1980s, fueled by the high-speed growth of domestic companies, an upward trend in wages, and the imbalance between supply and demand in the industrial workforce (construction, mining, manufacturing, etc.). This demand initiated an increase in the influx of illegal migrant workers in a variety of basic industries, such as manufacturing, construction, agriculture, and fishing. In November 1991, foreign industrial technology trainees were invited to Korea via overseas affiliated companies related to overseas investment, technology provision, and facility exports. In December 1993, the industrial trainee system was implemented, and in 2004, the newly introduced employment permit system was enforced in conjunction with the existing industrial trainee system. In 2007, the industrial trainee system was abolished and unified into the employment permit system. This system is a foreign manpower introduction policy, under which companies that intend

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to employ foreign workers due to the shortage of appropriate domestic workers submit a proposal to the government (the Minister of Employment and Labor). The government then reviews the feasibility of that proposal and decides whether to approve it or not. This system allows foreign workers with basic skills to enter Korea and get a job under the nonprofessional employment (E-9) status for 3 years. This system is currently implemented in most European countries and the USA.

As of December 2010, 1,261,415 foreigners were residing in Korea, including 1,092,900 legal residents (86.6%) and 168,515 illegal residents (13.4%) [1], accounting for about 2.5% of the country's total population of 50,515,666 [2]. Meanwhile, the number of migrant workers in Korea reached nearly 768,000 by the end of December 2010, which was 1.78 times more than that in 2005 [3]. These migrant workers made up 3.1% of the economically active population in Korea. Among the migrant workers in Korea, the number of industrial accident victims totaled 16,051 during the 3 years from 2008 to 2010, with 314 of them being killed. Notably, the number of industrial accident victims among the country's migrant workers has gradually increased from 3,967 to 5,599 between 2007 and 2010 [4].

According to the Occupational Safety and Health (OSH) Act, production workers are entitled to receive at least 2 hours of OSH education each month, which is provided after business owners submit an application to the Korea Occupational Safety and Health Agency (KOSHA) [5]. The OSH education programs were implemented in the classrooms of OSH education institutions or at the site of workplace especially for construction workers. Face-to-face lectures on OSH education generally reminded workers of basic OSH-related knowledge. However, business owners are likely to increase their profits if their migrant workers remain at work during the hours reserved for OHS education, and therefore, in reality, they rarely make voluntary applications to KOSHA. In addition, a substantial number of migrant workers are easily placed into a situation where they teeter on the borderline between legitimacy and illegitimacy, and cross between the legal positions of "stay" and "deportation" during their employment period. This means workplaces with unregistered migrant workers either do not apply for OSH education or are reluctant to receive it, as the workers are at risk of being placed in a situation where their identity can be revealed. Thus, such workplaces easily remove themselves from the OSH education network. An additional problem is that the OSH education for migrant workers requires an interpretation service to ensure that the migrant workers of various nationalities are taught in their native languages [6–8].

Owing to such problems, the OSH education of migrant workers to date has been extremely limited. Therefore, the incidence of industrial accidents among migrant workers has remained much higher than that for Korean workers [9]. The Occupational Safety and Health Research Institute (OSHRI) surveyed 2,050 migrant workers nationwide from April 12, 2010 to May 31, 2010, to compare and analyze the opinions of migrant workers about the existing OSH education. About 40% of the respondents said that they had not received OSH education in the previous year. The number of OSH education sessions they had after entering Korea was one (55.4%), two to three (26.7%), four to five (7.5%), six or more (10%), or nonresponse (0.4%) suggesting that OSH education is not properly conducted in workplaces [10]. However, several prior studies indicated that OSH education would be effective in preventing and reducing industrial disasters in workplaces [11–13].

Migrant workers' participation in OSH education in Korea was limited because of employers' reluctance, identification exposure, language, and so on. In this situation, e-learning-based OSH education can be an effective way to increase migrant workers' participation in OSH education. In Korea's educational field, some companies and universities began introducing e-learning-based education around the mid-1990s. Recently, e-learning-based education is utilized in a wide range of educational fields, including early childhood education, elementary and secondary education, higher education, and corporate education. E-learning refers to a type of education provided mainly by utilizing the Internet based on various computer and web technologies, such as CD-ROM, wired and wireless communication technologies, mobile devices, Internet-based cyber space, and video conferencing [14].

E-learning can relax the restrictions of time and space compared with traditional face-to-face education. Learners can learn at any time if they are at a place where a computer and the Internet are available. Learners can also control the sequence and speed of their learning, and study a particular part of the learning content repeatedly, thereby interacting more actively with the learning content. As digitalized learning material can be modified easily, the newest information can be provided if necessary. Learners can freely participate in learning activities regardless of gender, race, or appearance [14,15]. Given these advantages and characteristics, the introduction of e-learning in the OSH education for migrant workers is likely to be a highly efficient solution to various problems and limitations, such as the difficulty in assembling scattered migrant workers at a place, illegal residents' reluctance to the traditional form of face-to-face education, language problems, and the need for prompt notification with regard to harmful and dangerous chemicals.

However, a lot of money and professional manpower need to be invested in order to develop an effective e-learning program. E-learning also requires a certain level of computer and Internet skills, and access to computers and the Internet [14,15]. According to a survey on 1,872 migrant workers in 2008 by the Korea Research Institute for Vocational Education and Training, 60.9% of the respondents answered that they preferred e-learning-based education to the traditional face-to-face format. In addition, the survey showed that 69.3% could use a computer and 43% had been using the Internet and e-mail [16]. Considering that the survey was conducted in 2008, it may be assumed that most migrant workers who have recently entered Korea to work are equipped with the general level of skills and experiences for e-learning.

Previous research studies on e-learning indicate that learners' satisfaction and the results of learning are influenced by the learners' individual characteristics, learning content, learning environment, various types of interactions, and instructor characteristics with respect to teaching styles [17–21]. Among the learners' individual characteristics, learners' motivation to learn was proved to have a close relationship with learners' satisfaction in e-learning. Since learners' motivation to learn is related to the level of their willingness to learn the learning content, it directly affects the effectiveness and satisfaction of e-learning [17,22,23]. In addition, because e-learning requires the learners to have a certain level of computer and Internet skills, previous experience related to e-learning is an important factor for successful e-learning [15]. The learning content is a factor that indicates the qualitative level of a given program. The organization, usefulness of the learning content, and provision of practical examples can affect learners' satisfaction with e-learning programs [24,25]. The learning environment also has been regarded as an important factor for effective e-learning. This factor includes physical environment, stability of computer and Internet network, ease of use, media richness, and so on [26–28]. Interactions in online learning environments can be classified into three categories: interaction among learners, interaction between learners and learning content, and

interaction between learners and instructors [29]. The higher level of interaction with other learners and the instructor was proved to promote learners' satisfaction with e-learning courses [30–32]. Interaction with instructors includes prompt responses to learners' questions, feedback on assignments, and encouragement for participation in learning activities [33].

However, e-learning-based OSH education has been utilized in a very limited way for migrant workers in Korea, and no studies have investigated the factors influencing the degree of learners' satisfaction with e-learning-based OSH education for migrant workers. Therefore, studies investigating the influential factors need to be conducted in order to draw implications on how to apply those factors in developing and implementing effective e-learning-based OSH education programs for migrant workers. The purpose of this study was to investigate how the factors related to migrant workers' backgrounds and the instructional design affect migrant workers' satisfaction with e-learning-based OSH education. The factors related to migrant workers' backgrounds include gender, age, nationality, level of education, number of employees, and type of occupation. The factors related to the instructional design include motivation to learn, learning content, learning environment, interactions with learners and instructors, and previous experience related to e-learning.

2. Materials and methods

2.1. Participants

The participants were 300 migrant workers who participated in the OSH education using CD-ROM education materials in classrooms provided by the KOSHA upon the request of the Human Resources Development Service of Korea and the employers of migrant workers. In terms of nationality, each group of Filipinos, ethnic Koreans living in China, and Uzbekistanis accounted for 33.3% (100) of the total participants. Other background information of the participants is shown in Table 1.

2.2. Data collection

Data were collected for 2 weeks, using a questionnaire (Appendix 1) written in one of three languages for the participants from three countries. The surveys were administered face to face by the instructors after the OSH education session using CD-ROM materials in classrooms provided by KOSHA. With 150 copies per country, 450 copies of the questionnaire were distributed and 400 copies were collected from six major cities in Korea. From the collected copies, 300 were finally selected for statistical analyses after excluding copies with missing data.

The questionnaire consisted of three sections: experience with OSH education (5 questions), information for backgrounds and workplaces of the migrant workers (7 questions), and questions related to the instructional design and the degree of learning satisfaction with e-learning-based OSH education (26 questions). The first section dealing with the participants' previous experience with OSH education included questions related to the number of sessions of OHS education, the type of education, who paid for the education, problems with existing education, and the education's contribution to tasks in the workplace. The second section dealing with the migrant workers' backgrounds and workplaces included questions on nationality, gender, age, level of education, qualification for residency (type of visa), type of occupation, and the number of employees in the current workplace. The third section of the questionnaire consisted of four or five questions for each of the instructional design variables (motivation to learn, learning content, learning environment, interactions with learners and instructors, and previous experience related to e-learning) and five questions for the degree of learning satisfaction with e-learning-based OSH education. The response to the questions of the third section was based on a 5-point Likert scale, with 1 indicating "not at all" and 5 "very much". It took about 30 minutes for the participants to complete the questionnaire having 38 questions in total.

To examine the internal consistency of the questions for each variable of the third section, Cronbach α coefficients were calculated. Cronbach α coefficients for the instructional design variables were as follows: 0.797 for motivation to learn, 0.861 for learning content, 0.781 for learning environment, 0.820 for interactions with learners and instructors, and 0.928 for previous experience related to e-learning. The Cronbach α coefficient for the degree of learning satisfaction was 0.887. It has been suggested that reliability coefficients in the range of 0.70–0.80 are good enough for most purposes in basic research that is not related to ability tests or important decisions about someone's future [34,35].

2.3. Data analysis

Independent sample t tests and one-way analysis of variance were conducted to examine differences in the degree of learning satisfaction by the variables related to experience with OSH education, backgrounds, and workplaces. The independent variables include the number of sessions of OHS education, type of education, nationality, gender, age, level of education, qualification for residency, type of occupation, and the number of employees in the current workplace. The dependent variable was the degree of learning satisfaction with e-learning-based OSH education. The Scheffé's method was used for *post hoc* analysis after one-way analysis of variance.

Table 1
Background information of participants

Characteristics		N	%	Characteristics		N	%
Gender	Male	209	69.7	Residency qualification	Non-profession (E-9)	200	66.7
	Female	91	30.3		Working visit (H-2)	95	31.7
					Post-training (E-8)	5	1.7
Age (y)	20s	32	10.7	Size of workplace	<10	62	20.7
	30s	94	31.3		10−49	95	31.7
	40s	87	29.0		50−299	83	27.7
	50s	70	23.3		>300	60	20.0
	>60	17	5.7				
Level of education	Elementary	12	4.0	Type of occupation	Manufacturing	126	42.0
	Middle	90	30.0		Construction	49	16.3
	High	131	43.7		Service	82	27.3
	Junior college	53	17.7		Agriculture, etc.	8	2.7
	University	14	4.7		Others	35	11.7

OSH, occupational safety and health.

Correlation analysis and multiple regression analysis were conducted to examine relationships among the instructional design variables (independent variables) and the degree of learning satisfaction (dependent variable). Data analyses were conducted using SPSS WIN 12.0 statistics package program (SPSS Inc., Chicago, IL, USA).

3. Results

3.1. Differences in the degree of learning satisfaction by background variables

Among the migrant worker participants, the average level of learning satisfaction with e-learning-based OSH education programs was substantially high, at 4.13 points out of 5 (standard deviation 0.74). The results of the analysis of differences in the degree of learning satisfaction according to the variables of migrant workers' backgrounds revealed that differences in the degree of learning satisfaction with e-learning-based OSH education were statistically insignificant for all variables except nationality. These insignificant variables were gender, age, level of education, size of workplace, and type of occupation (Table 2).

Next, on reviewing the differences in the degree of learning satisfaction with e-learning-based OSH education according to nationality, migrant workers from Uzbekistan exhibited the highest score of 4.30, followed by the ethnic Koreans from China at 4.22 and Filipinos at 3.86. These differences were also statistically significant ($F = 10.682$, $p < 0.001$). The Scheffé test confirmed statistically significant differences between the Filipinos and ethnic Koreans living in China, and between the Filipinos and Uzbekistanis (Table 3).

In addition, there were statistically significant differences in the degree of learning satisfaction with e-learning-based OSH education according to the number of participation in previous OSH education ($F = 3.585$, $p < 0.05$). The Scheffé test confirmed a statistically significant difference between the "one-to-two times" group (4.27) and the "more than three times" group (3.99) (Table 4).

Table 2
Differences in the degree of learning satisfaction with e-learning-based OSH education according to the general characteristics of respondents

Characteristics		N	Mean	Standard deviation	t/F	p
Gender	Male	209	4.13	0.728	0.200	0.841
	Female	91	4.11	0.783		
Age (y)	20s	32	4.19	0.668	1.790	0.149
	30s	94	4.26	0.636		
	40s	87	4.04	0.898		
	>50s	87	4.05	0.694		
Level of education	Middle school	102	4.20	0.701	1.078	0.341
	High school	131	4.06	0.783		
	College and higher	67	4.16	0.726		
Size of workplace	<10	62	3.94	0.836	2.420	0.066
	10−49	95	4.09	0.861		
	50−299	83	4.23	0.595		
	>300	60	4.24	0.580		
Type of occupation	Manufacturing	126	4.14	0.661	0.859	0.489
	Construction	49	3.97	0.903		
	Service	82	4.19	0.776		
	Agriculture/ fishing/livestock	8	4.00	0.901		
	Others	35	4.19	0.666		
Nationality	Filipino	100	3.86	0.815	10.682	<0.001
	Ethnic Korean living in China	100	4.22	0.788		
	Uzbekistani	100	4.30	0.521		
	Total	300	4.13	0.743		

OSH, occupational safety and health.

Table 3
Results of a post-test on differences in the degree of learning satisfaction with e-learning-based OSH education according to nationality

Dependent variable	Nationality (I)	Nationality (J)	Mean difference (I − J)	p
Learning satisfaction	Filipino	Ethnic Korean living in China	−0.358	0.002
		Uzbekistani	−0.444	< 0.001
	Ethnic Korean living in China	Filipino	0.358	0.002
		Uzbekistani	−0.086	0.701
	Uzbekistani	Filipino	0.444	< 0.001
		Ethnic Korean living in China	0.086	0.701

OSH, occupational safety and health.

According to the result of *t* test to analyze the difference depending on the types of OSH education that the participants had previously taken, there was no significant difference between the "face-to-face (off-line) learning" group and the "blended (including e-learning) learning" group (Table 5).

3.2. Relationships between instructional design variables and the degree of learning satisfaction

The results of a correlation analysis to identify the relationships between the instructional design variables and the degree of learning satisfaction with OSH education are shown in Table 6. Among the instructional design variables, "learning content" exhibited the highest correlation with the degree of learning satisfaction with OSH education ($r = 0.708$, $p < 0.01$). This was followed by "motivation to learn" ($r = 0.686$, $p < 0.01$), "interactions with learners and instructors" ($r = 0.615$, $p < 0.01$), "learning environment" ($r = 0.583$, $p < 0.01$), and "previous experience related to e-learning" ($r = 0.276$, $p < 0.01$).

The results of a multiple regression analysis to examine the relative influence of the instructional design variables on the degree of learning satisfaction with OSH education are presented in Table 7. The five variables related to instructional design demonstrated the degree of learning satisfaction at a statistically significant level ($F = 53.12$, $p < 0.001$), accounting for 62% of the degree of learning satisfaction with e-learning-based OSH education. The factors that statistically influenced the degree of learning satisfaction with e-learning-based OSH education were "motivation to learn" ($t = 5.40$, $p < 0.001$), "learning content" ($t = 6.06$, $p < 0.001$),

Table 4
Results of one-way ANOVA: learning satisfaction by the number of participations in OSH education

Dependent Variable	Number of participation	Mean	Standard deviation	F	p	Post hoc analysis
Learning satisfaction	Not once (a)	4.0721	0.73894	3.585	0.029	b > c
	1−2 times (b)	4.2655	0.69170			
	More than 3 times (c)	3.9918	0.80169			

ANOVA, analysis of variance.

Table 5
Results of independent sample tests: learning satisfaction by types of education

Group	N	Mean	t	p
Offline	167	4.19	1.525	0.128
Blended	133	4.05	-	-

Table 6
Correlation among the instructional design variables and the degree of learning satisfaction with e-learning-based OSH education

Factors	1	2	3	4	5	6
(1) Motivation to learn	1	-	-	-	-	-
(2) Learning content	0.710*	1	-	-	-	-
(3) Learning environment	0.515*	0.601*	1	-	-	-
(4) Interaction with learners and instructors	0.595*	0.596*	0.698*	1	-	-
(5) Previous experience related to e-learning	0.210*	0.161*	0.276*	0.349*	1	-
(6) Learning satisfaction	0.686*	0.708*	0.583*	0.615*	0.276*	1

*$p < 0.01$.
OSH, occupational safety and health.

Table 7
Relative influences of the instructional design variables on the degree of learning satisfaction with e-learning-based OSH education

Factors	Nonstandardized coefficients		β	t
	B	SE		
Motivation to learn	0.290	0.054	0.293	5.400‡
Learning content	0.349	0.058	0.344	6.063‡
Learning environment	0.074	0.048	0.085	1.539
Interaction with learners and instructors	0.135	0.052	0.149	2.610†
Previous experience related to e-learning	0.056	0.024	0.095	2.357*
Constant	0.314	0.267	-	1.176

$R^2 = 0.62$, $F = 53.12$, $p < 0.001$.
*$p < 0.05$.
†$p < 0.01$.
‡$p < 0.001$.
OSH, occupational safety and health.

"interactions with learners and instructors" ($t = 2.61$, $p < 0.01$), and "previous experience related to e-learning" ($t = 2.36$, $p < 0.05$), whereas the learning environment variable was not statistically significant.

4. Discussion

This study investigated whether differences exist in the degree of learning satisfaction with e-learning-based OSH education according to variables related to the backgrounds of migrant workers (gender, age, level of education, size of workplace, and type of occupation). In addition, it investigated how factors related to the instructional design (motivation to learn, learning content, learning environment, interactions with learners and instructors, and previous experience related to e-learning) affect the degree of learning satisfaction with e-learning-based OSH education. Regarding the variables related to the backgrounds of migrant workers, the data analysis did not reveal statistically significant differences in the degree of learning satisfaction with e-learning-based OSH education for any variable, except for nationality. The degree of learning satisfaction with OSH education was substantially high, at an average of 4.13. These results illustrate that e-learning-based OSH education can be an effective educational method for most migrant workers, regardless of factors such as gender, age, level of education, size of workplace, and type of occupation.

An analysis of the relationships between the instructional design variables and the degree of learning satisfaction with e-learning-

based OSH education revealed the highest static correlation ($r = 0.708$, $p < 0.01$) between "learning content" and the degree of learning satisfaction with e-learning-based OSH education. This was followed by "motivation to learn" ($r = 0.686$, $p < 0.01$), "interactions with learners and instructors" ($r = 0.615$, $p < 0.01$), "learning environment" ($r = 0.583$, $p < 0.01$), and "previous experience related to e-learning" ($r = 0.276$, $p < 0.01$). These results accorded with the results of a number of previous studies, and showed that all five influential factors positively correlated with the degree of learning satisfaction with e-learning-based OSH education [36–38].

To investigate the relative influence of the instructional design variables on the degree of learning satisfaction with e-learning-based OSH education, a multiple regression analysis was conducted. The results showed that the independent variables of "motivation to learn," "learning content," "learning environment," "interactions with learners and instructors," and "previous experience related to e-learning" explained 62% of the degree of learning satisfaction with e-learning-based OSH education. In addition, among the five designated independent variables, only "learning environment" did not influence the degree of learning satisfaction with OSH education at a statistically significant level. The other four variables were seen to have influences on the degree of learning satisfaction, with "learning content" being the most significant, followed by "motivation to learn," "interactions with learners and instructors," and "previous experience related to e-learning." The results suggest the following implications for future e-learning-based OSH education programs for migrant workers.

First, in order to develop an e-learning-based OSH program that promotes learning satisfaction, the learning content of the program needs to be positively perceived by learners. Therefore, the learning content should be rich in knowledge related to the field of OSH in terms of accuracy, credibility, and novelty. In addition, the learning content needs to be organized logically and systematically. Second, because a higher level of "motivation to learn" results in a higher level of satisfaction with the education, opportunities to motivate migrant workers for learning should be provided regularly in pre- and post-employment education, helping to build the perception that learning is helpful for workplace safety and acquiring new skills. In order to promote "motivation to learn" related to e-learning programs, the content of the program needs to be presented in diverse forms of information, such as text, graphics, audio, and video. Third, various opportunities need to be provided for interactions with learners and instructors. Interactions among learners can be performed through exchange of information and materials, feedback on others' work, and online discussion on a subject. The instructor of an e-learning program needs to answer learners' question as soon as possible, provide constructive feedback on their work, and encourage them to participate in learning activities. Fourth, learners with previous experience related to e-learning had high levels of satisfaction with e-learning-based OSH education. Therefore, various opportunities for participating in e-learning programs need to be provided through vocational training institutions and lifelong education institutions so that migrant workers can accustom themselves to e-learning environments. In addition, easy access to computers and the Internet needs to be given to migrant workers who do not have them through workplaces, public libraries, and community centers.

This study revealed that e-learning-based OSH education could be an effective educational method for most migrant workers, and the effectiveness of e-learning-based OSH education would be influenced by the learning content of the e-learning programs, learners' motivation to learn, interactions with learners and

instructors, and previous experience related to e-learning. In this study, however, the effectiveness of e-learning-based OSH education was evaluated only in terms of learners' reaction (the degree of learning satisfaction), which was the first level of Kirkpatrick and Kirkpatrick's [39] training evaluation model, because e-learning-based OSH education for migrant workers was just in its initial stage in Korea. Therefore, there should be more follow-up studies to examine the effectiveness of e-learning-based OSH education in terms of changes in knowledge, skill, and attitude, and changes of behavior at workplace. In addition, this study focused only on e-learning-based OSH education for migrant workers in Korea. However, because the results of this study mostly accorded with those of previous studies on e-learning in other countries, these results may be applied to e-learning-based OSH education in other countries. Nonetheless, more studies on this subject need to be conducted in other countries for more accurate generalization of the results.

Conflicts of interest

No potential conflicts of interest relevant to this article were reported.

Appendix 1

▣ This part is about your experiences of occupational safety and health education. Please check ○ or ∨ on each item which is appropriate to you most.

1. How many times were you involved in occupational safety and health education?
① Not once ② 1−2 ③ 3−4 ④ 5−6 ⑤ > 7
※ If you chose ①, go to the question No. 6.
2. What kind of education did you take?
① External-gathering education ② Visiting education ③ Paper (letter) education ④ Blended education (on- and offline) ⑤ e-Learning education
3. Who paid the cost for the education that you took? (Plural checking allowed)
① Employees ② Employers ③ Government or public organizations ④ Employment insurance support ⑤ Free of charge

4. According to you, which of the following is the most critical problem in those educations? (Choose 1 item)
① Language problem (educated in Korean)
② Education content was not helpful
③ Employer's agreement was must
④ Fear out of illegal status
⑤ Education was hard to understand and boring
⑥ Others
5. Do you think that the occupational safety and health education was helpful?
① Never ② Not really ③ So-so ④ Generally yes ⑤ Totally yes

▣ This part is about your personal backgrounds. Please mark the number in ( ) which is appropriate to you.

What is your nationality?( )
① Ethnic Korean living in China ② Filipino ③ Uzbekistani
7. What is your gender?( )
① Male ② Female
8. Which age group do you belong to?( )
① 20s ② 30s ③ 40s ④ 50s ⑤ above 60s
9. What is your ultimate level of education?( )※Dropout is excluded.
① Graduation from an elementary school ② Graduation from a middle school
③ Graduation from a high school ④ Graduation from a junior (technical) college
⑤ Above graduation from a university
10. What is your VISA status?( )
① In-service training employment (E-8) ② Unprofessional working (E-9) ③ Seamen employment (E-10) ④ Visiting employment (H-2) ⑤ Others
11. To which type of industries are you engaged?( )
① Manufacture ② Construction ③ Service ④ Agriculture/fishery/stock breeding ⑤ Others
12. How many workers are there in your workplace?( )
① <10 ② 10−50 ③ 50−300 ④ 300−1,000 ⑤ >1000

This part is about your experiences of e-Learning based occupational safety and health education. Please check ○ or ∨ on the number which is thought to be the most appropriate in the light of your experiences.

Question	No ← a little → yes				
1. E-learning-based occupational safety and health education is closely related to the enhancement of my capacity and job career.	①	②	③	④	⑤
2. E-learning-based occupational safety and health education is better than other education systems in terms of concentration.	①	②	③	④	⑤
3. I am sure that I can sufficiently complete the e-learning-based programs of occupational safety and health.	①	②	③	④	⑤
4. If I get a chance, I will willingly try to be active in learning about occupational safety and health through Internet.	①	②	③	④	⑤
5. I think the e-learning-based OSH education deal with specialized content.	①	②	③	④	⑤
6. I think the contents and conceptions gained from e-learning are accurate.	①	②	③	④	⑤
7. Information from e-learning is trustworthy.	①	②	③	④	⑤
8. Contents of e-learning are fresh and substantial.	①	②	③	④	⑤
9. E-earning can provide diverse learning materials such as graphics and multimedia contents (audio−visual materials).	①	②	③	④	⑤
10. I can use Internet any time I want.	①	②	③	④	⑤
11. The e-learning system was easy to use and had needed functions.	①	②	③	④	⑤
12. The e-learning education was technically advanced and stable.	①	②	③	④	⑤
13. There was technical support whenever I had a systemic problem.	①	②	③	④	⑤
14. We can exchange information and knowledge through e-learning education.	①	②	③	④	⑤

(*continued*)

Question	No ← a little → yes				
15. Users of e-learning education can actively communicate with instructors.	①	②	③	④	⑤
16. Users of e-learning education can receive responses from instructors by e-mail or other means when they have questions.	①	②	③	④	⑤
17. Users of e-learning education can communicate with instructors periodically and keep consulting about learning process.	①	②	③	④	⑤
18. Usually, I use the e-learning system in my work.	①	②	③	④	⑤
19. I often upload and download information and data, and use multimedia.	①	②	③	④	⑤
20. I have plenty of experience of e-learning.	①	②	③	④	⑤
21. I am familiar with using online chatting, Q&A function, and basic software.	①	②	③	④	⑤
22. I gained a lot of knowledge, as I expected, from e-learning-based occupational safety and health education.	①	②	③	④	⑤
23. E-learning-based occupational safety and health education had a positive effect on my safety concerns.	①	②	③	④	⑤
24. Knowledge and experiences gained from e-learning were helpful at my workplace.	①	②	③	④	⑤
25. I am broadly satisfied with the education of occupational safety and health based on e-learning.	①	②	③	④	⑤
26. The outcome of the e-learning met my expectations or was more than what I expected.	①	②	③	④	⑤

We also used the above questionnaire in Korean and Uzbek versions for this study.

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