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An Analysis of the Effect of Academic Achievement of the College Students Majoring in Health Information Management on the Extent of Need for Developing Digital Learning Tools Related to Medical Terminologies

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ABSTRACT

This study is a research study conducted to examine and understand the effect of the academic achievement of the subjects related to the major of the health information management college students on the need for developing the digital learning tools.
This study was conducted with the freshmen, sophomores, juniors, and seniors majoring in health information management at University D located in Chungcheong-do, University K located in Uijeongbu, University B located in Busan, University J located in Jeonju, and University S located in Wonju. The purpose of this study was explained to them, and the students who voluntarily agreed to participate in the study were selected, while the analysis was finally conducted for 220 people. To understand the effect of academic achievement on the need for digital learning tools related to medical terminologies, T-Test, ANOVA, and the multiple linear regression were used for analysis.
As a result of making correction for other control variables to examine and understand the correlation between the major related academic achievement and the need for medical terminologies related app development and the VR development, the need for developing an app learning tool increased by 0.60 point as the major related academic achievement increased by one unit, while the need to develop the VR learning tools increased by 0.71 point. Furthermore, as a result of the stratified analysis of the correlation between major related academic achievement and the need to develop the digital learning tools according to the Level of English proficiency, the correlation between the academic achievement and the digital learning tools was not significant in the 'High' English level group. In the case of this 'Average' group, as the major related academic achievement increased by one unit, the need for developing an app learning tool increased by 0.48 point and the need for developing a VR learning tool increased by 0.87 point. When the academic achievement increased by one unit, the need to develop an app learning tool increased by 0.98 point, while the need to develop a VR learning tool increased by 0.65 point. In line with the generalization of wireless communication services and the era of smart phone based learning, it is sought to provide the basic data for the development of digital learning devices which do not exist in the field of health information manager (HIM). Furthermore, if the medical terminologies based digital learning tools, which are the fundamental skills for the major program, are provided for the college students majoring in health information management with a low academic achievement in particular, for the majoring students with a low level of English, then along with the improvement of the major related learning interest and the self-directed learning skills, it is expected that the quality of the HIM will be improved.

1. Introduction

Health information manager (HIM) was enacted in 1983 under the name of 'medical recorder' to manage the medical records that include all of the information on disease examination, treatment, and the results related to the patients' health care in accordance with the Medical Service Technologists Act, etc. Since the medical records not only contain medical information, but also play a pivotal role as the evidence for the medical education and research data, and for the legal disputes, the HIM (formerly, medical recorder) who manages them may be said to be an important professional manpower within a medical institution (Dick, Steen, & Detmer, 1997; Hong, 2017). Recently, by using the big data such as the health and medical information, the importance of using the big data to solve the public health problems and needs such as changes in the society in pursuit of health and the improvement of the quality of life has emerged. Given the need to create the national health and medical information through the establishment of a quality management system for various medical records and medical information, the name was changed from medical recorder to HIM in 2018 ("Article 2 of the Enforcement Decree of the Act on Medical Technicians etc.,"; Hong & Boo, 2017). This is not only a change in name, but also the evolution of medical records in the electronic form from paper medical records of the past, and it is changing to play a role as a clinical support expert based on the medical management support that provides support for the hospital management ("Article 2 of the Enforcement Decree of the Act on Medical Technicians etc.,"; Association., 2022; Hong & Boo, 2017; S. H. Lee & W., 2013; Nam & Jung, 2020).

Meanwhile, for the HIM, the first national license test was conducted at the Korea Health Personnel Licensing Examination Institute (Kookshiwon) in 1985, and until 2017, 23,907 people were licensed, which is estimated to be 0.46 person per 1,000 people (Shin, J., & Kim, 2018). While this number is continuously increasing to 0.28 person in 2008, 0.35 person in 2012, and 0.44 person in 2016, it is a very low number compared to the other health care workers defined under the Medical Service Technologists Act, etc. (Shin et al., 2018). This is because there is a difference in the number of applicants for each job type, but the average pass rate of the national HIM exam for the past 5 years was 40.2%, which is presumed to be due to the lower pass rate (Association, 2022) compared to the other health care professions.

Since the HIM is responsible for checking and classifying all the records of medical practices of medical personnel, most of the subjects in the national examination for acquiring a license are consisted of the subjects related to medical terminologies (B. G. Lee, 2017). In particular, according to the HIM national exam related questions analytical report in 2021, the average score of the practical test subjects analyzed using medical terminologies was 24 points, but the average grade was 24.7 points, which is the subject with the highest fail rate among the subjects in the national examination. Hence, a sufficient learning of the overall medical terminologies must be practiced (Association, 2022; B. G. Lee, 2017). Medical terminologies are the most basic technical terms used as a means of communication between the medical personnel, and they are considered to be a very important subject for improving the basic major related skills for the medical health major students (B. G. Lee, 2017). Furthermore, despite the fact that it is a field that requires education

based on a systematic approach, such as by providing learning contents for roots, prefixes, and suffixes, as it is formed on the basis of English (B. G. Lee, 2017; Seo & Kim, 1993), most of the relevant departments are not properly equipped with the faculty for the HIM (Kang, 2003). As the two-, three-, and four-year school system has a large difference in terms of the curriculum, it does not demonstrate the unity and standardization of the system to produce the HIM and increase competitiveness. The difference between the goals set for fostering talents and the work within the industry is also growing, and it is evaluated that the vicious cycle is repeated due to the deterioration of the quality and competitiveness of HIM and ultimately the devaluation and deterioration of the employment rate (Kang, 2003).

Furthermore, the educational research related to the HIM was also found to be very inadequate, and the scope and form of the study were also narrow. The previous study of Younghee Nam also reveals that, it is not only a general journal that has not been approved by the National Research Foundation of Korea, but also that the research contents related to HIM are narrow enough to be classified into the three major fields rather than various studies related to the medical records (Nam & Jung, 2020). Meanwhile, in the language department, where active research is conducted for the development of various digital learning tools, the digital learning tools are generating effects such as the improvement of language skills and learning satisfaction (Han, 2020). If learning tools are developed, it is expected to have a great effect on improving learning skills and satisfaction.

Hence, in this study, the situation in which the pass rate of HIM is significantly lower than that of other health care workers is fundamentally due to the lack of learning tools related to medical terminologies, which are evaluated to be the basic learning skills of the major, among the subjects of the national HIM exam (B. G. Lee, 2017; Seo & Kim, 1993), and consequently, based on the previous research (Kang, 2003) which claimed that there is a deterioration in the quality of HIM and heterogeneity between education and industry, and it is intended to analyze the impact of the academic achievement of the students majoring in health information management is related to medical terminologies related apps on the need for the VR learning tool development, and based on which, it is intended to provide the basic data for the development of digital learning devices which do not exist in the field of HIM in line with the generalization of wireless communication services and the era of smartphone based learning.

2. Methods

2.1 Data sources and the sampling method

This study is a cross-sectional study which has analyzed the correlation between the academic achievement of college students majoring in health information management and the need for digital learning tools related to medical terminologies. The subjects of this study were freshmen, sophomores, juniors, and seniors majoring in health information management at University D located in Chungcheong-do, University K located in Uijeongbu, University B located in Busan, University J located in Jeonju, and University S located in Wonju. The purpose of the study

was explained and the students who voluntarily agreed to participate in the study were selected. The total number of the study subjects was 230 people, 115 subjects attended 4-year colleges and 115 subjects attended 2-year colleges and 3-year colleges were recruited. Thereafter, a total of 220 people were studied, excluding 10 people who were dropped out due to inappropriate responses for the questionnaire (Appendix 1).

2.2 Independent variable

The independent variable in this study is the academic achievement related to the major, and as for the questions of 'I am doing well in the major courses related to health information management', 'I am satisfied with my grades in the major subjects related to health information management', 'Even if there is a problem during learning related to health information management, I can solve it on my own without the help of others.', measurements were taken as 'Not at all' (0 point) to 'Very true' (4 points), and the maximum value was calculated to be 12 points.

2.3 Dependent variable

The dependent variable in this study is the need to develop medical terminologies related apps and the VR learning tools, and prior to the questionnaire, the following questionnaire was provided after explaining the industrial field work related to medical terminologies, which is one of the main duties and responsibilities of the HIM. As for the need to develop the app learning tools, for the questions of 'It is positive for HIM learning app development', 'The HIM learning app development is necessary', 'The HIM learning app development is important', 'It is urgent to develop an information manager learning app.', 'If I use the HIM learning app, I will be able to learn more easily even the learning contents that I usually find difficult.', 'If I use the developed HIM learning app, My skills for the classification and medical record chart interpretation is expected to be improved.', measurements were taken with 'Not at all' (0 point) to 'Very true' (4 point), and the maximum value was calculated to be 24 points.

Furthermore, in the case of the need to develop the VR learning tools, and for the questions of 'It is positive for the development of VR learning tools for HIM's communication skills.', 'It is necessary to develop the VR learning tools for HIM's communication skills.', 'It is important to develop a VR learning tool for the HIM's communication skills.', 'It is urgent to develop a VR learning tool for the HIM's communication skills', 'VR learning for the developed HIM's communication skills. If the tool is used, the ability to manage incomplete records is expected to improve.' and 'Using the VR learning tool for the developed HIM's communication skills is expected to improve communication skills with professional personnel.', measurements were taken with 'Not at all' (0 point) to 'Very true' (4 point), and the maximum value was calculated to be 24 points.

2.4 Control variables

The control variables in this study were classified into 'gender', 'grade', 'discipline classification',

'level of English proficiency', 'information awareness of HIM', and 'intention to acquire license', and as for gender, they were classified into 'male', 'female', grade is 'freshmen', 'sophomore', 'junior', and 'senior', and as for the academic system, they were classified into '4 year system', 'community college', and for the English level of proficiency, they were classified into 'Low', 'Average', and 'High', and for the level of information awareness about HIM, they were classified into 'I have learned for the first time after enrollment', 'I have heard of the name', 'I have known about work and qualifications', and as for the intention to acquire a license, they were classified into 'Yes' and 'No.'

2.5 Analytical approach and statistics

In this study, in order to analyze the effect of college students majoring in health information management on the need to develop medical terminologies related apps and the VR learning tools, the subjects' gender, grade, school system classification, information awareness of HIM, and the intention to acquire a license as variable were controlled, after which an analysis was performed using T-Test, ANOVA, and the multiple linear regression analysis. As for the arrangement and the statistical analysis of the collected data, SAS Ver 9.4 (SAS Institute Inc., Cary, NC, USA) was used, and the statistical significance was tested at a significance level of 5%.

3. Results

3.1 General characteristics of the study subjects

Table 1 illustrates the results of assigning the number of respondents and evaluation scores to the general characteristics of the study subjects in order to examine the correlation between the academic achievement of major students and the need to develop the digital learning tools. The average scores of the 225 subjects related to majors in academic achievement, the need to develop medical terminologies related app learning tools, and the need to develop the VR learning tools were 6.82 points, 16.88 points, and 15.01 points, respectively. Of the total subjects, 20.4% (46 people) and 79.6% (179 people) were males, and the average scores for male academic achievement and digital learning tool development were 6.67, 17.54, and 15.24 points, respectively, and 6.85, 16.70, and 14.95 points for females. In the case of the level of English proficiency, 37.8% of the group answered 'Low', 53.3% answered 'Average' and 8.9% answered 'High', and in the case of 'Low' for the scores for academic achievement and digital learning tool development required for each major, they were 6.29, 17.05, and 14.75 points, and as for the 'Average' group, the scores were 7.03, 16.71, and 15.15 points, and in the case of the 'High" group, they were 7.80, 17.15, and 15.25 points.

Table 1. General characteristics of the study subjects

Variables	Total		Academic achievement related major			Need for the development of digital learning tools			Need for the development of VR learning tool		
	N	%*	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Total	225	100.0	6.82	2.06		16.88	4.50		15.01	4.87	
Gender					0.212			0.389			0.879
Men	46	20.4	6.67	2.47		17.54	3.47		15.24	5.25	
Women	179	79.6	6.85	1.94		16.70	4.72		14.95	4.78	
Grade year					0.209			0.187			0.396
Freshman	91	40.4	6.62	2.12		16.49	4.61		14.43	5.02	
Sophomore	77	34.2	6.95	1.90		16.86	4.50		15.29	4.94	
Junior	41	18.2	6.68	2.15		17.80	3.77		15.56	4.10	
Senior	16	7.1	7.69	2.06		16.75	5.62		15.56	5.56	
Classification of School					0.217			0.021			0.011
Four-year college	115	51.1	7.13	2.13		17.30	4.48		15.63	5.22	
Community college	110	48.9	6.49	1.94		16.43	4.50		14.36	4.40	
English proficiency					0.018			0.586			0.964
Below average	85	37.8	6.29	1.84		17.05	4.58		14.75	4.68	
Average	120	53.3	7.03	1.95		16.71	4.36		15.15	5.07	
Highly proficient	20	8.9	7.80	2.93		17.15	5.15		15.25	4.60	
Recognition of information about HIM					0.567			0.839			0.234
Low	95	42.2	6.73	2.23		17.18	4.80		15.59	5.13	
Mid	126	56.0	6.87	1.94		16.67	4.27		14.66	4.63	
High	4	1.8	7.50	1.29		16.25	4.99		12.25	5.12	
Intention to obtain HIM license					0.050			0.151			0.175
No	5	2.2	5.20	1.92		14.20	3.03		12.40	2.88	
Yes	220	97.8	6.85	2.05		16.94	4.52		15.07	4.89	

* HIM: Health Information Manager / VR: Virtual Reality

3.2 Analysis between the major related academic achievement and the need to develop the digital learning tools

Table 2 is the result of making correction for other control variables to examine the correlation between major related academic achievement and the need for medical terminologies related app development and the VR development. As the major related academic achievement increased by one unit, the need for developing an app learning tool increased by 0.60 point (B: 0.60, 95% CI: 0.312-0.895, P-value: <.0001), and the need for developing a VR learning tool increased by 0.71 point (B: 0.71, 95% CI: 0.400-1.024, P-value: <.0001).

Table 2. Analysis between the major related academic achievement and the needs to develop learning tools

Variables	Need for the development of digital learning tools				Need for the development of VR learning tool			
	B	95% CI		P-value	*B*	95% CI		P-value
Academic achievement related major	0.60	0.312	0.895	<.0001	0.71	0.400	1.024	<.0001
Gender								
Men	Ref.				Ref.			
Women	-0.91	-2.359	0.538	0.217	-0.18	-1.726	1.373	0.823
Grade year								
Freshman	Ref.				Ref.			
Sophomore	0.19	-1.239	1.624	0.792	0.37	-1.156	1.906	0.630
Junior	1.61	-0.162	3.391	0.075	1.29	-0.612	3.188	0.183
Senior	-1.10	-3.585	1.384	0.384	-0.81	-3.472	1.842	0.546
Classification of School								
Four-year college	Ref.				Ref.			
Community college	-1.37	-2.695	-0.054	0.042	-1.63	-3.045	-0.221	0.024
English proficiency								
Below average	1.44	-0.834	3.720	0.213	1.17	-1.270	3.600	0.347
Average	0.42	-1.717	2.550	0.701	0.87	-1.410	3.152	0.453
Highly proficient	Ref.				Ref.			
Recognition of information about HIM								
Low	Ref.				Ref.			
Mid	-0.55	-1.812	0.717	0.395	-1.08	-2.427	0.277	0.119
High	-1.16	-5.713	3.402	0.618	-4.17	-9.038	0.708	0.094
Intention to obtain HIM license								
No	-1.89	-5.866	2.092	0.351	-1.75	-6.001	2.509	0.420
Yes	Ref.				Ref.			

* HIM: Health Information Manager / VR: Virtual Reality

3.3 Detailed analysis between the major related academic achievement and the need to develop the digital learning tools according to the level of English proficiency

Table 3 is the result of stratified analysis of the correlation between the major related academic achievement and the need to develop the digital learning tools according to the level of English proficiency. When the degree of academic achievement related to the major increased by one unit in the group whose level of English proficiency was 'High', the need to develop an app learning tool increased by 0.31 point (B: 0.31, 95% CI: -1.002-1.621, P-value: 0.6108), yet it was not statistically significant, and the need for development of the major related VR learning tools increased by 0.35 point (B: 0.35, 95% CI: -0.649-1.355, P-value: 0.4507), yet it was not statistically significant. For the group with the 'Average' level of English proficiency, as the academic achievement related

to the major increased by one unit, the need to develop an app learning tool was 0.48 point (B: 0.48, 95% CI: 0.056-0.906, P-value: 0.0271), while the need to develop the VR learning tools increased by 0.87 point (B: 0.87, 95% CI: 0.402-1.343, P-value: 0.0004), and as for the 'Low' group of the level of English proficiency, when the major related academic achievement increased by one unit, the need for the app learning tool development increased by 0.98 point (B: 0.98, 95% CI: 0.464-1.495, P-value: <.0001), and the need for the VR learning tool development increased by 0.65 point (B: 0.65, 95% CI: 0.117) -1.186, P-value: 0.0175).

Table 3. Subgroup analysis between the academic achievement related major and the need for learning tools by English level

Variables		Need for the development of digital learning tools				Need for the development of VR learning tool			
		B	95% CI		P-value	*B*	95% CI		P-value
Academic achievement related major	Highly proficient in English	0.31	-1.002	1.621	0.6108	0.35	-0.649	1.355	0.4507
	Average in English	0.48	0.056	0.906	0.0271	0.87	0.402	1.343	0.0004
	Below average in English	0.98	0.464	1.495	<.0001	0.65	0.117	1.186	0.0175

* HIM: Health Information Manager / VR: Virtual Reality
* Control variables: Gender, grade year, classification of school system, information on health information manager, intention to acquire the relevant license

4. Discussion

This study has analyzed the effect of the major related academic achievement on the need to develop medical terminologies related apps and the VR learning tools targeting the college students majoring in health information management. Furthermore, by stratifying the performance level of English proficiency, which is the foundation of medical terminologies, the correlation between the academic achievement and the need to develop major related digital learning tools was analyzed in detail.

As a result of the study, as the academic achievement related to the major increased by one unit, the need for developing medical terminologies related app learning tools and the VR learning tools increased. Furthermore, as with the group with a high level of English proficiency, the correlation between the academic achievement and the need to develop the digital learning tools consisted of apps and the VR was not statistically significant. However, in the group with an average or a low level of English proficiency, the need for developing the digital learning tools consisted of apps and the VR increased as the academic achievement related to the major increased.

While medical terminologies are the basic technical terms for the college students in the health field and are the most important subject for cultivating the basic major related skills, there are only a few digital learning tools, and there is no uniformity and systematization of tools for the field of HIM (Nam & Jung, 2020). Given this situation, it was investigated that the health related

college students desperately demand the development of digital based learning tools which can actively and effectively learn as well as the teaching methods provided in the regular curriculum, and even the digital learning tools that may be used for learning are provided with raw learning tools such as simply transferring the contents of a dictionary rather than an optimized format for learners to learn, thereby reducing interest in learning and learning skills for basic subjects, it lead to a lack of the learning skills for the basic courses (B. G. Lee, 2017; Nam & Jung, 2020). In the previous study of Seonkyeong Shim, the increase in the academic achievement of the learners motivates their learning participation, and the interaction to use the learning tools for higher academic achievement occurs, and hence, requiring or finding learning tools for the missing parts did exist (Sim, 2012), and in the other previous studies, the students with a low academic achievement, such as grades and self-directedness, it was investigated that not only the degree of self-directed learning increased, but also the self-directed learning skills increased (Chae, 2020). Hence, the research result which claimed that the research results found in this study that the need for the major related digital learning tools increases as the academic achievement increases was consistent with that of the previous studies (Chae, 2020; B. G. Lee, 2017; Nam & Jung, 2020; Seo & Kim, 1993).

Furthermore, the results of the study which claimed that the need for digital learning tools related to the major increases as the academic achievement increases according to the level of English proficiency were also consistent with the previous studies. According to the previous study of Jaegeun Jae, the medical terminologies currently used at medical institutions are mostly in English, and most of the technical terms and reference books provided in the educational process are also in English, and since the exams related to the medical terminologies are given in English rather than Korean, the lower the level of English, the more difficult it is to understand and acquire learning, take exams, and execute related presentations (Chi, 1996). Furthermore, in a situation where the interdisciplinary curriculum is different compared to other health and medical professions, or in a situation where the professors for fostering HIM are not adequately equipped, the group with a lower level of English proficiency is related to the English based medical terminologies and national examinations, and it is also assumed that not only will they experience difficulties with the subject, but they will also experience the need for learning tools due to the lack of learning tools. In addition, according to the previous study of Jiwon Kim (Kim & Choi, 2019), the higher the level of English, the higher the likelihood of understanding the principles of derivative affixes such as prefixes and suffixes, and the medical terminologies were also based on English (Seo & Kim, 1993), and since they are formed with the English like roots, prefixes, and suffixes for the basic elements (B. G. Lee, 2017), as with the results of this study, the need for digital learning tools was found in the group with a high level of English compared to the other groups by understanding the compositional principle of medical terminologies, and it is considered that the group with a lower level of English proficiency is experiencing the need for the digital learning tools related to the medical terminologies according to the improvement of academic achievement.

Hence, this study expects that if the digital learning tools such as the medical terminologies based apps and the VR are provided, as they are the basic skills of their major, for not only the college students majoring in health information management with a low academic achievement, but also for the major students with a low level of English proficiency, with the improvement

of the major related learning interest and self-directed learning skills, the lower HIM national exam related pass rate compared to the other health care occupations and the reduction of the difference between the educational and industrial sectors, which are considered to be highly heterogeneous, will further improve the quality of HIM.

The limitations of this study are as follows. First, limitations exist since this study was conducted at 5 universities (3 4-year colleges, and 2 community colleges) among the HIM curriculum departments (Nam & Jung, 2020), which are consisted of 108 universities nationwide (42 4-year colleges, and 66 community colleges). Hence, in the follow-up studies, it is suggested that the qualitative research be conducted at various universities nationwide. Second, limitations exist as, while the analysis target was set for all grade years, the seniors among the respondents accounted for 7.1% of the total, and it was set in the same category as the sophomores and juniors at 4-year colleges and the sophomores and juniors at the community colleges. Hence, in the future studies, research ought to be conducted including more diverse grade years. Third, since this study is a cross-sectional study, it is determined that it is necessary to extend the study period and the longitudinal study by follow-up on the subsequent studies. Fourth, since it was not possible to use objective indicators to measure the level of English proficiency, it is necessary to use the objective measurement indicators such as English related grades of the college students in the future.

Notwithstanding which, the advantages of this study are as follows. First, this study is meaningful as the first study conducted with the majoring college students because there has never been a study related to the learning of major college students within the field of HIM. Second, in the health-related departments such as HIM, the freshmen year is a time to lay the foundation for the major subjects and is evaluated as a very important period for the easy school life (Jung, 2020). In this study, the proportion of the relevant group was 40.4%, and it is meaningful in that it sufficiently includes the current educational situation of the basic learning skills such as medical terminologies. Third, in this study, by conducting a survey with the college students majoring in health information management across 5 cities and provinces, there is a representativeness of the curriculum which may vary region to region.

5. Conclusion

Based on a survey conducted with the college students majoring in health information management, this study has examined and understood the effect of academic achievement of college students majoring in health information management on the need for the medical terminologies related apps and the VR learning tools. As a result of the study conducted, as the academic achievement increased by one unit, the need for app learning tools and the VR learning tools increased. Furthermore, as a result of the stratified and detailed analysis of the level of the English subject, which is the foundation of the medical terminologies, the correlation between the academic achievement and digital learning tools was not significant for the group with a high level of English proficiency, but in the group whose level of English proficiency was ‘Average’ or ‘Low’, there was a strong correlation between the academic achievement and apps and the VR learning tools. Based on which,

it is sought to provide the basic data for the development of digital learning devices which do not exist in the field of HIM in line with the era of universal wireless communication service and smartphone-based learning. If the medical terminologies based digital learning tools, which are the fundamental skills for the major program, are provided for the college students majoring in health information management with a low academic achievement in particular, for the majoring students with a low level of English, then along with the improvement of the major related learning interest and the self-directed learning skills, it is expected that the quality of the HIM will be improved.

Conflicts of interest

No author has any financial or other conflict of interest to declare.

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Appendix 1. Questionnaire on the Academic Achievement Related to Health Information Manager and the Need for the Development of Medical Terminologies Related Digital Learning Tools

A Survey of the Perception of Learning Major Programs Related to Health Information Manager and the Demand for Learning Tools

Welcome.
This survey seeks to contribute to improving the learning conditions for health information manager by examining and understanding your perception of the health information manager related major program learning and the demand for learning tools for the health information management related major students. There are no correct answers to the questions, and hence, please express your thoughts honestly.

This survey will not be used for any purpose other than the intended purpose, and the results of the individual surveys will be maintained confidential in accordance with Article 33 of the Statistics Act and Article 5 of the Enforcement Decree of the same Act. The results of this survey will never be reflected on the students' academic performance or be personally disadvantageous in any manner whatsoever. Your valuable answers are the important data for research, and hence, we ask for your active participation to ensure that your opinions may be accurately reflected. Based on your honest opinions, the educational conditions for the health information managers will be further improved.

The survey will be conducted from Monday, March 21, 2022 through Monday, March 28, 2022, and please complete this form by the deadline and reply to the email below.
• Reply to: yangjm1206@gmail.com

If you have any questions about the survey, please contact us using the contact information below.

• Person in charge of the survey: Hyeon-ji Lee and Jeong-Min yang (Researcher, Digital Life Convergence Research Center, Dankook University)
• Email: hyeonji2ee@gmail.com

March 21, 2022
Digital Life Convergence Research Center, Dankook University

※ Basic information of the survey subjects

(Personal information entered in the survey will not be used for any purposes other than that of research.)

▸ Four year college or university: _____College/University
▸ Major program: _____Department
▸ Year of entry: _____
▸ Grade year: _____Year of entry
▸ Year of birth: _____
▸ Gender: ① Male ② Female

※ General characteristics of the survey subjects

● Have you studied life science subjects for over 1 semester before entering college?
- This is a question to confirm the learning experience of learning the basic knowledge related to anatomy and physiology before entering college.

① Yes ② No

● What do you think your English level of proficiency is?
- This is a question to examine and understand the relationship between English level of proficiency and the medical term learning.

① Very low ② Low ③ Average ④ High ⑤ Very high

● What motivated you to choose this major program?
① Because of the aptitude ② At the recommendation of others ③ According to the grades
④ Because the job prospects are very positive ⑤ Other: _____

● Did you know about the “health information manager” before entering college?
① Learned about it for the first time after enrollment
② Have heard of the name
③ Have known about the job generally
④ Have known about the detailed scope of work and qualifications

● What is your desired career path after graduating from college?
① Hospital (Administration Department, Insurance Department, Planning Office, Human Resources Department, Medical Information Department, etc.)
② Public enterprises (National Health Insurance Service, Health Insurance Review & Assessment Service, etc.)
③ Private insurance companies and loss adjusting corporations
④ Other health and medical related industries
⑤ Public officials
⑥ Non-health care industry
⑦ Academic work (going to graduate school, etc.)
⑧ Other: _____

● Are you intending to acquire a health information manager license?
- After completing the health information management related subjects, you can take the national exam and acquire a license after passing the exam.
① Yes ② No

● What do you think is the largest role of a health information manager?
① Quality management of medical records
② Standard based classification of disease, cause of death, and behavior
③ Protection and management of personal health information
④ Support for the analysis and utilization of health and medical information
⑤ Insurance claim review and evaluation
⑥ Don’t know
⑦ Other: _____

● In order to learn about your courses taken and academic achievement, we seek to collect course history and score information from the academic information system and use it for research purposes. Do you agree to the provision of the relevant information?
(If you do not agree, please enter the reason.)

※ After the relevant information is collected, your name and year of entry will be maintained anonymous. The collected information will not be used for any purposes other than that of research.
① I agree. ② I do not agree.
(_____)

※ This is a questionnaire on the health information manager related major learning and the perception of the health information manager.

Please read the questions and check the box which most closely matches your opinion.

● What is a health care information manager?

A health information manager (HIM) must hold the relevant license and analyze the health information at a medical institution, transcribe health information, register cancer, manage medical statistics, execute the classification and other duties related to the classification, confirmation, maintenance and management of the records and information related to medical care and health guidance, etc., at a medical institution (Article 2 of the Enforcement Decree of the Act on Medical Servicemen, etc., Attached Table 1).

● Subjects related to the health and medical information management

These subjects must be completed to acquire a health care information manager license, which include the subjects related to the health care information manager license examination and the following subjects. (Even if the subject has a different name, if the subject content is the same, please respond by including the subject as a subject related to the health and medical information manager.)

- Anatomy and Physiology, Pathology, Medical Terminology, Classification of Diseases and Medical Practices, Medical Record Information Analysis Practice, Cancer Registration, Health Insurance Theory, Health Insurance Practice, Healthcare Organization Management, Health and Medical Information Management, Healthcare Information Management Practice, Medical Information Technology , Health and Medical Data Management, Health Information Protection, Medical Treatment Related Laws, Health and Medical Statistics, Medical Quality Management

Questions		Not at all	No	Average	True	Very true
Satisfaction with the majors related to health information management						
1	I am interested in the subject contents related to health information management.					
2	The health information management related major books are worth learning about.					
3	The subjects related to health information management fit me well.					
4	I feel that I am learning something valuable in a major related to health information management.					
5	I am satisfied that I am currently majoring in the health information management.					
6	Even if I choose it again, I will choose a major related to health information management.					
7	The health information management related majors are considered popular majors.					
8	My parents would be proud of me majoring in the health information management.					
9	The background of graduating from a health information management related major will be advantageous for pursuing my career after college.					
10	I have never felt ashamed that I am majoring in the health information management.					
11	I proudly tell people that I am majoring in the health information management.					
12	Many people will want to choose a major related to the health information management.					
13	Compared to my friends, the health information management related major I am majoring is the best.					
14	I am satisfied with the overall contents of my health information management related major.					
Academic achievement						
1	I am doing well in my major in the health information management.					
2	I am satisfied with my grades in the health information management related major.					
3	Even if there is a problem while learning about health information management, I can solve it myself without the help of others.					
Discontinuation of learning						
1	Overall, I attend lectures on the health information management related subjects without missing any lectures.					
2	I will be eligible for the license exam by completing all subjects related to the health information management.					
3	I have experienced or plan to take a leave of absence due to academic problems related to the health information management.					
4	If I take a leave of absence, I will return to school without exception.					

※ Our Research Center seeks to develop a learning tool using a mobile application (hereafter, “app”) to improve the ability to classify diseases and interpret medical record charts. The relevant app is consisted of learning by difficulty with game elements applied, providing the basic knowledge for learning, learning methods and solutions, and question writing, etc.

● Please check the items which are closest to your thoughts on developing a learning app for the learning of health information manager, such as such an app.

Questions		Not at all	No	Average	True	Very true
1	The health information manager’s learning app development is positively taken.					
2	A health information manager’s learning app needs to be developed.					
3	It is important to develop a health information manager’s learning app.					
4	The health information manager’s learning app development is urgent.					
5	The learning content that I usually find difficult can be learned more easily by using the health information manager’s learning app.					
6	By utilizing the developed health information manager learning app, it is expected that the ability to interpret disease classification and medical record charts will be improved.					

● Please freely enter your thoughts on learning contents (subjects, body systems, etc.) which would be good to be included in the learning app undergoing development, learning method (coding path, chart interpretation step, etc.), learning time, areas you want equipped for the convenience and convenience of use (login, storage method, account linkage, etc.), and any additional points of supplementation.

※ Medical record chart's quantitative analysis is among the key tasks and responsibilities of a health information manager, and the management of incomplete records (incomplete records and incomplete records due to omissions or contradictions) through such is very important for the patient care's continuity and safety.
While it is possible to discover incomplete records via on-the-job training at medical institutions, there is a limit to the experience of correcting and supplementing incomplete records based on the communication with professional personnel (medical staff, etc.), which is the next step.
Hence, our Research Center seeks to develop a communication training simulation using the VR to experience the real-world communication with professionals which is difficult to experience in practice, and also improve the communications and incomplete record management skills.

● As explained in the above, please check the items closest to your opinion on the development of learning tools using the VR to improve the communication skills of the health information manager.

Questions		Not at all	No	Average	True	Very true
1	The development of "VR learning tools for health information manager's communication skills" is positively taken.					
2	The development of "VR learning tools for health information manager's communication skills" is needed.					
3	The development of "VR learning tools for health information manager's communication skills" is important.					
4	The development of "VR learning tool for health information manager's communication skills" is urgently needed.					
5	If the developed "VR learning tool for health information manager communication skills" is utilized, it is expected that the ability to manage incomplete records will be improved.					
6	By using the developed "VR learning tool for communication skills of health information manager", it is expected that the communication skills with professional personnel will be improved.					

● Please freely enter your thoughts on learning contents that would be good to be included for the VR learning undergoing development (medical department, type of conversational partner, etc.), learning method (simulation time per session, response method (text, voice), etc.), and the areas to be equipped for the ease of use and convenience (login, storage method, account linkage, device (HMD) use, etc.) and any additional points of supplementation.

We appreciate your participation and time.