Factual Survey of Education Using ICT Including E-learning in Japanese Physical Therapy Schools

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Abstract. [Purpose] A questionnaire survey on e-learning in Japanese physical therapy schools was conducted in order to examine the efficiency and potential of the ICT-supported education by comparing the results with general Japanese higher education institutions. [Subjects and Methods] The questionnaire prepared by NIME in 2006 for higher education institutions was revised, and posted to 228 physical therapy schools in Japan (69 universities and 159 technical schools). [Results] Of all the questionnaires, 53.6% (37/69) and 42.8% (68/159) were returned from the universities and technical schools, respectively. Many items in the questionnaire showed similar tendencies to the results of the NIME's survey. However, the "ascertainment of the learning effect of e-learning" showed a different tendency from general Japanese higher education institutions ($p = 0.000$). [Conclusion] Physical therapy schools less frequently ascertain the learning effect of e-learning than general Japanese higher education institutions. The fact suggests that e-learning may not have been adapted by physical therapy education due to factors deemed unsuitable for e-learning such as the school capacity issues and technique-centered education.

Key words: E-learning, ICT, Factual survey

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INTRODUCTION

Recently, in higher education it has become well-known that the use of e-learning can increase the efficiency/potential of teaching. This is true also for medical education, but in terms of e-learning used in higher education, Japan is reportedly far behind other countries such as European countries, the US, and Korea¹⁾.

In fact, the National Institute of Multimedia Education (NIME) has already published reports on the present situation of e-learning in Japanese higher education institutions²⁾, however no report is available on the present situation of e-learning in medical education, especially in Japanese physical

therapy (PT) education.

The purposes of this research were to investigate the present situation of information communication technology (ICT)-supported education such as e-learning in Japanese PT schools, and to perform a comparative study to examine the difference in e-learning between universities and technical schools.

SUBJECTS AND METHODS

A questionnaire asking about the use of ICT such as e-learning in each school was sent to 228 PT schools (69 universities and 159 technical schools).

The authors revised the questionnaire for higher education institutions made by NIME in 2006³⁾ and

added 4 original question items to finally include 22 items (Table 1).

This survey was conducted in December, 2007 for 1 month using the mailing method, and the questionnaire explained ethical matters, including that it was an anonymous survey and that we would be very careful handling the obtained information.

Statistical analysis was performed using a chi-square test with a significance level of 5%. The statistical software Dr. SPSSII was used.

RESULTS

Of all the questionnaires, 53.6% (37/69) and 42.8% (68/159) were returned from universities and technical schools, respectively. Table 1 shows the results of the survey.

The comparison between the results of NIME and PT schools showed significant differences in questions 6, 7, 10, 14 and 17 (Q6, $p = 0.037$; Q7, $p = 0.045$; Q10, $p = 0.011$; Q14, $p = 0.000$; Q17, $p = 0.000$).

The comparison between universities and technical schools in the survey for PT schools showed significant differences in questions 6, 7 and 14 (Q6, $p = 0.008$; Q7, $p = 0.000$; Q14, $p = 0.000$).

Question 17 showed a very significant difference between the results of NIME and PT schools, but not between the two types of PT school, universities and technical schools.

For our original questions 3, 4 and 5 asked only to PT schools, the following 3 results were obtained.

1. Most universities have ICT facilities, but 20% of technical schools do not.
2. As much as 70% of all technical schools answered the rate of ICT use as “zero” (the rate was 40% in universities).
3. The question asked which process in the taxonomy is necessary for e-learning, based on the Benjamin Bloom’s classification⁴⁾. The most frequent answer was “only cognitive domain” in both universities and technical schools. As a whole, similar tendencies were observed in the both groups.

DISCUSSION

The comparison between the results of NIME and PT schools showed similar tendencies, which suggests that the present situation of e-learning in Japanese PT schools may be similar to that in

general Japanese higher education institutions in 2006.

Since questions 6 and 7 were more ambiguous than other questions, and allowed multiple answers, they may have provided biased results.

Question 14 showed a very significant difference in the chi-square tests, which might have occurred because PT schools frequently answered: “others”.

On the other hand, question 17 on “ascertainment of the learning effect of e-learning” showed an obvious difference between the results of NIME and PT schools. Based on the absence of correlation and the highly significant difference observed in the chi-square tests, the results of this question may have suggested our (PT schools’) specificity. The results clearly indicate the fact that general Japanese higher education institutions often perform question surveys and examinations to ascertain the learning effect of e-learning (55% and 48%, respectively), while 40% of Japanese PT schools do nothing in particular.

This may be because e-learning has not been adapted in PT education due to factors which deem it unsuitable for e-learning such as the school capacity issue and technique-centered education.

For the comparison between universities and technical schools, the results of our original questions suggest the following. Use of ICT may increase the cost and burden of maintenance in universities, and need more work from each teacher in technical schools, thus the scale and economic context of each educational institution may influence the use of ICT. Universities have advantages over technical schools, because universities can acquire budgets for e-learning more easily under the Ministry of Education, Culture, Sports, Science and Technology’s “Contemporary Education Needs Initiative Support Program” (Contemporary Good Practice) which was initiated in 2004 to revitalize higher education⁵⁾.

Question 17 showed the specificity of PT schools in comparison with the results of NIME, but no difference was observed between universities and technical schools. Therefore, it seems a unique characteristic of PT schools.

Many items of our questionnaire showed similar tendencies to NIME, which revealed that the present situation of e-learning in Japanese PT schools including technical schools as well as universities is similar to that of general Japanese higher education institutions. However, PT schools

Table 1. A questionnaire about education: applied ICT such as the E-learning in...?

	NIME		PT school	
	The ratio	A real number	The ratio	A real number
Q 1 Which is the kind of your educational institution?				
1. National university		87		7
2. Public university		51		3
3. Private university		388		27
4. Junior college		328		0
5. College of technology		61		68
Q 2 Is one grade of capacity of the subject several people?			(Abbreviation)	
Q3 Are there ICT facilities where a student can use the Internet in class ?				
1. I have exclusive facilities.				36
2. I have facilities for common use.				58
3. The ICT facilities such as PC rooms do not exist.				11
Q 4 What is the ratio of e-learning in class ?(It excludes a basic subject)				
1. 0%				61
2. ~20%				36
3. 20~40%				6
4. 40~60%				1
5. 60~80%				0
6. 80~100%				1
Q5 In PT-education, how necessary is e-learning ?				
1. Not necessary at all				5
2. I think that it is necessary, but it is not necessary to use it in education of PT(If anything, it is OJT)				14
3. Only the part of the cognitive domain is necessary				36
4. It is necessary in the part of the recognition domain / and emotion and will domain				14
5. It is necessary in the cognitive domain / emotion and will domain / mind movement domain				24
6. No answer				12
Q6 Please answer about current action for ICT practical use education.(multiple responses)				
1. Improvements to quality of educational contents & courses using ICT	33.3	305	22.9	24
2. Enrichment of educational contents & courses using ICT	31.4	287	20.0	21
3. Combining face-to-face tuition & e-learning (through blended learning)	32.2	295	23.8	25
4. Fostering personnel for education using ICT	19.5	178	8.6	9
5. Faculty development for education using ICT	19.1	175	7.6	8
6. Promotion through university-wide activities	25.6	234	18.1	19
7. Promotion of collaboration with other departments and faculties	6.9	63	14.3	15
8. Promotion of collaboration with other universities in Japan	10.2	93	6.7	7
9. Promotion of collaboration with overseas universities	4.6	42	1.9	2
10. Other	15.7	144	28.6	30
			p<0.05	
Q7 Please answer about future action policy for ICT practical use education.(multiple responses)				
1. Improvements to quality of educational contents & courses using ICT	38.8	355	25.7	27.0
2. Enrichment of educational contents & courses using ICT	40.2	368	27.6	29.0
3. Combining face-to-face tuition & e-learning (through blended learning)	36.9	338	24.8	26.0
4. Fostering personnel for education using ICT	32.7	299	21.9	23.0
5. Faculty development for education using ICT	31.1	285	17.1	18.0
6. Promotion through university-wide activities	39.2	359	21.9	23.0
7. Promotion of collaboration with other departments and faculties	11.4	104	15.2	16.0
8. Promotion of collaboration with other universities in Japan	14.9	136	8.6	9.0
9. Promotion of collaboration with overseas universities	8.2	75	2.9	3.0
10. Other	9.8	90	23.8	25.0
			p<0.05	

Q8 Have you introduced ICT practical use education ?

1. Have introduced	74.6	683	35	37
2. Have not introduced	25.4	232	64	67
3. No answer	0	0	1	1

Q9 What kind of organization is involved in promoting ICT practical use education?(multiple responses)

1. Cross-university committee or working group set up	29.3	200	16.2	6.0
2. Internal organization (Information education center , faculty etc.)	54.6	373	45.9	17.0
3. Individual teachers, no organizational measures taken	39.4	269	43.2	16.0
4. Consortium with other Japanese university	8.6	59	2.7	1.0
5. Consortium with overseas university	1.6	11	0.0	0.0
6. Other	1.5	10	2.7	1.0

Q10 What is the situation of using ICT program in your school? (multiple responses)

1. Education of faculty and department at universities, junior colleges & colleges of technology	93.6	639	89.2	33.0
2. Remedial education (supplementary scholastic education)	16.1	110	8.1	3.0
3. Extramural lectures	25.5	174	5.4	2.0
4. Life learning, adult education	14.5	99	10.8	4.0
5. For national examination & qualification accreditation	30	205	32.4	12.0
6. Other	6.6	45	2.7	1.0

p<0.05

Q11 Please answer about the purpose of introduction of ICT inflection education of your school. (multiple responses)

1. To provide students with effective education	81.1	554	89.2	33.0
2. To adapt to various learning formats	59	403	67.6	25.0
3. To provide efficient education	60.6	414	73.0	27.0
4. To provide high quality education	47.7	326	43.2	16.0
5. To rationalize education and administration	18.7	128	16.2	6.0
6. To attract new students	5.3	36	2.7	1.0
7. To reduce costs	3.8	26	0.0	0.0
8. Other	2.8	19	5.4	2.0

Q12 What are the merits of having introduced ICT practical use education ? (multiple responses)

1. Enabled students to learn anytime, anywhere	40.7	278	43.2	16
2. Enabled more effective education (e.g. contribution to better academic ability)	55.6	380	48.6	18
3. Enabled teaching appropriate to students' needs	36.5	249	24.3	9
4. Enabled individual teaching through two-way communication	25.6	175	16.2	6
5. Enabled efficient education (e.g. by reducing manpower)	18.6	127	29.7	11
6. Easier to reduce costs than face-to-face tuition	2.3	16	5.4	2
7. Enabled educational activities across a wide geographical area	9.8	67	13.5	5
8. Students' self-learning has been vitalized	30.6	209	27.0	10
9. Other	5.1	35	5.4	2

Q13 What are the problems of carrying out ICT education? (multiple responses)

1. Dean and senior staff do not adequately appreciate education using ICT	6.3	43	13.5	5.0
2. Unable to gain a consensus within the school about support for education using ICT	19.6	134	24.3	9.0
3. Inadequate understanding of effects of education using ICT on the part of teaching staff	30.9	211	32.4	12.0
4. Lack of teachers' skills in education using ICT	54.5	372	56.8	21.0
5. Lack of students' skills in education using ICT	20.8	142	29.7	11.0
6. Lack of knowledge about development of e-learning lecture and teaching systems	43.8	299	54.1	20.0
7. Lack of knowledge about handling copyrights	35.7	244	32.4	12.0
8. Unable to obtain a budget for introduction of education using ICT	35.4	242	27.0	10.0
9. Infrastructure for introduction of education using ICT not in place	20.5	140	32.4	12.0

10. No platform that meets the achievements of the organization	8.6	59	16.2	6.0
11. Lack of learning support system for students	24.2	165	29.7	11.0
12. Lack of personnel to create and maintain system and contents	61.2	418	51.4	19.0
13. Preparation of an organized in-school cooperative system	34.4	235	24.3	9.0
14. No incentives for teaching regarding education using ICT	18.6	127	10.8	4.0
15. Other	3.7	25	2.7	1.0

Q14 What are the demerits of having introduced ICT practical use education ? (multiple responses)

1. Teaching staff have to spend more time creating contents and preparing lessons	56.2	384	51.4	19.0
2. More expensive than face-to-face tuition	19.2	131	5.4	2.0
3. Learning effects were inferior to face-to-face tuition	2.2	15	8.1	3.0
4. Difficult to sustain students' will to learn	4.5	31	2.7	1.0
5. Lesser communication with students suffers	3.2	22	2.7	1.0
6. Burden of maintaining and managing system	53	362	29.7	11.0
7. Other	5.1	35	24.3	9.0

p<0.05

Q15 Who is involved in deciding subject content for education using ICT practical education ? (multiple responses)

1. Cross-university organization (center or committee or working group)	43.5	297	48.6	18.0
2. Individual teachers, no organizational measures taken	82.3	562	51.4	19.0
3. University consortium	4.2	29	5.4	2.0
4. Outsourced	16.4	112	13.5	5.0
5. Other	8.5	58	5.4	2.0

Q16 Please answer about facilities and methods used by institutions introducing education using ICT.(multiple responses)

1. Equipped with large screens or multiple displays enabling education using ICT	91.7	626	59.5	22.0
2. Able to upload teaching materials to the internet, student can look at them on their computers.	75	512	37.8	14.0
3. Discussions between students are held on electronic bulletin boards.	29.9	204	10.8	4.0
4. Short tests are conducted over PCs and mobile terminals.	40.7	278	16.2	6.0
5. Students can send reports via PCs and mobile terminals.	73.1	499	35.1	13.0

Q17 How do you ascertain academic effect of education using ICT? (multiple responses)

1. Conducting questionnaires	55.2	377	18.9	7.0
2. Conducting tests	48	328	35.1	13.0
3. Ascertaining from the number of credits obtained.	34.4	235	13.5	5.0
4. No particular methods used	21.4	146	40.5	15.0
5. Other	13.5	92	8.1	3.0

p<0.05

Q18 Please answer about the examinations using ICT.

1. Considering introduction.	33.6	78	37.3	25.0
2. Introduction planned.	12.1	28	6.0	4.0
3. Neither considered nor planned.	52.2	121	55.2	37.0
4. Introduced in the past, but ceased introduction.	1.3	3	0.0	0.0
5. No answer	0.9	2	1.5	1.0

Q19 What kind of thing is the planned organization form to introduce? (multiple responses)

1. Through cross-university effort.	37.7	87	14.9	10.0
2. Through an internal organization (information education center, faculty etc.)	42.5	99	17.9	12.0
3. Through establishment of a new organization.	10.4	24	4.5	3.0
4. Through a consortium with other Japanese university.	5.7	13	1.5	1.0
5. Through a consortium with overseas university.	1.9	4	1.5	1.0
6. Through individual teachers, no organizational measures taken.	17.9	42	7.5	5.0
7. Other	3.8	9	1.5	1.0

Q20 What are the problems of introducing ICT practical use education? (multiple responses)

1. Dean and senior staff do not adequately appreciate education using ICT	7.5	17	13.4	9.0
2. Unable to gain a consensus within the school about support for education using ICT	22.6	52	19.4	13.0
3. Inadequate understanding of effects of education using ICT on the part of teaching staff	34.9	81	25.4	17.0
4. Lack of teachers' skills in education using ICT	58.5	136	34.3	23.0
5. Lack of students' skills in education using ICT	25.5	59	17.9	12.0
6. Lack of knowledge about development of e-learning lecture and teaching systems	50	116	29.9	20.0
7. Lack of knowledge about handling copyrights	23.6	55	20.9	14.0
8. Unable to obtain a budget for introduction of education using ICT	45.3	105	11.9	8.0
9. Infrastructure for introduction of education using ICT not in place	40.6	94	16.4	11.0
10. No platform that meets the achievements of the organization	13.2	31	7.5	5.0
11. Lack of learning support system for students	26.4	61	10.4	7.0
12. Lack of personnel to create and maintain system and contents	64.2	149	25.4	17.0
13. Preparation of an organized in-school cooperative system	35.8	83	16.4	11.0
14. No incentives for teaching regarding education using ICT	14.2	33	10.4	7.0
15. Other	2.8	6	0.0	0.0

Q21 Please give the reasons why e-learning has not been introduced.(multiple responses)

1. Due to lack of interest in e-learning within the university.	40.5	49	40.3	27.0
2. Due to lack of know-how on e-learning adaption.	30.6	37	29.9	20.0
3. Due to lack of developed infrastructure in the university.	35.5	43	25.4	17.0
4. Due to lower instructional impact than face-to-face tuition.	14.9	18	10.4	7.0
5. Due to a lack of effects that counterbalance costs.	16.5	20	11.9	8.0
6. Due to insufficient funding for introduction.	30.6	37	19.4	13.0
7. Due to a preponderance of skills courses and other such courses not suited to e-learning.	50.4	61	13.4	9.0
8. Other	8.3	10	7.5	5.0

Q22 Please answer when ICT practical use education was introduced and terminated.

(Abbreviation)

showed different tendencies from those of general Japanese higher education institutions for some items (e.g. ascertainment of the learning effect of e-learning). Different types of PT schools, i.e. universities and technical schools showed different tendencies in some items (e.g. approach to ICT use in education and disadvantages of the introduced ICT).

Toward an ICT-supported PT education including e-learning, it will be necessary to remove the specificity of PT schools observed in question 17 and to decrease the disadvantages which are much more frequently seen in technical schools.

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