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Differences of university's ICT introduction effects by the university scale and the presence of technical or educational support system

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Abstract: According to the factor analysis of the questionnaire survey on the promotion of ICT utilization education conducted in 2015 for universities throughout Japan, it became clear that there are 4 factors, which are composed of "improvement of university's brand power", "improvement of educational method", "educational effect" and "cost reduction", as the effects of ICT introduction.

In this paper, we focused on the existence of a system to support ICT utilization education technically or pedagogically, and how the effect differs depending on the size of the university and the presence / absence of technical and educational support system. The difference in scale score was examined by analysis of variance.

Keywords: ICT use in education, e-learning, higher education, complete enumeration

1. Introduction

The purpose of this research is to clarify factors that increase educational effect by introducing and utilizing ICT based on the answers from the survey (AXIES 2016) conducted in FY 2015 and previous survey results to grasp the actual situation of ICT utilization education in higher education institutions,

So far, four factors have been obtained, "Improvement of university's brand power" "Improvement of educational method" "Educational effect" "Cost reduction" behind "the effect obtained" by introducing ICT (Tsuji et al. 2017a). On the other hand, it is clear that the ICT environment and services have a positive influence on the above four factors as the organization is smaller (Tsuji et al. 2017b).In this paper, we report on the relation between the presence of technical or educational support system and 4 factor scores extracted from obtained effect by the size of university.

2. Difference of the effects of introducing ICT in presence of support system and on the scale of university

In order to analyze the presence or absence of support system and the difference of ICT introduction effect on university scale, a 2 × 3 analysis of variance was performed, where the scale scores of four factors were dependent variables, and "presence of technical support system" and "university scale" (Group E with 1000 students or less, group D from 1001 to 3000, and group 3 of 3001 or more A-C groups Group) were used as independent variables.

From the results (upper part of Table 1), there was a significant interaction with each scale score of the 2 factors of "improvement of university brand power" and "improvement of education method" ($F(2, 175) = 4.194$, $p < 0.05$, $F(2, 191) = 5.070$, $p < .01$). As a result of the simple principal effect test, the simple main effect of "presence or absence of technical support system" in "university scale" E group in these two factors was significant ($F(1,175) = 7.476$, $p < .01$, $F(1, 191) = 25.759$,

p <.001).Therefore, the scales scores of institutions with technical support organizations were respectively significantly higher. On the other hand, the simple main effect was not significant in group D and group AC.

From these results, the small scale institution that has the technical support system showed significantly higher scales of "improvement of university brand power" and "improvement of educational method."Next, we performed a 2 x 3 analysis of variance with the scale scores of the 4 factors of ICT introduction effect as dependent variable, and "presence or absence of educational support system" and "university scale" as independent variables, and 4 factors. As a result, a significant interaction was observed at the scale score of all 4 factors (Table 1, bottom). Subsequently, as a result of examining the simple main effect, the scale score was significantly higher in the group E than in the institution not having the educational support system.

From the above results, it seems that the possibility that construction of technical and educational support system at small schools may lead to various effects of ICT utilization.

Table 1: Scale scores and variance analysis results based on presence / absence of support system and university scale (above: technical support, bottom: educational support).

Scale of Univ.	Group.E		Group.D		Group.A-C		Main Effect		
Presence of Tech. Support System(TSS)	No TSS	With TSS	No TSS	With TSS	No TSS	With TSS	Scale of Univ.	Presence of TSS	Interaction
Increasing the university's brand power	1.79 .67	2.26 .65	2.19 .59	2.03 .63	2.29 .89	2.09 .54	.63	.10	4.19*
Educational effects	2.81 .53	2.97 .73	3.03 .52	2.94 .51	3.17 .50	3.17 .51	2.34	.05	.68
Improving educational methods	1.99 .61	2.87 .82	2.53 .76	2.72 .58	2.90 .49	3.05 .57	7.87**	13.54**	5.07**
Cost reduction	2.48 .78	2.76 .80	2.84 .76	2.66 .77	3.05 .65	2.81 .67	2.11	.15	2.14

Scale of Univ.	Group.E		Group.D		Group.A-C		Main Effect		
Presence of Edu. Support System(ESS)	No ESS	With ESS	No ESS	With ESS	No ESS	With ESS	Scale of Univ.	Presence of ESS	Interaction
Increasing the university's brand power	1.80 .57	2.44 .71	1.94 .43	2.20 .74	2.16 .83	2.10 .50	.15	8.15**	3.89*
Educational effects	2.70 .64	3.20 .54	3.05 .55	2.88 .47	3.10 .52	3.18 .51	1.69	2.33	5.47**
Improving educational methods	2.17 .82	2.91 .69	2.71 .64	2.64 .63	2.98 .50	3.04 .58	6.90**	5.83*	6.14**
Cost reduction	2.50 .83	2.88 .68	2.86 .89	2.57 .63	2.93 .70	2.81 .67	1.23	.02	3.84*

*p<.05 **p<.01

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