A study on the Effect of Educational Information System on Internal Factors of School Organization

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Abstract: This research is to investigate how educational information system affects operation focus, teacher satisfaction, student satisfaction, strategy and finally the resultant performance of school organization. Method: AMOS 18.0 was used for validity testing on the input factors to the study model for confirmatory factors analysis. To this end, certain hypotheses were proposed and the validity test was conducted to test how well the hypothesis accounted for the relationship observed in the study. Conclusions: Educational information system has become a crucial factor for schools, as it is for ordinary business, In particular, parts where educational information system plays the most important role are school administrations.

Keywords: Educational Information System, Internal Factors of School Organization, Structural Equation Model.

1 Introduction

The 21st century is a knowledge-based society where accumulation of knowledge and information is highly valued. Such society lays much emphasis on the creation of practical knowledge that can be effective under different circumstances. A successful member of such society would be one who can lead self-motivated studies with creativity and problem solving skills, and can contribute to the value of the community with humanistic personality.

In line with such expectation of a knowledge-based society, interest in education inevitably secures competitiveness of a nation in the present and future, hence education should also seek changes in reflection of overall changes in society and make efficient use of school organizations. School organization is the most fundamental unit of an educational system, efficient innovation, and its management is necessary in developing personnel resources that can meet the needs of a knowledge-based society.

The Korean Ministry of Education & Human Resource Development has made previous efforts in applying information systems to enhance teachers satisfaction at work, mitigate their workload, foster school parents and students trust in educational institutions by improving productivity and transparency of educational administrations, and make use of computerized education administration.

In 1997, the Korean Ministry of Education & Human Resource Development developed Stand Alone (S.A), Client/Server, and Integrated School Management Systems (C/S) [1], but such systems were available to a limited number of teachers, inevitably increasing the workload of the teachers in charge, and program errors occurred frequently.

The Ministry of Education & Human Resource Development, therefore, demands a new system in which all teachers can easily share educational information system.

Therefore, the Ministry designed and developed the National Education Information System (NEIS) for Elementary, Junior High, and High Schools nationwide.

The NEIS is a nationwide-system that connects the Korean Ministry of Education & Human Resource Development with its affiliated organizations through the Internet to share information [2].

The purpose of NEIS is mainly to provide good education service to students and parents by providing a system through which faculty members can handle all administrative works that can occur at school such as academic, personnel affairs and accounting as well as simple school administration, therefore freeing faculty members from overhead workload, and hence helping

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them focus on teaching, to improve education quality [3][4].

In the study, therefore, we look into how Educational Information System affects operation focus, teacher satisfaction, student satisfaction, strategy and finally the resultant performance of school.

2 Theoretical Background

The purpose of using information systems by organizations is to improve overall efficiency of organization by facilitating the decision making of its members [5], and the employment of information system has direct effect on the performance of organization by inducing changes not only in the behavior of its members but also in the organizational structure [6].

In the case of businesses, the use of information system constitutes the most basic part of profit making, so that they actively encourage the use of information systems, but the level of use at nonprofit organizations is in fact comparatively low. In South Korea where education and human resources are highly regarded, many nonprofit organizations have been making much effort to make use of educational information systems.

South Korea has been consistently working on education informatization since 1986, but it has mostly been about school computer networks; internal, external circumstances were difficult to expand informatizaton to Elementary, Junior High and High schools [7], which is under development currently.

The development of informatization of educational administration occurred largely in three stages. The first stage took place in 1990 with the implementation of Client/Server(C/S)-based SISm Student Information System, computer communication-based Official Document Communicating system, individual PC-based Education Statistical System, individual PC-based Material Management System and computer communication-based Edunet. The second stage was the Informatization of Education Administration when the NEIS conducted strategic planning in September 2000, and the service was introduced first to the area of general administration in November 2002 before its full application to all areas of administration in March 2003, before School Affair System was introduced in 2006. The third stage witnessed stabilization and functional improvements in reflection of various voices at work, and further development of NEIS for visually handicapped teachers at special schools was completed; then the education finance campaign (2005-2008) started; EduFine was fully implemented in March 2010 after a trial session with a model school; and the current Electronic Document System was opened in April 2008 [8].

The introduction of the system was to relieve teachers of their heavy workload and to help improve education quality [9]. The introduction of NEIS enabled block treatment of simple work through an electronic system, such as school registration for a new school year, class organization, student promotion, student transfer, school report card, grading and statistical works, and enabled standardization of complicated jobs, thereby reducing administrative workload.

According to the analysis on the effect of NEIS, teachers were optimistic that the introduction of NEIS reduced the time of administration work and helped efficient work allocation, but did not help reduce the paper usage. Majority of school parents recognized its positive effect on improving peoples satisfaction [10].

The purpose of Electronic Document System is to help improve the performance of work process with the application of new information and communication technologies for consistent and integrated systematic management of various types of electronic, digital documents over the life cycle of documents. And the major functions are divided to electronic payment, document distribution, document management, e-bulletin, e-mail and system operation management [11].

The backgrounds that helped faculty members recognize the effect of school electronic document systems is that the system helps reduce time, save costs, improve the approval process and reduce potential conflicts within the administrative department [12]. However, the system may contribute in reducing human interaction among the administrators and faculty. An unintentional secondary effect is increased exchange of official documents due to its convenience of use. Because of its convenience, the use of notices, such as notices of discretionary day off, publicity, training camp, shift of material management dramatically increased to account for 30 percents of total communication. Reporting time period was shortened. When authorities send documents that require urgent attention, teachers find themselves struggling to meet the deadline, and this inevitably hinders teaching work. Such large volume of document work, in fact, hinder information sharing, and drafters sometimes find themselves unsatisfied with the electronic way of approval even though they acknowledge the effectiveness of the system.

3 Research Model and Methodology

3.1 Research Model and Hypotheses

The following are the hypnoses for how educational information system affects each internal factor such as workforce, teachers satisfaction, customer satisfaction, strategy and school performance in Korean Elementary, Junior High and High schools, as see in the (Figure 1) below.

H1: Educational information system affects on workforce.

H2: Educational information system affects teachers satisfaction.

Table 1: The results of the confirmatory factor analysis

| Factor	Initial Items	$Cronbach's$ alpha	Final items	x^2/d.f	P	GFI	AGFI	NFI	RMR
1.Educational Information System	5	0.980	5	79.522	0.00	0.883	0.650	0.909	0.034
2.Workforce	5	0.988	5	17.922	0.00	0.957	0.870	0.963	0.018
3.Teacher Satisfaction	7	0.889	7	43.266	0.00	0.813	0.626	0.801	0.055
4.Customer Satisfaction	7	0.901	7	25.639	0.00	0.887	0.774	0.889	0.036
5.Strategy	6	0.921	6	12.095	0.00	0.958	0.902	0.974	0.019
6.Results	6	0.979	6	27.496	0.00	0.900	0.767	0.907	0.029
Total	36		36						
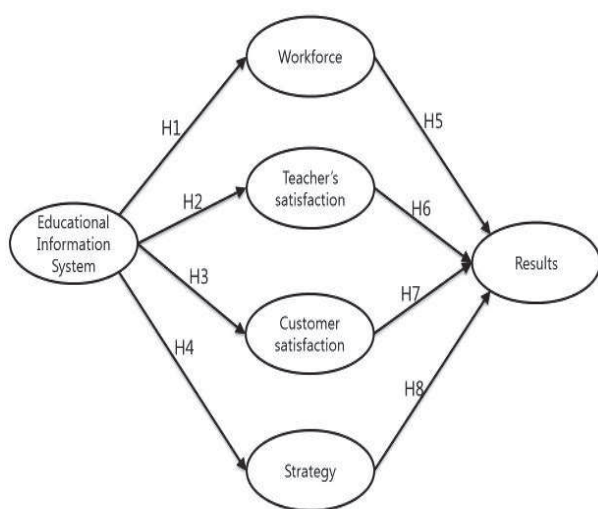
Fig. 1: Process

H3: Educational information system affects customer satisfaction.

H4: Educational information system affects strategy.

H5: Workforce affects results.

H6: Teachers satisfaction affects results.

H7: Customer satisfaction affects results.

H8: Strategy affects results

3.2 Sample Characteristics

Questionnaires were distributed among teachers at twenty-two Elementary, Junior High and High school students asking about the factors that have effect on the performance of schools. Sampling was done by the self-administered questionnaire survey method. Of the 1,000 copies of questionnaires distributed on April 16, 2011 among the Elementary, Junior High, High schools in the districts of 5 local education offices in the city of Busan, Korea, 856 copies were collected and 828,

excluding poorly answered questionnaires, were used for the analysis.

4 Analysis

4.1 Convergent and Discrimination Validity

In this study, AMOS 18.0 was used for validity testing on the input factors to the study model for Confirmatory Factor Analysis. To this end, certain hypotheses were proposed and the validity test was conducted to test how well the hypothesis accounted for the relationship observed in the study.

For the convergent validity, the first test was Standardized Factor Loadings: $FL > 0.6$. The second test was Squared Multiple Correlations: $SMC > 0.5$ [13]. And the third test was Standardized Residual Covariance: $-2.58 < SRC < +2.58$.

The validity test on discrimination was conducted after the convergent validity test. The validity test on discrimination was to test whether the factors have different structures from each other [14].

For validity test on discrimination, correlation test (r¡0.9) among the factors and Chi square test (goodness-of-fit tests; df=1, $p < 0.05 = 3.84$, $p < 0.01 = 6.63$) were used [15].

And findings were that all of the 36 items appeared to be statically significant.

4.2 Results of the Structural Equation Model

In the study, using SEM, we investigated what direct effect educational information system has on workforce, teachers satisfaction, customer satisfaction and strategy, and also indirect effects.

Fit statistics of the manufacturing and service companies indicate that the chi-square of the model is 733.902 with a d.f. of 8. GFI is 0.761, AGFI is 0.372, NFI is 0.835, CFI is 0.837 and RMR is 0.076.

And the effectiveness of the Educational Information System appeared to be, starting from largest in order,

Table 2: The results of the confirmatory factor analysis

Hypothesis	Path	FL	T-value	P-value	Hypothesis Supported
H1	Educational Information System − > Workforce	0.892	37.877	0.00	**
H2	Educational Information System Teachers satisfaction	0.796	34.140	0.00	**
H3	Educational Information System Customer satisfaction	0.765	33.097	0.00	**
H4	Educational Information System Strategy	0.755	8.629	0.00	**
H5	Workforce Results	0.255	8.629	0.00	**
H6	Teachers satisfaction Results	0.312	10.967	0.00	**
H7	Customer satisfaction Results	0.353	12.856	0.00	**
H8	Strategy Results	0.038	1.395	0.16	ns
			*: P<0.05, **: P<0.01, ns: not significant		

Workforce (H1, 0.892), Teachers satisfaction (H2, 0.796), Customer satisfaction and Strategy, with a conclusion that Educational Information System has effect on all organizations of school.

For internal factors, except the strategy, all the factors, workforce, teachers satisfaction, customer satisfaction, appeared to have effect on the resultant performance. The detail is as follows in the Fig.2 below.
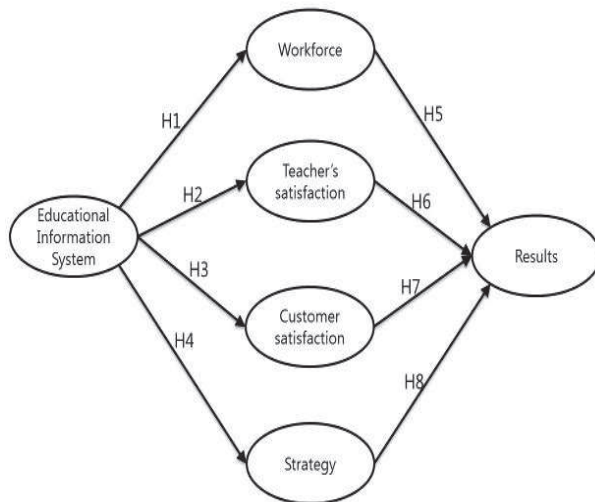
Fig. 2: Process

5 Conclusion

This study is an empirical study to see what effect Educational Information System has on the workforce, teachers satisfaction, customer satisfaction strategy and the resultant performance, for the teachers at the Elementary, Junior High and High schools in the Busan region.

The finding is that Educational Information Systems have become a crucial factor for schools, as it is for ordinary businesses. In particular, parts where Educational Information System plays the most important role are school administrations. The study indicates that all concurrent school work is electronically documented at Elementary, Junior High and High schools in South Korea. This is an indication that the development is progressing as intended by the Korean Ministry of Education and Science and Technology

Educational information systems appeared to have effect on school teachers as well. It can be said that it is mostly school teachers who handle the jobs at school, and Educational Information System is updated in reflection of improvement proposals by teachers. Therefore the system has effect on customer (student) satisfaction. In addition, parents themselves can see how their children are doing at school, the administration and the direction of the school, by connecting the Educational Information System.

The study also shows that today, a great number of schools employ Educational Information Systems for their strategy to attract students and for the development of their schools.

Finally, the study leads to an investigation on how internal factors such as workforce, teachers satisfaction, customer satisfaction and strategy affect the performance of the school. According to our results, all factors except strategy have effect on the resultant performance of the school. In the case of strategy, it can be said that strategy is about the future of the school and has indirect effect on the performance of school mainly through different factors.

A limiting factor of the study is that the sampling was limited to teachers at Elementary, Junior High and High schools in the Busan region. Nation-wide studies are necessary for generalization of our results.

Acknowledgement

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