

The Effectiveness of the Use of Educational Content in Primary and Secondary Schools in Korea

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Summary

Since the late 1990s, there has been a rapid development and popularization of ICT-based educational content utilized in primary and secondary schools. This has occurred under the rapid development of information and communications technology (ICT), and the launching of the Korean government's plan for comprehensive education innovation. As a result, various new ICT-based educational content (here in known as "educational content"), produced in both public and private sectors, has been used and the government has been more interested to evaluate the rate of use of educational content rather than the educational effect of such content on student performance. This study therefore analyzes the effect of using educational content among teachers and students of primary and secondary schools. The teacher surveyed claims that this educational content is used effectively during the preparation, teaching, and evaluation stages of teaching. They were very receptive to the use of educational content in teaching and student's learning. Similarly, students also believe that using this type of educational content is helpful in improving academic achievement and enhance their learning. According to them, the use of educational content is mainly helpful in fueling interest in the subject, inspiring motivation, and facilitating understanding of concepts and content to be learned. Although both teachers and students expressed immense satisfaction with the use of educational content, they also stressed their need for suitable contents that has more variety and therefore enabling great active interaction and participation to the different needs of students.

Key words:

Effectiveness, e-Learning, Educational contents, K-12, ICT.

Introduction

"Content" is defined as all materials that are used for the creature of multimedia software and/or services. Such items include images, photos, voice, film, music, movie, animation, and so on. In particular, multimedia content refers to digitalized text, music, pictures, and graphics stored in a CD-ROM or computer. In other words, it is the information content that can be digitalized, produced, circulated, and consumed using ICT equipment, or those transmitted bidirectionally through a broadband communications network or high-speed data network [1]. Based on this definition, "educational content" can be defined as multimedia data or software that can be utilized for educational purposes as well as various software and

information content that are provided in CD-ROM format or through the Internet for educational purposes. Educational content can be divided further into contents for supporting teacher's teaching activities, for supporting learner's learning activities, and for supporting works related to education in schools in general [2].

In Korea, ICT-based educational content that can be used in primary and secondary schools have been developed and propagated since the 1980s. In fact, the EDUNET System (www.edunet.net), operated by KERIS since 1996 has serviced 1,177,518 educational information (statistics from 2005). Similarly public organizations such as the Metropolitan and Provincial Offices of Education (MPOE) and private companies also provide educational content [3]. In particular, the 2005 Revised "Guidelines for Information and Communications Technology integration in Elementary and Middle Schools" emphasized the use of Information and Communications Technology (ICT) in learning and teaching activities. For example, students create their own work using ICT-based educational content [4], i.e., the development and propagation of educational content as the foundation for using ICT should be activated continuously.

At the same time as the rapid development and propagation of such educational content, studies have been conducted into the educational effects and outcomes of using such content. [5][6][7]. One OECD study surveyed of students aged 15 or older in 15 countries, focused on the purpose, proficiency, and frequency relating to computer use. In Korea, another study investigated the use of ICT-based educational content using indices for analyzing the level of education informatization. In other words, the evaluation and analysis conducted to date focused only on the infrastructure for the use of such content or frequency of their usage; they didn't analyze what kind of educational effect the use of such educational content actually had on student performance.

Therefore, this study analyzed the effectiveness of the use of ICT-based educational content (here in known as "educational content") by examining the awareness and competencies of teachers and students in Korean schools. This paper also sets out map a future direction for developing educational content and presents recommendations on how to promote its use.

2. Survey Details and Methods

2.1 Survey Details

To determine the effects of using educational content on the teacher's teaching and student's learning, this study classified the outcomes of using educational content into outcomes in relation to the teachers and those in relation to the students. The following items were surveyed:

Table 1 : Survey Items

	Item	Major Contents
Teacher	Effect	·Positive changes in the role of the teacher ·Efficiency in preparation, teaching, and evaluation ·Enhancing competency in using educational content ·Contribution to the teacher in terms of teaching ·Contribution to the student in terms of learning
	Satisfaction	·Satisfaction with the use of educational content in teaching ·Intention to continue using educational content
Student	Effect	·Contribution to the improvement of academic achievement ·Contribution to the school course
	Attitude	·Joy of learning, commitment ·Satisfaction

2.2 Survey Design and Method

For the survey, primary and secondary schools in Korea were the population from which respondents were randomly selected, in four stages. In the first stage, 73 schools were selected in proportion to the number of students in each school level (27 elementary schools, 24 middle schools, and 22 high schools). In the second stage, the 73 schools allocated from each school level were reselected considering the number of elementary and middle school students in each of the 15 metropolitan cities and provinces (excluding Jeju Island) for sample collection. For the third and fourth stages, the number of samples were allocated per school and per class, and samples, randomly selected. Thus, 1,076 teachers from 73 elementary and secondary schools and 2,190 4th to 11th grade students(10th, 11th grade means freshman and sophomore in high school), were surveyed. The surveyed data was analyzed using SPSS (V.12) based on the data inspection procedure. The following summarizes the concrete design and development processes of the survey by teacher and student:

Table 2 : Survey Design

Domain	Major Contents	
Universe	Teachers(T) and students(S) in elementary, middle, and high schools in Korea(excluding jeju island)	
Subject	T	Teachers in elementary, middle, and high schools in Korea - Including 1 person in charge of education information (head of the Education Information Division) - Even distribution of teachers in each grade in elementary schools and of teachers in charge of ten major subjects in middle and high schools
	S	4th to 11th graders(from elementary to high school)
Number of samples	T	1,076 teachers from 73 schools (14~16 persons per school level) - Designed into the ratio of 16 elementary school teachers, 14 middle school teachers, and 15 high school teachers
	S	2,190 students from 73 schools - 30 students from each school, 10 students from each grade (for high school students, 13~16 students per grade)
Sampling error	T	±3.0% (95% level of confidence)
	S	±2.1% (95% level of confidence)
Survey method	Self-administered questionnaire (visit to the teacher's office and classroom)	
Survey period	June 29 ~ July 20, 2005	

Portion of the participating teachers were as follows, elementary school teachers(38.2%), middle school teachers(32.2%), and high school teachers(29.6%). Note, however, that this ratio was not significantly different from that of teachers in the population respectively; 41.9%, 27.1%, and 30.9%. A total of 2,190 students responded, 37.0% of whom were elementary students, 32.9%, middle school students, and 30.1%, high school students. Again, this ratio was not significantly different from that of students in the same grade of population respectively ; 36.3%, 33.5%, and 30.2%.[8].

3. Analysis of the Effectiveness of the Use of Educational Content by Teachers

3.1 Positive Changes in the Role of Teachers (can choose 3 from 8 items)

Teachers said that the use of educational content in class “give them ideas for developing other teaching materials or inspiring students’ motivation (76.5%),” “allow them to make learning fun for the class (64.2%),” “let them play the role of a guide for students as they solve problems by themselves (47.0%),” and “eliminate simple tasks such as reading texts and writing on the blackboard (46.1%)”; thus

implying positive changes in the role of the teacher in teaching.

Table 3 : Teachers' Recognition of the Use of Educational Content

%	A	B	C	D	E	F
Elementary	79.9	58.3	45.8	46.8	19.6	28.9
Middle	78.7	65.5	49.1	42.1	23.4	15.2
High	70.8	68.8	46.2	49.5	19.9	15.0
Mean	76.5	64.2	47.0	46.1	20.9	19.7

A: Provides ideas for developing teaching materials and inspiring motivation to study

B: make learning fun for the class

C: guide for students as they solve problems by themselves

D: Eliminates the teacher's simple tasks such as reading texts and writing on the blackboard

E: Increase teachers' effective time usability

F: Reduce the burden of teachers in teaching

More high school teachers responded that the use of educational content in class "allows them to make learning fun for the class (68.8%)" and "eliminates simple tasks during class (49.5%)" compared to elementary school and middle school teachers. On the other hand, more elementary school teachers believed that the use of educational content "reduces the burden of teachers in teaching (28.9%)." This highlights that teachers in different school levels have varying opinions regarding the changes in their role based on the use of educational content.

In terms of teaching experience, teachers with 5 years' experience or less claimed that the use of educational content "gives them ideas for developing other teaching materials or inspiring students' motivation (83.6%)." On the other hand, teachers who have been teaching for 21 years or longer believed that the use of educational content "lets them play the role of a guide for students as they solve problems by themselves (59.7%)." This suggests that teaching experience affects the perception teachers have on the changes in their role based on the use of educational content.

3.2 Efficiency in Preparation, Teaching, and Evaluation

This study also analyzed the perception teachers have on the efficiency realized with the use of educational content at each stage vis-à-vis teaching (preparation, teaching, and evaluation). The teachers responded that using educational content was "efficient for the preparation (93.6%)," "efficient for teaching (90.1%)," and "efficient for evaluation (74.7%)."

Table 4 : Efficiency in Using Educational content

%	During Preparation	During Teaching	During Evaluation
Elementary	95.1	95.6	79.6
Middle	93.3	91.4	73.8
High	92.3	83.4	70.6
Mean	93.6	90.1	74.7

In other words, most teachers used educational content at the preparation stage and effectively incorporated it into their teaching. By school level, the effect of the use of educational content was most pronounced among elementary school teachers.

3.2 Contribution of Educational content to Teaching

When asked how helpful the use of educational content in teaching was, 74.4% of teachers answered "Helpful"; at least 17.1% believed that the use of educational content was "Very Helpful."

Table 5 : Contribution of Educational content

%	Very Helpful	Helpful	Not Very Helpful	Not Helpful
Elementary	19.6	78.2	2.2	0.0
Middle	19.5	74.0	6.2	0.3
High	12.2	71.0	16.2	0.7
Mean	17.1	74.4	8.2	0.3

This suggests that most of the teachers (91.5%) regarded the use of educational content in teaching activities as helpful. In terms of the characteristics of the teachers, those who taught lower grades in small town areas (about 20,000 population) were found to be more receptive to the use of educational content. This implies that educational content used more effective in teaching in elementary schools and in schools in small town areas (rural areas) than schools in cities.

On the other hand, students were asked how specifically the use of educational content helped in their learning. Those who responded that the use of educational content was helpful (n=968) cited "fueling interest in learning (33.7%)" as the biggest reason, followed by "aiding in the understanding of the context of teaching (32.7%)," "convenience in teaching (18.2%)," and "diversification of/flexibility in learning (9.6%)." This mirrors the teachers' perception on educational content, e.g., they were effective in fueling interest and inspiring motivation among students and improving understanding of the context of teaching.

On the other hand, the teachers who believed that the use of educational content was "Not Helpful" (n=77) cited the "inattentiveness of students in class (32.5%)," "ineffective for students in terms of understanding the context of learning (29.9%)," "complexity in preparing for class (22.1%)," and "more focused on teacher's lecture and explanations (15.6%)" as reasons. According to them, the

use of educational content made controlling students and teaching difficult and caused the class to depend heavily on the explanation of the teacher without having any noticeable effect on the understanding of the content of the subject.

3.4 Effect of the Use of Educational content on Teaching and Learning

Teachers were asked how effective teaching using educational content was in relation to the three dimensions of students' learning: 1) Delivering the Concept in the Learning Contents; 2) Increasing Student Participation, and; 3) Enhancing Achievement in Learning.

Table 6 : Effect of Educational content

%	Effect on Delivering the Concept in the Learning Contents	Effect on Increasing Student Participation	Effect on Enhancing Achievements in Learning
Elementary	95.1	85.0	78.5
Middle	90.1	89.8	74.8
High	86.2	81.5	70.5
Mean	90.5	85.4	74.6

At least 90.5% responded "Delivering the Concept in the Learning Contents", with 85.4% answering "Increasing Student Participation." Only 74.6% believed that teaching using ICT-based educational content "enhanced achievement in learning," however. This implies that teachers regard the use of educational content as helpful in encouraging student participation or facilitating understanding of concepts in learning content but not directly helpful in enhancing achievement in learning.

3.5 Teachers' Satisfaction with the Use of Educational content

When asked how satisfied they were with using educational content in class, 87.2% of the teachers answered "Very Satisfactory" and "Satisfactory". By school level, the majority of elementary school teachers gave positive responses; also for teachers in the small town areas (92.9%). At least 25.3% of high school teachers thought otherwise.

Table 7 : Satisfaction over the Educational content

%	Very Satisfactory	Satisfactory	Unsatisfactory	Very Unsatisfactory
Elementary	5.4	91.0	3.4	0.2
Middle	6.5	84.0	9.2	0.3
High	4.0	70.7	24.3	1.0
Mean	5.3	81.9	12.3	0.5

"No suitable content for course progress (61.2%)," "inattentiveness of students in class (53.7%)," "extensive time required for preparation (46.3%)," and "no

facilities/environment for using the content (36.4%)" were cited as the reasons for the negative response. This suggests a lack of quality content to support courses and the teachers' need for strategies for using educational content.

4. Analysis of the Effectiveness of the Use of Educational content by Students

4.1 Degree of Assistance Given to Students Through the Use of Educational content

Fourth to eleventh grade students were asked did the use of educational content helped enhance their academic achievement. At least 80.7% answered "yes", with only 19.3% responding "no".

Table 8 : Degree of Helpfulness in Enhancing Academic Achievement, Facilitating School Learning, or Doing Homework

%	Helpful	Not Helpful	%	Helpful	Not Helpful
Elementary	86.3	13.7	Elementary	84.8	15.2
Middle	77.6	22.9	Middle	78.4	21.6
High	78.2	21.9	High	82.4	17.5
Mean	80.7	19.3	Mean	81.8	18.1

On the other hand, 81.8% believed that the use of educational content was helpful in studying, doing homework, and preparing for examinations. In particular, most of those who regard (n=1,356) the content as helpful claim that it helped "understand difficult contents more easily(41.4%)", "do homework more easily(24.3%)", "improve academic scores(15.7%)", "make studying enjoyable (10.2%)" and "boost confidence in studying (8.2%)".

Table 9 : Degree of Helpfulness in Facilitating School Learning/Preparation for Examination

%	understand difficult contents easily	do homework easily	improve academic scores	make studying enjoyable	boost confidence in studying
Elementary	40.4	24.3	13.4	12.8	9.1
Middle	34.0	26.3	14.7	14.7	10.3
High	49.7	22.5	19.2	3.3	5.3
Mean	41.4	24.3	15.7	10.2	8.2

On the other hand, those who thought that the use of such content was not helpful at all (n=301) cited "Does not help improve academic scores (32.0%)," "Does not help understand the contents of the course(23.8%)," "Other materials are more useful(16.3%)," and "Inconvenient to use(11.3%)" as reasons.

Table 10 : Degree of Unhelpfulness in Terms of Facilitating School Learning/Preparation for Examination

%	Does not help improve marks	Does not help understand the contents of the course	Other materials are more useful	Inconvenient to use
Elementary	25.3	26.4	18.4	12.6
Middle	28.9	25.6	19.8	14.0
High	41.9	19.4	10.8	7.5
Mean	32.0	23.8	16.3	11.3

4.2 Students' Satisfaction with the Use of Educational content

When asked whether they were satisfied with the content, 78.7% of the students answered "yes". More elementary school students in particular were satisfied with the use of educational content (87.0%) compared to those from middle school (75.1%) and high school (74.0%). By gender, more female students were satisfied with the use of this content (80.8%) compared to males (76.8%).

Table 11 : Students' Satisfaction with the Use of Educational content

%	Very Satisfactory	Satisfactory	Unsatisfactory	Very Unsatisfactory
Elementary	20.2	66.8	11.9	1.1
Middle	11.3	63.8	19.4	5.4
High	6.4	67.6	22.3	3.6
Mean	12.6	66.1	17.8	3.3

At least 59.9% of the students claimed that they enjoyed studying more when educational content was used. In particular, more students in lower grades gave a positive response.

On the other hand, to determine the commitment to using educational content, students were asked whether they had experienced studying without noticing the passage of time. At least 66.9% of the students gave a negative answer. This shows that the type of commitment observed in other situation like playing online games, chatting with friends, etc, is almost nonexistent in the use of educational content. The results of the survey showed that teachers and students have high expectations and enthusiasm to use educational content in elementary, middle, and high schools. They also expressed satisfaction with the use of educational content and acknowledged its contribution to teaching and learning. Moreover, expectations and awareness in relation to the effectiveness of such content are high. Nonetheless, educational content were mostly used as a tool for generating interest and inspiring motivation among students and enhancing understanding of the concepts rather than for broadening the experience and perception of students and developing an advanced contemplative faculty. This implies that the importance of developing and promoting the use of educational content

can be effectively encouraged by the active participation of learners in the learning process. There is also a need for greater teacher effort and will to use educational content in this way.

5. Conclusion

To facilitate use of ICT-based educational content in elementary, middle, and high schools, and to have a significant beneficial impact on teaching and learning, as required by the current education system, development of the technology must be geared toward the following.

First, there is a need to develop quality educational content that can effectively improve teaching and learning. The results of the survey suggest that overall expectations in relation to the efficiency and effectiveness of the use of educational content are high. However, the current use of such content more focuses on fueling interest and inspiring motivation among students and enhancing understanding of concepts, less on being suitable for each student's special needs and ability, improving each student's skills or competency, and encouraging the participation of students in the learning process. Therefore, quality educational content that can effectively improve creative thinking skills and productive competency of students based on their needs and ability should be developed.

Second, there is a need to develop content that can encourage the active participation of students in the learning process and improve the learning effect.

Although the expectations and satisfaction of students in relation to the use of ICT-based educational content are high, their enjoyment and commitment to its used is relatively low; hence the need to develop content according to the level and requirements of the learner. Moreover, educational content must include those that were newly composed and developed through active interactions focusing on the involvement and participation of learners instead of simply delivering fragmentary knowledge.

Third, continuous teacher training related to the use of ICT-based educational content is required. How efficiently it is used at the actual site of education is more important than their development. The results of the survey prove that most teachers are receptive to the use of educational content. Nonetheless, continuous promotion on ICT-based educational content, its uses and continuous training are essential to enable teachers to organize the content(data) according to course needs; thus realizing qualitative improvement in the use of educational content.

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