

Teachers' Perceptions and Attitudes of Technology Integration in Korean Classrooms

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Abstract: *Technology is prevalent in our society and technological tools are used in everyday life. Numerous careers require individuals to effectively communicate and use technology and students will need to obtain technology-enhanced skills to stay competitive in the 21st century's global economy. As the importance of using technology in classrooms increases, more research on teachers' competency and attitudes on using technology in their classrooms have been conducted. Teachers' perception of using technology, understanding and learning of technology, and thoughts on support from schools has been studied by researchers. The findings of this research shows that teachers believe that the integration of technology should be a part of their curriculum. This study uses a quantitative approach to observe teachers' attitudes and perception on using technology. A 29-question, five-point Likert scale survey was administered to 118 Korean teachers and this study gives indications of perceptions on using technology in the classroom. The results can inform the general perception and attitudes that Korean teachers have as to how well these teachers are prepared and willing to use technology in their classrooms for the positive effects on students' learning.*

Keywords: technology-integrated lessons, technology, teachers' perceptions

Our world is constantly evolving and it is important to embrace the change. Information can now be obtained and shared easily through technology. As technology is prevalent in our society, technological tools have become an integral part of everyday life. Numerous carriers require individuals to effectively communicate and use technology in all endeavors (Bauer & Kenton, 2005; Sanders, 2009; Suh, 2010; Zhao, 2007). Sanders (2009) found that there was "rapidly emerging awareness in America that technology is not just a ubiquitous component of contemporary culture, but also one of the critical keys to global competitiveness" (p.25). Thus, students will need to obtain technology-enhanced skills to stay competitive in the 21st century's global economy.

As technology advances, education must move towards a system where teachers can prepare students to become active citizens of the society and discerning consumers of information. Implementing national standards in not only for science and mathematics, but also for technology to have increased plans for K-12 connectivity (Lappan et al., 1991; Sanders, 2009). Understanding the implications of using technological tools to achieve educational goals is critical (Baylor & Ritchie, 2002; Lewis, 1999; Savery, 2002; Zhao, 2007). Therefore, teachers must receive the training necessary to properly incorporate technology into their classrooms to help students to pursue careers and understand technology related issues in the workforce.

Not only do students need the knowledge and capabilities in technology to survive in the job markets, but they also need a positive attitude towards using and learning technology. A recent study noted that students recognized technology as the most popular subject (Jenkins, 2006; Rees & Noyes, 2007; Savery, 2002). Students' out of schools lives are richer in communication and information technology than their in school lives, and Jenkins (2006) shows that many students prefer to work with new technology because it is interesting and beneficial to living. These study results support incorporating technology in instructional methods.

As the importance of using technology in classrooms increases, more studies on teachers' competency and attitudes on using technology in their classrooms have been conducted. This study used a quantitative approach to examine teachers' attitudes and perception on using technology. The findings may help to increase public awareness about teachers' perceptions of using technology in education as well as to help educators to appreciate the importance of a technology-integrated curriculum.

Literature Review

Science, technology, engineering, and mathematics (STEM) is everywhere in our life. Technology, especially, changes of how people interact and learn in amazing ways. Society has changed to require citizens to have higher levels of STEM literacy to make decisions about complex issues (Ching, Basham, & Planfetti, 2005; Sanders, 2009). In addition, many careers require technological skills to thrive in a globally competitive world (Lewis, 1999; Ahao, 2007). Thus, education will need to give opportunities for students to gain adequate technology integrated educational experiences.

The decrease in the cost of technology has allowed many schools to implement technology into their curriculum and classrooms. This has made technology more accessible for a larger number of students (Barak, Lipson, & Lerman, 2006; Hollenbeck & Fey, 2009; Suh, 2010). "Many middle-grades mathematics classrooms already provide an impressive array of technological tools. In some schools, access to tools is the easy part" (Hollenbeck & Fey, 2009, p. 431), which results in students having access to computer software programs, graphing calculators and other sophisticated technology. Students do not have to use scientific rulers to calculate and compute mathematics (Dix, 1999; Hollenbeck & Fey, 2009, Suh, 2010). Thus, understanding the implications of using this available technology is important to achieve educational goals.

Many studies demonstrate that implementing technology properly enhances both learning experiences and academic performance (Dix 1999; Hollenbeck & Fey, 2009; Lavin, Korte & Davis, 2010). Finding the best way to integrate technology in classrooms is important. In addition, teachers can determine what technologies best suit learning goals by concentrating on the learning outcomes of students (Jurist, 1999; Lewis, 1999). To provide best learning experiences, which will eventually result in positive performance, choosing appropriate technology is needed.

Although many studies show positive results of incorporating technology in the curriculum, many teachers fail to capitalize on the myriad of learning possibilities that technology provides. The National Council of Teachers of Mathematics (NCTM) (which country?) standards illustrate how effective skills, knowledge, and attitudes are developed when technology integrated instructions are employed by teachers (Lappan et al., 1991). However, many teachers are challenged by NCTM's standard because they have limited time and training to infuse appropriate technology into their classrooms. Some teachers even have

limited choices of technology depending on their school environment (Hsu, 2010; Savery, 2002; Zhao, 2007). Not only for these reasons mentioned, but many other factors affect teachers' use of computers in their classrooms.

As there are multiple reasons for teachers' resistance toward the use of technology, these barriers should be closely looked at. There are many standards and topics to cover in secondary classrooms; thus, time scheduling for technology use may be a barrier in teachers' quest to incorporate technology (Lewis, 1999; Rees & Noyes, 2007). Not only time management and resources can become barriers in the curriculum, but also intrinsic forces such as practices, attitudes, and beliefs can be barriers (Baylor & Ritchie, 2002; Hong & Noh, 2002). Therefore, looking at teachers' perceptions is important.

Teachers' perception of using technology, understanding and learning of technology, and thoughts on support from their school has been studied by researchers. The findings of the research show that teachers believe that integrating technology should be a part of their curriculum (Ching, Basham, & Planfetti, 2005; Lappan et al., 1991). However, some studies showed gender differences on thoughts of teachers in using technology in their instruction. Male teachers were less anxious toward the use of hardware, but there was no significant difference in overall computer anxiety levels found among female and male teachers (Hong & Koh, 2002; Rees & Noyes, 2007). Thus, teachers' perspectives may be different according to gender.

Regardless of the gender differences of teachers, teachers who were skilled and well educated with technology were innovative at overcoming obstacles and used technology as both a teaching and learning tool (Bauer & Kenton, 2005). However, they did not use technology consistently, and the researchers pointed out that schools were not ready for a true integration of technology (Bauer & Kenton, 2005; Hong & Noh, 2002). This result shows that teachers may be competent using technology, but may need more help for successful technology integration.

Although there are many barriers that prevent teachers from integrating technology in their classrooms, there are positive perspectives of teachers on using technology for students' interest and motivation. Technology integrated lessons for active learning kept students more focused, motivated, and engaged in lessons (Barak, Lipson, & Lerman, 2006; Hollenbeck & Fey, 2009; Suh, 2010). In addition, technology changes teachers' teaching because the lessons become more student-centered compared to direct teaching (Jurist, 1999). Not only did students become collaborative learners from passive learners, but also teachers changed their roles. Thus, the lesson can be enhanced to inquiry and investigation instead of the traditional learning style.

Methodology

Participants

The research was conducted with 118 elementary and secondary school teachers who attended Busan National University of Education in South Korea while 112 Korean teachers answered all the questions on the survey. Participants for this study consisted of teachers holding different degrees including bachelor's, master's, and Doctor of Philosophy degrees. There were some beginner teachers but most participants had been teaching for more than 10 years. The teaching experience in years varied from less than a year to 35 years. In terms of ethnicity, all of the participants were Asian. There were 58 males and 52 females. Teachers

taught multiple subjects such as English, Mathematics, Science, Arts, Music, Social Studies, and Ethics.

Instrument

A survey was administered to the teachers in a methods class and the participants took the survey for 30 minutes where they had enough time to think and answer all of the questions carefully. The researchers made the survey, which was based on literature reviews. The survey questions consisted of 33 Likert-scale type, which measured participants' attitudes and perceptions toward incorporating technology in their classrooms (1= "least like them," 2=" less like them," 3=" somewhat like them," 4= "more like them," 5=" most like them").

To look at teachers' background variables, items "Gender: Male or Female," "Current degree level," "Total teaching experience in years," and "what grade level do you currently teach" were measured. To measure teachers' perception on their technology proficiency, the following items were measured: "I am familiar with instructional technology," "I have adequate time to learn technological skills," "I understand the nature of technology systems," "I had adequate training in using educational technology," "I am comfortable using technology during classroom instruction," "I understand the legal, ethical, cultural, and societal issues related to technology," "I can choose technology resources," "I can use content-specific technology tools (e.g., software, graphing calculators, web tools, etc.) to support learning," "I can use technology to facilitate academic learning," "I can use technology to engage students in learning," "I can use technology to motivate students to learn," and "I can help others solve technology problems."

While the researchers measured teachers' background variables and perceptions, they also measured several of the following items to look at teachers' attitudes toward technology use: "Technology is useful in teaching," "Technology skills are essential to my students," "I avoid the use of technology whenever possible," "Technology based instruction is just another fad," "More training would increase the use of the technology in classrooms," "Technology should be incorporated into the classroom curriculum," "The use of technology furthers the gap between students along socio-economic lines," "Technology enhances classroom instruction," "I would recommend technology usage for instructional purposes to other teachers."

The last set of items on the survey were measured to see how often teachers integrate technology in their classrooms for the following purposes: "small group instruction," "individual instruction," "to tutor," "to promote student-centered learning," "as a research tool for students," "as a classroom presentation tool," "as a communication tool," and "as a productivity tool."

Procedure

In order to determine teachers' perceptions and attitudes on using technology in their classrooms, a quantitative study was selected. To have a wide range of perspectives on specific ideas in a short period of time, a quantitative study fits best. Researchers used SPSS 23 to organize the data and to run descriptive analysis for all the participants that completed the survey. Researchers also performed one-sample *t*-tests about teachers' perceptions and attitudes. In addition to the descriptive analysis, the researchers found the mean and standard deviations for female and male only to see if there were any differences existing by gender. The responses on the survey were used to investigate perceptions and attitudes that teachers have on incorporating technology into their lessons.

Results

As the survey was originally designed, there were 3 factors: teachers' background, teachers' perception, teachers' attitude, along with the frequency of the use of technology. However, the researcher did not composite the variables to get the mean of each factor. Instead, the mean and standard deviations were measured on individual items to look at specific aspects.

To observe teachers' proficiency, perceptions, and attitudes of technology, descriptive analysis was used. The mean score for all of the participants on the 15 perceptions and attitude questions out of 18 were over 3.00. Six of the items showed a mean of more than 4.00 (see Table 1). Teachers strongly agreed that they could use technology to motivate students to learn (=4.21) and engage students in learning (=4.14). Mean scores ranged from 2.04 to 4.21 and the standard deviation differed from 0.66 to 1.12. Moreover, one sample *t*-test for teachers' survey scores revealed a statistical significance in all of the items (see Table 1).

Table 1. Means, Standard Deviations, and Statistical Significance of Survey Scores

Items	N	Mean	SD	Sig. (2-tailed)
1. I am familiar with instructional technology.	112	4.14	.837	< .001*
2. I have adequate time to learn technological skills	112	3.63	.977	< .001*
3. I understand the nature of technology systems.	112	3.77	.805	< .001*
I had adequate training in using educational technology.	112	3.40	1.043	< .001*
I am comfortable using technology during classroom instruction.	112	3.94	.852	< .001*
I understand the legal, ethical, cultural, and societal issues related to technology.	112	3.80	.911	< .001*
I can choose technology resources.	112	4.05	.837	< .001*
I can use content-specific technology tools (e.g., software, graphing calculators, web tools, etc.) to support learning	112	3.96	.799	< .001*
I can use technology to facilitate academic learning.	112	4.01	.717	< .001*
I can use technology to engage students in learning.	112	4.14	.708	< .001*
I can use technology to motivate students to learn.	112	4.21	.659	< .001*
I can help others solve technology problems.	112	3.71	.915	< .001*
Technology based instruction is just another fad.	112	2.04	.929	< .001*
More training would increase the use of the technology in classrooms.	112	4.16	.766	< .001*
Technology should be incorporated into the classroom curriculum.	112	2.86	1.122	< .001*
Technology enhances classroom instruction.	112	3.88	.737	< .001*
I would recommend technology usage for instructional purposes to other teachers.	112	3.70	.826	< .001*
The use of technology does not further the gap between students along socio-economic lines.	112	2.30	.948	< .001*

* Significant at $p < .05$

To understand the center and the spread for each variable and to determine how often a teacher uses technology for certain purposes, descriptive statistics analysis was performed. Most of the teachers answered that they use technology as a presentation tool (=4.05). Teachers often used technology to promote student-centered learning (=3.63). Teachers also used technology as a productivity tool such as creating charts and reports (=3.80) and as a communication tool such as discussions and email (=3.53). In addition, they have integrated technology in their classrooms to use it as a research tool for students (=3.41). However, teachers seemed to not use technology much to tutor students (=2.81). Moreover, standard deviations were relatively the same between all pre and post survey scores (See Table 2).

Table 2. Means and Standard Deviations of Frequency in the use of different purposes

Questions	N	Mean	SD
Small group instruction	112	3.31	.711
Individual instruction	112	3.12	.857
To tutor	112	2.81	.925
To promote student-centered learning	112	3.63	.724
As a research tool for students	112	3.41	.855
As a classroom presentation tool	112	4.04	.722
As a communication tool (e.g., discussions, email, phone)	112	3.53	.995
As a productivity tool (e.g., creating charts, reports, etc.)	112	3.80	.837

Discussion and Conclusion

Results show that both male and female teachers at Busan National University of Education have high self-perception of competency to use technology in their classrooms. Previous research states the importance of teachers' competence of technology to be able to choose appropriate technology and incorporate it into classrooms (Lewis, 1999; Hong & Noh, 2002; Hsu, 2010). Results also revealed that teachers integrate technology in their classes with different degrees and purposes despite the barriers that prevent them from integrating technology in their teaching, which is consistent with previous research.

As Hollenbeck and Fey (2009) stated that more technologies are available for teachers and schools to incorporate in their curriculum, the results also showed that teachers could often choose technology resources. These research findings match with previous literature stating that the teacher is an important factor for successful integration of technology in classrooms. When teachers are able to choose appropriate technology that matches with learning goals, teachers are able to provide student-centered and better learning environments.

Technology integrated lessons allowed students to be more focused, motivated, and engaged in lessons (Barak, Lipson, & Lerman, 2006; Hollenbeck & Fey, 2009; Suh, 2010). Teachers scored high on the perception of how they can use technology not only to engage, but also to motivate students in learning. Because students prefer and have positive attitudes towards having technology-integrated lessons, teachers should incorporate technology into their classrooms.

The mean for the item, "Technology should be incorporated into the classroom curriculum" was 2.86 with the standard deviation of 1.122. This shows that teachers use technology to facilitate and deliver instruction but do not often integrate technology into

teaching. As previous research tells one how important it is to understand the implications of using available technology to achieve educational goals and outcomes, researchers recommended having workshops on realizing the importance of technology integration.

Although research had concerns on how teachers would not have available technology in their schools, the results did not match with these concerns. Teachers scored relatively high on being able to choose technology and being able to use content-specific technology resources. However, teachers scored low on the belief that the use of technology does not further the gap between students along socio-economic lines. This shows that the school would need to have enough technology available for all the students to make sure no student is left behind from not having the benefit of using technology in class.

Professional development opportunities are important to allow teachers to discuss and share ideas to integrate technology effectively and successfully. The results show teachers need more positive attitudes on incorporating technology into the classroom curriculum. Teachers may not have enough time to incorporate technology because they already have many standards to cover in a given school time, which may result in negative attitudes toward incorporating technology. Thus, encouraging collaboration among teachers to share ideas and teaching strategies may help teachers to increase positive thoughts on technology integration so students can benefit from technology integrated lessons.

Overall, researchers highly recommend enhancing teachers' technology integration abilities and skills through workshops about its effectiveness in classrooms for teachers to gain positive minds on technology integration. In addition, providing teachers with extra time to plan technology incorporated lessons will help teachers to effectively implement technology in their classrooms. Moreover, it is very important to investigate the technology-incorporated lessons in relationship to curriculum goals and outcomes.

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Appendix

Survey Questions

Technology used in classrooms include but not limited to the following: graphing calculator, video, cell phones, blogging, spreadsheets, word processors, presentation software, games, tutorials, programming, online newspaper, computer, TV, projector, internet, video, electronic mail, 3D-model, and software program.

<i>Teachers' Background Variables</i>
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Please check where it best reflects you.

Gender: Male Female

Current degree level:

Bachelors

Masters

Doctorate

Total teaching experience in years: _____

What grade level do you currently teach?

Elementary School Middle School High School

Teachers' Perception on their Technology Proficiency					
Please rate your skills regarding the following topics (1 represents the lowest level, while 5 represents the highest).	1	2	3	4	5
I am familiar with instructional technology.					
I have adequate time to learn technological skills.					
I understand the nature of technology systems.					
I had adequate training in using educational technology.					
I am comfortable using technology during classroom instruction.					
I understand the legal, ethical, cultural, and societal issues related to technology.					
I can choose technology resources.					
I can use content-specific technology tools (e.g., software, graphing calculators, web tools, etc.) to support learning.					
I can use technology to facilitate academic learning.					
I can use technology to engage students in learning.					
I can use technology to motivate students to learn.					
I can help others solve technology problems.					
Attitudes toward Technology Use					
Please rate your level of agreement. (1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree).	1	2	3	4	5
Technology is useful in teaching.					
Technology skills are essential to my students.					
I avoid the use of technology whenever possible.					
Technology based instruction is just another fad.					
More training would increase the use of the technology in classrooms.					
Technology should be incorporated into the classroom curriculum.					
The use of technology furthers the gap between students along socio-economic lines.					
Technology enhances classroom instruction.					
I would recommend technology usage for instructional purposes to other teachers.					
Integration of Technology into Classrooms					
Please rate how often you use technology for the following purposes in your classroom (1=Not at all 2=Rarely 3=Sometimes 4=Often 5=Everyday).	1	2	3	4	5
Small group instruction					
Individual instruction					
To tutor					
To promote student-centered learning					
As a research tool for students					
As a classroom presentation tool					
As a communication tool (e.g., discussions, email, phone)					
As a productivity tool (e.g., creating charts, reports, etc.)					