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Instructional Predictors of Students' Technology Standards

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ABSTRACT

This paper assessed the students' technology standards as influenced by instructional system that is supportive of IT. A self-survey on technology standards and perception of the school's instructional system was utilized to gather the quantitative data. The survey was conducted among the 568 undergraduate and graduate students of a higher education institution. Interviews to selected respondents were also conducted to qualitatively support the quantitative results. The data analyses revealed that the students have a moderate perception on the instructional system that is supportive of IT. Students' self-assessment showed an average or moderate technology standard. The correlation analyses ascertained a significant relationship between the school's instructional system that is supportive of IT and the students' technology standards.

Keywords: technology standards, instructional system, technology

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INTRODUCTION

Standards are valuable in assessing technology integration to the extent that they provide reference points for measurement rubrics or lists of authentic and observable performances that demonstrate the use of technology in context. Standards set measurable goals for technology integration; they do not assign value positions to the results of measurement. The issue of the desirability of technology integration relates to the links between technology adoption and educational or management outcomes.

In order to obtain measures for the indicators of technology standards and integration, the Technology in Schools Task Force has looked for standards that might provide criteria to which behaviors and practices could be compared. Standards for proficiency in the use of technology by students, teachers, and administrators have been mapped through the work of the International Society for Technology in Education (ISTE) and other national groups. ISTE(2004) specify a desired performance profile for technology-literate students, teachers and administrators. Schools can examine these performance standards to determine measures of skills with technology.

Technology Standards are the sets of criteria to which behaviors and practices on the use of technology by students, teachers and administrators could be compared. As used in the study, these standards have been mapped through the work of ISTE National Educational Technology Standards (NETS) project. For students, standards are set based on (1) Basic operations and concepts, (2) Social, ethical, and human issues, (3) Technology productivity tools, (4) Technology communication tools, (5) Technology research tools and (6) Technology problem-solving and decision-making tools.

Technology can provide teaching and learning opportunities that were previously unavailable. To understand the relationship between technology and education, several principles are in order. First and foremost is that the success or failure of technology depends more on human factors than it does on hardware or software. According to Sheingold (1991), it is now well understood that the challenge of integrating technology into schools and classrooms is much more human than it is technological. Means (1993) mentioned in her paper that the instructional value of technology lies in the way that it is used and in the activity structure that surrounds it, rather than in the hardware or software itself. Jones (2000) found that technology's effectiveness is dependent on the learning environment in conjunction with the capabilities of the software and hardware to perform tasks one could not do otherwise. They also reported that the success or failure of technology-enabled learning

experiences often depends on whether the software design and instructional methods surrounding its use are congruent and on the appropriate match between the technology application and the reform readiness of the setting in which it is being used.

The types of technology resources that give students access to curricular content are expanding. Curriculum and technology will play an unquestionably crucial role in the futures of individual children and our world. Experts from many disciplines advise that technology should and could play an important role in curriculum planning, development, delivery, assessment, and administration (Wisconsin, 1995).

Linda Roberts as cited by Trotter (1997) summarized literature addressing how technology can be used in various content areas. She indicated that teachers and students will need to know how to select and use electronic resources that provide (i) the core content for a giver curricular area, (ii) the interactive supports that adapt content to individuals' developmental and/or learning style needs, and (iii) modifiable tools that allow teachers and students to adjust technology resources to meet individual learner needs and interests.

Establishing priorities where technology can make curriculum and instruction more engaging, relevant, and successful requires school improvement planners to make a number of decisions. Topmost are two concerns, both of equal weight. One is deciding where and how technology in curriculum and instruction can be most effective. Studies reveal that the use of electronic, interactive technologies as learning tools can make a significant difference in, among other things, student achievement and learner motivation. The second decision is how to respond best to society's demands for technology literacy (Reinking & Dridwell-Bowles, 1996).

RESEARCH PARADIGM

Figure 1 shows the hypothesized relationship between the instructional system that is supportive of IT and the students' technology standards. The former is the independent variable and the latter is the dependent variable.

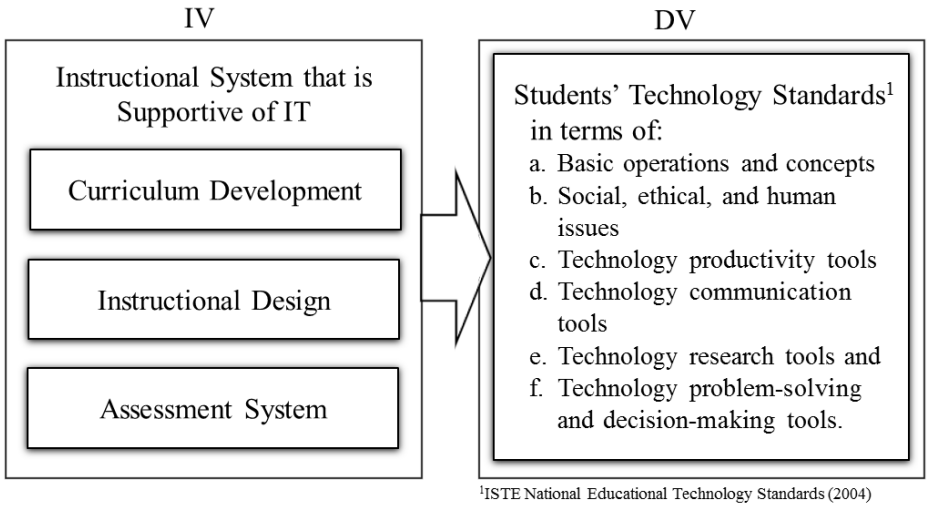

Figure 1. Conceptual Framework

OBJECTIVES OF THE STUDY

The study aimed to assess students' technology standards as influenced by instructional system that is supportive of IT. Specifically, this sought to answer the following research questions:

1. How do students perceive the instructional system that is supportive of IT in terms of:
   a. Curriculum development
   b. Instructional design, and
   c. Assessment system
2. How do students perceive their technology standards in terms of:
   a. Basic operations and concepts
   b. Social, ethical, and human issues

c. Technology productivity tools
d. Technology communication tools
e. Technology research tools and
f. Technology problem-solving and decision-making tools.

3. How significant is the relationship between the instructional predictors of IT and students' technology standards?

METHODOLOGY

The participants of the study were 568 students from the seven collegiate departments and the Graduate School of a higher education institution where the study is conducted. This is 50% of the randomly sampled students from the identified total population of third year to fifth year undergraduate students and graduate students (who have at least 2 semesters of residency) in the said school.

The quantitative data were obtained from a researcher-made survey questionnaire. To assess students' technology standards, items from the ISTE National Educational Technology Standards (2004) were adopted. The second part of the questionnaire was used to assess the instructional system that is supportive of IT in terms of curriculum development, instructional design and assessment system. This instrument was submitted to experts for their comments and suggestions for validation. Both parts of the survey were subjected for reliability testing among 20 students who were not included as subjects of the study. The reliability coefficients obtained for students'technology standards is 0.67 while the coefficients for instructional system that is supportive of IT in terms of curriculum development, instructional design and assessment systems are 0.79, 0.84 and 0.76, respectively. These values are all are all greater than the acceptable coefficient of 0.65.

Permission to gather data was requested by the researcher from the College President and Deans of Academic Affairs and Graduate School prior to administration of the questionnaire.Interviews were also conducted to qualitatively support the quantitative results.

Descriptive statistics such as the mean was used to answer research questions 1 and 2. A criterion which served as the basis for the interpretation of the mean ratings is as follows: 4.51 – 5.00 (Very high); 3.51 – 4.50 (High); 2.51 – 3.50 (Moderate); 1.51 – 2.50 (Low); 1.00 – 1.50 (Very low). For testing significance of the relationships between the dependent and independent variables of the study, Simple Correlation Analysis was used. The significance level was set at 0.05. To interpret the r-values, the following scale was used: 0.00 – 0.19 (very low correlation); 0.20 – 0.39 (low correlation); 0.40 – 0.69 (moderate/marked correlation); 0.70 – 0.89 (high correlation); 0.90 – 1.00 (very high correlation).

RESULTS AND DISCUSSION

Table 1: Mean Distribution of the Students' Perception on Instructional System that is Supportive of IT

Variables	Sample Item	Mean	Descriptive Interpretation
Curriculum Development	*The design of the curriculum is driven by the goals and performance indicators for student learning in technology that has been defined by the school or as required by the Commission on Higher Education (CHED).*	3.32	Moderate
Instructional Design	*Applications of technology are incorporated in the design of teaching strategies to make learning activities more meaningful and relevant to students.*	3.26	Moderate
Assessment System	*Information Technology resources are employed to expand and strengthen the system of assessing student learning.*	3.24	Moderate
	Overall Mean	**3.27**	**Moderate**

Table 1 shows the mean distribution of the students' perception on instructional system. As can be gleaned from the table, it was rated at the moderate extent. According to some respondents, their curriculum could support what they need to learn with technology and that they are usually assessed using technology. They also say that they are given provisions to use computer laboratories during lectures and discussions. This further implies that the students are satisfied with the school's instructional system though they are also looking forward for a more improved provision for technology in the instructional system. The endpoint of all interventions done for technological improvement through improved instructional system is better student achievement. As mentioned by Reinking & Dridwell-Bowles (1996), establishing priorities can make curriculum, instruction or assessment more engaging, relevant, and successful requires school improvement planners to make a number of decisions – deciding where and how technology in curriculum and instruction can be most effective and how to respond best to society's demands for technology literacy.

Table 2: Mean Distribution of the Students' Technology Standards[1]

Variables	Sample Item	Mean	Descriptive Interpretation
Basic Operations and Concepts	*Demonstrate a sound understanding of the nature and operation of technology systems.*	3.00	Moderate
Social, Ethical and Human Issues	*Understand the ethical, cultural, and societal issues related to technology such as censorship, copyright, data privacy and security.*	3.34	Moderate
Technology Productivity Tools	*Use technology tools to enhance learning.*	3.48	Moderate
Technology Communication Tools	*Use telecommunications to collaborate, publish and interact with peers, experts, and other audiences*	3.27	Moderate
Technology Research Tools	*Use technology to locate, evaluate and collect information from a variety of sources*	3.26	Moderate
Technology Problem-solving and Decision-making Tools	*Use technology resources for solving problems and making informed decisions.*	3.05	Moderate
	Overall Mean	**3.23**	**Moderate**

[1]*ISTE National Educational Technology Standards (2004)*

Presented in Table 2 is the mean distribution of students' technology standards. The overall mean of 3.23 indicates that the students have moderate or average technology standards. It can also be seen on the table that the respondents have much to improve when it comes to basic technological operations and concepts. This is shown by the lowest mean score for basic operations and concepts (3.00). This further reveals that students have moderate understanding of the nature and operation of technology systems. They also would like to be trained to be more proficient in the use of technology. Though they need to improve in this aspect they show such willingness for acquiring proficiency as they use technology tools like the internet to enhance learning. This is shown by the highest mean rating of 3.48 on technology productivity tools.

Table 5: Summary of r-values

IV: Instructional System that is Supportive of IT	DV: Students' Technology Standards	
	r	r^2
Curriculum Development	0.682*	0.4651
Instructional Design	0.654*	0.4277
Assessment System	0.612*	0.3745

df = 567 critical value = 0.195 *significant at 0.05 level

Correlation made on students' perception on technology standards and instructional system that is supportive of IT revealed a significant relationship as presented in Table 3. All the computed r-values are greater than the critical value. The table also shows a moderate degree of relationship between all the independent variables and dependent variable. Moreover, it can also be gleaned from the table that instructional system accounted for 37.45% to 46.51% on the variation of students' technology standards. This implies that the students' technology standards are reasonably influenced by the school's instructional system specifically by its curriculum practices. As according to Braid and Tuazon (1998), it is important that technology be integrated throughout the curriculum and instruction, and not simply to impart technology-related knowledge and skills. It is important to distinguish between technology as a subject area and the use of technology to facilitate learning which will eventually influence students' technology knowledge and skills.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, it can be concluded that students have a moderate perception on the instructional system that is supportive of IT. Their self-assessment revealed average or moderate technology standards. Concomitantly, the school's instructional system that is supportive of IT is significantly related to students' technology standards.

In as much as the instructional system predicts students' technology standards, it is therefore imperative that the school should ensure effective integration of technology within the curriculum, instructional design and assessment system. The school should be committed to the on-going evaluation and revision of the curriculum taking into account the learning needs and interests of the students without compromising the standards students are expected to achieve related to technology which should be clearly communicated to students and the community. On the other hand, teachers should warrant that the applications of technology are incorporated in the design and implementation of teaching strategies to make learning activities more meaningful and relevant to students. Technology should be used to motivate students to learn, to present the lesson, to enrich students' learning as well as remedy students' learning difficulties. In addition, high quality assessments should be employed to evaluate students' achievement of the essential technology knowledge and skills.The result of which should be clearly communicated to students and parents.

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