The Readiness on the Implementation of the Special Program for Information and Communication Technology

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The study evaluated the implementation of the Special Program for Information and Communication Technology (SP-ICT). Two hundred seventy teachers and forty-six school heads involve in the implementation of the program for the last three years served as respondents. Data were gathered by using a questionnaire. Data were statistically analyzed to determine what variables predict the extent on the implementation of the special program for ICT. Results revealed that the older the teacher, the more they are likely to be ready in the implementation of the SP-ICT as far as instructional supervision, manpower and learning resources are concerned. Young school heads with low educational backgrounds were found to have equipped with modern day technological knowledge and application. School and teachers' readiness in the implementation of SP-ICT were significantly correlated. Their readiness was significantly correlated to the extent of implementation of SP-ICT in terms of planning and implementation. Furthermore, research found out that technological knowledge and technological pedagogical knowledge were statistically significant predictors of planning the implementation of SP-ICT.

Keywords: computer education, special program for ICT, technology readiness, technology self-efficacy

INTRODUCTION

The integration of Information and Communication Technology (ICT) in the teaching learning process gives great impact in the development of education among learners. The role of education contributes meaningfully in achieving quality education. The transformation of knowledge, skills and attitudes through the integration of ICT creates positive impact in the teaching learning process. The position of ICT as a mechanism or agent of social change and social development is widely accepted in today's society. It needs to change from time to time to ensure its own stability and growth. The education system needs to be updated from time to time in order to implement the necessary changes in order to deal with the new technology in society. The system should be more realistic than just theoretical knowledge (Thamarasseri, 2014). Practical information should be given rather than learning just abstract aspects. The use of ICT creates a powerful learning environment and transforms the learning and teaching process in which students engage knowledge in an involved, self-directed and constructive manner (Stosic et al. 2020).

ICT is not only seen as a tool that can be applied to current teaching methods, but as an important tool to support new ways of teaching the learning process. In the 21st century, the word "technology" is an important issue in many areas, including education. Technology incorporation has now gone through developments and transformed our cultures, which have fundamentally changed the way people think, work and live (Yumurtaci, 2017). In this sense, schools and other educational institutions that are to prepare students to live in a "information society" need to include ICT inclusion in their curriculum (Hernandez et al, 2019; Hero, 2020). The rapid growth of ICT has brought dramatic changes to various fields. The use of ICT in education is seen as a teaching and learning tool, and as an important means of administrative organization.

In school year 2017, the Schools Division of Nueva Ecija under the Department of Education, started the implementation of the Special Program for Information and Communication Technology Curriculum (SP-ICT) in the elementary level. It aims to help students become competent, confident, responsible and critical users of ICT by making efficient, effective and creative use of basic software and hardware in their everyday classroom activities. It also encourages the students to develop the appropriate skills that are essential for cooperative, collaborative and independent lifelong learning by using ICT and develop the full potential of students in technology to prepare them in life. However, in reference to 2014 UNESCO Institute for Statistics, on their study of Information and Communication Technology (ICT) in Education in Asia, revealed that there seems to have no data yet for public school teachers teaching using ICT. Only two percent of the public-school teachers in this locale of the study were trained to use ICT.

Integrating and implementing a special program about technology in the curriculum can help to improve the teaching learning process. Innovative and manipulative learning resources, modern teaching strategies, contextualized and localized materials, understanding diversity of learners and technology-oriented school personnel and staff contribute to the successful implementation of the special program. However, despite of the ongoing implementation of SP-ICT program for the last three years, there are still issues and concerns that need to be addressed which can be used for policy formulation and basis for future ICT related researches. Lack of facilities and learning materials, insufficient number of computer units, untrained school heads and teachers are some of them. Every aspect of the program should be planned effectively as to the readiness of the personnel involved, materials and resources needed during the implementation of the program.

METHODS

Using total sampling, the study covered the public elementary schools in the Division of Nueva Ecija, Philippines that offers -ICT. These schools include 46 school heads and 276 teachers handling SP ICT classes for the last three years were selected as respondents. However, a total of 270 teachers only responded to the research questionnaire. The descriptive-correlation research design was utilized to establish the relationship between teachers and schools' readiness in the implementation of the program. Teachers 'readiness in terms of curriculum, facilities, administration and instructional supervision, manpower resources and learning resources and schools' readiness which includes the TPACK self-efficacy namely, technological knowledge, content knowledge, pedagogical knowledge, technological content knowledge, pedagogical content knowledge, technological pedagogical knowledge and technological pedagogical content knowledge were measured by frequency counts, percentage distribution and mean based on the extent of their readiness in terms of technology, pedagogy and content knowledge as integrated in the SP-ICT program.

Conversely, extent on the implementation of the SP-ICT program on planning and implementation was measured by the rubric of technology integration observation instrument, developed by Hofer et al. (2011) still be utilized using frequency counts, percentage distribution and mean. Pearson product moment correlation was used to find out the significant relationship between teachers and schools' readiness and extent of the implementation of the program. Moreover, multiple linear regressions were applied to find out specific variables that predict the extent on the implementation of the special program for ICT.

RESULTS

The Inter-Correlation of Schools' and Teachers' Readiness on the Implementation of Special Program for Information and Communication Technology (SP-ICT)

Table 1 presents the intercorrelation between perceived schools and teachers' readiness on the implementation of special program for information and communication technology. Based on the results, school and teachers' readiness in the implementation of SP- ICT are significantly positively correlated at 0.01 level of significance. Specifically, curriculum is significantly positively correlated to technological knowledge, (r=.457); content knowledge, (r= .556); pedagogical knowledge, (r= .564); technological content knowledge, (r= .472); pedagogical content knowledge, (r= .557); technological pedagogical knowledge, (r= .529) and technological, pedagogical and content knowledge, (r= .576).

TABLE 1
INTERCORRELATION BETWEEN THE PERCEIVED SCHOOLS AND TEACHERS' READINESS IN THE IMPLEMENTATION OF THE SPECIAL PROGRAM FOR INFORMATION AND COMMUNICATION TECHNOLOGY (SP-ICT)

TEACHERS' READINESS (TPACK SELF-EFFICACY)							
SCHOOLS' READINESS	**TK**	**CK**	**PK**	**TCK**	**PCK**	**TPK**	**TPCK**
Curriculum	.457**	.556**	.564**	.472**	.557**	.529**	.576**
Facilities	.505**	.584**	.602**	.474**	.558**	.560**	.545**
Administration and Instructional Supervision	.486**	.541**	.609**	.515**	.564**	.565**	.602**
Manpower	.382**		.445**	.383**	.456**	.423**	.465**
Learning Resources	.444**	.483**	.554**	.490**	.550**	.527**	.494**

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

On the other hand, the variable on facilities is significantly positively correlated to technological knowledge, (r=.505); content knowledge, (r= .584); pedagogical knowledge, (r= .602); technological content knowledge, (r= .474); pedagogical content knowledge, (r= .558); technological pedagogical knowledge, (r= .560) and technological, pedagogical and content knowledge, (r= .545). In terms of administration and instructional supervision, it is significantly positively correlated to technological knowledge, (r=.586); content knowledge, (r=.541); pedagogical knowledge, (r= .609); technological content knowledge, (r= .515); pedagogical content knowledge, (r= .564); technological pedagogical knowledge, (r= .565) and technological, pedagogical and content knowledge, (r= .602). Moreover, the variable on manpower resources is also significantly positively correlated to technological knowledge, (r=.382); content knowledge, (r= .435); pedagogical knowledge, (r= .445); technological content knowledge, (r= .383); pedagogical content knowledge, (r= .456); technological pedagogical knowledge, (r= .423) and technological, pedagogical and content knowledge, (r=.465). Furthermore, the readiness of the schools and teachers in terms of learning resources is also significantly positively correlated to: technological knowledge, (r=.444); content knowledge, (r= .483); pedagogical knowledge, (r= .554); technological content knowledge, (r= .490); pedagogical content knowledge, (r=.550); technological pedagogical knowledge, (r= .527) and technological, pedagogical and content knowledge, (r= .494).

Inter-Correlation Between Respondents' Socio-Demographic Profile and Extent of Implementation Of SP-ICT on Planning and Application

Depicted on Table 2, the results of the intercorrelation between respondents' socio- demographic profile and extent of implementation of SP-ICT in terms of planning and application. It reveals that respondents' designation, education and length of service are significantly correlated. Specifically, designation is significantly negatively correlated to planning (r= -.222) and application (r= -.162) at 0.01 level of significance. Furthermore, education is also significantly negatively correlated to planning (r= -.221) and application (r= -.199). Similarly, length of service of respondents is significantly negatively correlated to planning (r= -.145) and application (r= -.165).

TABLE 2
INTERCORRELATION BETWEEN RESPONDENTS' SOCIO-DEMOGRAPHIC PROFILE AND EXTENT OF IMPLEMENTATION OF SP-ICT IN TERMS OF PLANNING AND IMPLEMENTATION

	EXTENT OF IMPLEMENTATION	
SOCIO-DEMOGRAPHIC PROFILE	**Planning**	**Application**
Age	-.066	-.099
Sex	-.021	-.023
Designation	**-.222****	**-.162****
Education	**-.221****	**-.199****
Length of Service	**-.145***	**-.165****

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Inter-Correlation Between the Perceived Schools and Teachers' Readiness and Extent on the Implementation of Special Program for Information and Communication Technology (SP-ICT)

Table 3 presents the perceived schools and teachers' readiness is significantly positively correlated to the extent on the implementation of the SP-ICT in terms of planning and application at 0.01 level of significance. Explicitly, curriculum is significantly positively correlated to planning and implementation (r=.411) and application (r= .406). On the other hand, facilities also are positively correlated to planning (r=.427) and application (r=.432).

TABLE 3
INTERCORRELATION BETWEEN THE PERCEIVED SCHOOL AND TEACHERS' READINESS AND EXTENT ON THE IMPLEMENTATION OF THE SPECIAL PROGRAM FOR INFORMATION AND COMMUNICATION TECHNOLOGY (SP-ICT)

SCHOOLS AND TEACHERS' READINESS	EXTENT ON THE IMPLEMENTATION	
	Planning	**Application**
Curriculum	.411**	.406**
Facilities	.427**	.432**
Administration and Instructional Supervision	.411**	.405**
Manpower Resources	.304**	.339**
Learning Resources	.384**	.359**

**. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).

Administration and instructional supervision likewise show significantly positively correlated with planning (r=.411) and application (r=.405) respectively. Manpower resources is also significantly positively correlated to planning (r=.304) and implementation (r=.339) at 0.01 level of significance. Furthermore, learning resources also shows positively significantly correlation to planning (r=.384) and application (r=.359) at 0.01 level of significance.

Predictors on the Extent of Implementation of SP-ICT on Planning

Model summary presented on Table 4.A (see Appendix D) provides the measures of how well the overall model (i.e. the predictors are able to predict readiness on the implementation of SP-ICT) and Table 4.B on ANOVA (see Appendix E). This means that 35.40% of the variability of the dependent variable which is extent of implementation of SP ICT on planning is explained by the predictors of this study. The remaining 64.60% could be associated with other factors not included in this study.

TABLE 4A
MODEL SUMMARY

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.595[a]	.354	**.317**	.31880

a. Dependent Variable: PLANNING. The table showed that F-test value was 9.590 which was significant at p<0.05.

TABLE 4B
ANOVA

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.569	17	.975	9.590	**.000[b]**
	Residual	30.286	298	.102		
	Total	46.854	315			

Table 4.C below showed that technological knowledge is statistically significant predictor of planning ($\beta = 0.193$, $p < 0.01$), followed by technological pedagogical knowledge. ($\beta = 0.278$, $p < 0.05$). Based on the analysis, it can be concluded that technological knowledge and pedagogical knowledge are 35.40 percent significant predictor of planning and the remaining percentage could be associated with other variables not covered by this study.

TABLE 4C
COEFFICIENTS

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.066	.239		8.655	.000
	Designation	-.022	.017	-.121	-1.264	.207
	Education	.016	.032	.036	.501	.617
	Age	.007	.004	.151	1.518	.130
	Sex	.057	.055	.050	1.034	.302
	Length of Service	-.003	.005	-.066	-.620	.536
	Curriculum	.056	.055	.090	1.011	.313
	Facilities	-.061	.077	-.100	-.789	.431
	Administration	.036	.068	.064	.538	.591
	Manpower Resources	-.029	.067	-.043	-.427	.669
	Learning Resources	.091	.065	.154	1.408	.160
	Technological Knowledge	**.114**	**.041**	**.193**	**2.786**	**.006**
	Content Knowledge	.101	.061	.141	1.661	.098
	Pedagogical Knowledge	.079	.060	.111	1.329	.185
	Technological Content Knowledge	-.027	.057	-.043	-.471	.638
	Pedagogical Content Knowledge	-.077	.062	-.114	-1.240	.216
	Technological Pedagogical Knowledge	**.192**	**.068**	**.278**	**2.807**	**.005**
	Technological, Pedagogical and Content Knowledge	-.038	.079	-.052	-.482	.630

Predictor on the Extent of Implementation of SP-ICT on Application

Predictor on the implementation of the SP-ICT on application is presented in Table 5. The model summary shows the variable that is able to predict readiness on the implementation of SP-ICT. The model means that 33.40% of the variability of the dependent variable which is extent of implementation of SP ICT on implementation is explained by the predictors of this study. The remaining 66.60% could be associated with other factors not included in this study.

TABLE 5A
MODEL SUMMARY

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578[a]	.334	**.296**	.38077

a. Predictors: (Constant) Technological Pedagogical Content, Sex, Length of Service, Education, Facilities, Technological Pedagogical Content, Technological Content, Manpower, Curriculum, Pedagogical Content, Designation, Age, Learning Resources, Administration
b. Dependent Variable: Application

The table showed that F-test value was 8.8786 which was significant at $p<0.05$.

TABLE 5B
ANOVA

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	21.656	17	1.274	8.786	**.000[b]**
	Residual	43.205	298	.145		
	Total	64.861	315			

In terms of application, the table illustrates that among predictors on the extent on the implementation of SP-ICT, technological pedagogical knowledge is statistically significant predictor of application ($\beta = 0.271$, $p < 0.01$.)

TABLE 5C
COEFFICIENTS

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.936	.285		6.790	.000
	Designation	-.027	.020	-.129	-1.325	.186
	Education	.025	.038	.047	.656	.512
	Age	.007	.005	.136	1.351	.178
	Sex	.051	.066	.038	.777	.438
	Length of Service	-.002	.006	-.044	-.403	.687
	Curriculum	.034	.066	.046	.509	.611
	Facilities	.038	.092	.052	.407	.684
	Administration	.024	.081	.035	.292	.770
	Manpower Resources	-.035	.080	-.044	-.435	.664
	Learning Resources	.037	.077	.052	.473	.637
	Technological Knowledge	.096	.049	.137	1.957	.051
	Content Knowledge	.076	.073	.090	1.042	.298
	Pedagogical Knowledge	-.022	.071	-.026	-.312	.755
	Technological Content Knowledge	-.005	.068	-.006	-.069	.945
	Pedagogical Content Knowledge	.102	.074	.129	1.380	.169

	Technological Pedagogical Knowledge	.220	.082	.271	2.703	**.007**
	Technological Pedagogical and Content Knowledge	-.050	.094	-.058	-.531	.596

a. Dependent Variable: Implementation

It indicates that selecting and choosing different technologies that can be used in teaching contributes to the successful implementation of the SP-ICT. On the other hand, it can be determined that the technological pedagogical knowledge is 33.40 percent significant predictor of implementation and the remaining percentage could be associated with other variables that are not covered by this study.

DISCUSSION

The connection between perceived schools and teachers' readiness in the implementation of the SP-ICT are found to have highly correlated. It shows that the more the schools are ready in terms of curriculum, facilities, administration and instructional supervision, manpower and learning resources, the more ready the teachers are in terms of: TPACK self-efficacy; content knowledge; content knowledge; pedagogical knowledge; technological content knowledge; pedagogical content knowledge; technological pedagogical knowledge; and technological, pedagogical and content knowledge. School and teachers coordinate with each other in the value of technology integration in the teaching learning process by conducting technical assistance, class observation, monitoring and supervision and conduct technology related trainings. The combination and TPACK self-efficacy and the readiness of the schools and teachers in the implementation of the SP-ICT improve the quality of learning. The above findings were supported by the study of Harris et al. (2009) that TPACK is different from knowledge of its individual component concepts and their intersections. It arises instead from multiple interactions among content, pedagogical, technological, and contextual knowledge. TPACK encompasses understanding and communicating representations of concepts using technologies; pedagogical techniques that apply technologies appropriately to teach content in differentiated ways according to students' learning needs; knowledge of what makes concepts difficult or easy to learn and how technology can help redress conceptual challenges; knowledge of students' prior content- related understanding and epistemological assumptions, along with related technological expertise or lack thereof; and knowledge of how technologies can be used to build on existing understanding to help students develop new epistemologies or strengthen old ones. TPACK is a form of professional knowledge that technologically and pedagogically adept, curriculum-oriented teachers use when they teach (Harris et al., 2009; Hussain et al., 2020).

The established intercorrelations of respondents' socio-demographic characteristics and the extent of implementation on planning and application imply that respondents with low professional rank or designation are more likely to be ready in terms of planning and implementation. Such findings were supported in the study of Yuyou and Wenjing (2018) in which the higher the designation, the more functions, obligations and opportunities they have. Such findings indicate that respondents with low educational background are seemed to be ready in planning and application of SP-ICT. The lower the educational attainment, the more they are ready in the planning and implementation of the program. Education may not be considered as factor in dealing with the technological planning and implementation. Similar to Yagci et al. (2015), the level of education is one of the key factors that affect the use and accessibility in ICT.

Furthermore, the fewer length of service of respondents the more they are likely to be ready in the planning and application of the SP-ICT. Respondents with fewer number of years in service are generally those who are young and can learn technology easily, therefore, they can easily plan, integrate and implement technology in the teaching learning process. In the study of the National Center for Education Statistics (2000), it indicates that teachers with less years of experience are often to use computers in their classrooms than teachers with more years of experience. This may be attributed, in part, to the fact that new teachers have been introduced to computers in the course of their studies.

Schools and teachers' preparedness on curriculum, facilities, administration and instructional supervision, manpower and learning resources more likely to influence the extent of implementation on planning and application. If the curriculum and facilities are well equipped with necessary components and resources, successful implementation of the program is possible. Thus, active support and assistance of the school heads among teachers also improve the planning and application of the SP-ICT. According to Cuban (2001), access to technology does not translate into the use of that technology by classroom teachers. Therefore, to effectively measure technology integration, evaluators need to focus on how the technology is implemented in the classroom, not merely document available materials.

The implementation dimensions' focus on using technology for both teaching and learning, recognizing the unique differences between these two processes. Implementation for learning focuses on using technology in the classroom as a means to boost students' understanding of the content, or to engage students in the core activity through the assistance of technology. The implementation of technology for teaching dimension examines the level to which the teacher relies upon the technology during an instructional session to deliver the content.

Planning as significant variable on the extent of SP-ICT's implementation indicates that technological and pedagogical knowledge predicts the planning of the SP-ICT. The integration of technology in the teaching learning process and the use of different technological approaches are more likely to give an impact in the planning of the SP-ICT. Concurred with Diaz and Bontembal (2000) and Canbay and Cuhadar (2020), the scope of technology integration is examined with a view of showing its relationship with pedagogy. It should be noted that technology, which is used to facilitate learning, is part of the instructional process and not an appendage to be attached at any convenient stage during the course of instruction. Technology integration not only involves the inclusion of technical artifacts per se, but also includes theories about technology integration and application of research findings to promote teaching and learning. It should include the strategies for selecting the desired technologies, skill to demonstrate how the selected technologies will be used, skill to evaluate such technologies, as well as the skill to customize the use of such technological skills in a way that addresses instructional problems.

Pedagogy-based training begins by helping teachers understand the role of learning theory in the design and function of class activities and in the selection and use of instructional technologies. The relationship between instructional technology and pedagogical concepts is considered with a view of assisting teachers to recognize the impact of such a relationship in an educational inquiry. Hero (2020) accentuated that technology integration is complex and is made up of processes of interconnected activities.

Technology should be implemented in the classroom only if its role in a given instruction is determined along with pedagogical issues related to a given instructional task. The role of technology in education can only be determined if teachers who implement technology at the classroom level are involved in technology (Okojie et al., 2005; Palieraki & Koutrouba, 2021). More so, Topper (2005) believes that for teachers to use technology in support of their teaching, and to see it as a pedagogically useful tool, they must be confident and competent with the technology they are planning to use .

It is important that teachers recognize that a relationship exists between technology in education and pedagogical decision-making. According to Obielodan et al. (2020), research evidence shows that participants whose technology instruction was integrated in their methods course reported more frequent use of technology for both teacher productivity and student projects during both on-campus courses and their first year of actual classroom teaching. There is no blueprint for technology integration, however, it is suggested that effort be made to link technology for instruction to all levels of pedagogical processes and activities.

CONCLUSION

The mixture and TPACK self-efficacy and the readiness of the schools and teachers in the implementation of the SP-ICT more likely to improve the quality of learning. The recognized interrelationships of respondents' socio-demographic variables and the extent of implementation on planning and application may suggest that teaching possessing lower ranks more likely manifest skills on ICT planning and application. Further, schools and teachers' preparedness on curriculum, facilities, administration and instructional supervision, manpower and learning resources seem to influence the extent of implementation on planning and application. As such, technological and pedagogical knowledge play pivotal role in planning and application of the information and communication technology in the teaching and learning process.

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