A Proposed Strategic Information System Plan as Basis For Policy Formulation for Public Secondary Schools

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Abstract

The study assessed the current Information System (IS) situation of the four main public secondary schools in terms of software application, technical infrastructure, people and processes related to teaching and learning. Frequency of use of the available technologies utilized for teaching and learning and the strengths and weaknesses of the IS situation on the areas of software application, technical infrastructure, people and processes as perceived by the teachers of public secondary schools were also assessed. The study used a descriptive method that employed a quantitative approach using a stratified sampling procedure to choose 156 public secondary teachers as respondents. Hence, the survey questionnaire was used to determine their responses. Data collected were presented descriptively using frequency and percentage rating. The study found out that the majority of the teachers use Microsoft Productivity programs, email and social media most frequently for teaching and learning. Technical infrastructures such as network and communication tools revealed to be often utilized to support instruction. Furthermore, the study discovered that teachers were equipped with the skills and competencies on the utilization of various information systems. However, these people should be fully aware of the IS issues and concerns in school in order for them to be encouraged and have a strong commitment to learn more and apply the skills they gained from trainings and other professional development programs. The study also revealed that teachers were familiar with the IS processes. Though, they still need to be trained on system management processes, resources management and manage business relationship. Hence, this study addressed certain needs through the development of the Strategic Information System Plan (SISP). It further brought awareness to teachers, school heads and division top management personnel making them properly guided on the proper implementation of IS utilization in school through the developed SISP.

Keywords: *Strategic planning, Information system, Strategic information system planning, Information and Communication Technology (ICT), IT infrastructure, Software application*

1. Introduction

Strategic planning is defined as the process which results in the development of a strategic plan, which identifies the future direction of an institution and maps the way the direction was reached (Nataraja, 2014). Moreover, Strategic Information System Planning (SISP) was also commonly known as ICT strategic planning in the education sector. It is a set of tools used in the development of ICT strategies, seeking to identify the ICT elements which enable the support to corporate business (De Paula et.al, 2015).

The rapid development of ICT in education seems to show that more public institutions are engaging in IS strategic planning. Most of the public organizations including public schools devote time, effort, and money in addressing the needs of the teachers and the students by developing a strategic plan. However, not as many have seen success with strategic planning because it is not a simple task to undertake (Fielder, 2016).

Basic education in public schools has been and will continue to grow and develop. The increasing number of teachers and students' population indicates an increasing demand and challenges as experienced by the department. With the current trends, where learning with technology has become essential, the need to keep pace with society and prepare students for their roles in society is just two reasons to use technology in education. Yet, findings of the study conducted by Adegbenro (2017) explained that teachers attitudes towards the use of ICT in the classroom revealed that teachers' attitudes are highly positive but their actual use of ICT tools in class is rare and is subject to innovative processes.

At present, ICT in education remains a large task such as improvement on student-computer ratios and teacher-computer ratios, lacks infrastructures for connectivity and access to technologies, limited basic computer literacy training, limited laboratories and others (Tinio, 2002).

Department of Education, Schools Division of Lucena City, aims to continuously deliver quality basic education and lay the foundation for life-long learning and service for the common good. Subsequently, the study assessed the current IS situation in terms of software application, technical infrastructure, people and processes. Frequency of use of the available technologies utilized for teaching and learning and the strengths and weaknesses of the IS situation on the areas of software application, technical infrastructure, people and processes as perceived by the teachers of public secondary schools were also assessed. The main objective of the study was to propose a Strategic Information System Plan SISP as basis for policy formulation for public secondary schools in the division of Lucena City.

2. Objectives

The main objective of the study was to propose a strategic Information System Plan (SISP). It specifically aimed to assess and study the following:

1. To determine the current Information System (IS) situation of the public secondary schools in terms of software application, technical infrastructure, people and processes.
2. To analyze the strengths and weaknesses of the current Information System (IS) in the areas of software application, technical infrastructure, people and processes.
3. To develop Strategic Information System Plan for the school's division based on the collected data.

3. Materials and Methods

The study was conducted in four (4) main public secondary schools with the largest number of students' and teachers' population among the public secondary schools in the entire division. The respondents of this study consisted of public secondary school teachers. Stratified sampling was the sampling technique used in this study because the respondents came from different schools. Participants sampled from each school or strata were calculated proportionally to the total population. Stratified sampling is beneficial to this study because there were big differences between the strata, as this can give a more accurate representation of the population. Out of 261 populations, a total of 156 sample size and actual data was tallied and analyzed.

Table 1 Computed and actual sample size per school

School name	Population	Sample size	Actual data	Rate of Response	Margin of error	Usable data
School A	96	57	57	100%	5%	96
School B	68	41	41	100%	5%	68
School C	44	26	26	100%	5%	44
School D	53	32	32	100%	5%	53
Total	261	156	156	100%	5%	156

In the survey, part of the instrument was adopted from the questionnaires developed by Cassidy (2006). Although this was modified by the researcher in accordance to the needs of the public secondary schools to meet the requirements of this study. For the validity of the instrument, five individuals were asked to validate the survey instrument before distribution. Two of the validators were graduated of master's Program major in Information Technology Management and three PhD graduates who are specialized in Information Technology Management, Industrial Technology Management and Mathematics. All the validator's comments and suggestion were carefully consolidated and adopted. First part of the study determined the current Information System (IS) situation of the public secondary schools while the second part assessed the strengths and weaknesses of the Information System (IS) in the areas of a)

software applications, b) technical infrastructure c) people and d) processes. A five-point Likert Scale ranging from 1 (never) to 5 (almost always) were used to assess the frequency of use of the current IS. On the other hand, scale ranging from 1 (Not Applicable) to 5 (strongly agree) were also used to determine the respondents' percentage of agreement on the strengths and weakness of IS in each area. The Likert Scale was also treated by adding the scale of Disagree and scales for Agree. Furthermore, in the analysis of strength and weaknesses, the areas with high percentage of agreement treated as the strength while the low percentage of agreement treated as the weaknesses. The items were tallied, frequency and percentage per area type was computed and ranked. The highest percentage indicated the most common or highest in rank.

In the process of gathering data, the following activities or procedure were performed: (1) sought permission to conduct the study in the public secondary schools, (2) went to the school to personally ask permission to the concerned school heads, (3) identify teachers who will take part in the study from each school, (4) administer survey instrument through survey distribution. (5) retrieve the accomplished questionnaires after one week. (6) perform descriptive statistics on the gathered data, (7) analyze the current situation of the school's Information Systems and their strengths and weaknesses.

Data collected were treated statistically using descriptive statistical tools such as frequency, percentage and ranking to describe the variables. The data on each table were summarized by getting the total per criterion. Only the total was presented on each table for interpretation and discussion.

4. Results and Discussion

4.1 Current information system situation in terms of software applications

The study was able to determine the current Software Applications used for teaching and learning processes in public secondary schools.

In lesson planning, the almost always utilized tool was Microsoft Word. While in lesson implementation, communication tools such email and social media like Facebook were the most utilized among others. In the conduct of pre-assessment and students' performance evaluation, Microsoft Productivity Programs such as Microsoft Word, Microsoft Excel and Microsoft PowerPoint were often times used.

Among the available software applications, the least utilized were as follows: independent practice tools, learning management system tools, zip grade, google apps and online quizzes. The mentioned tools were all internet dependent. Infrequent used of these tools were influenced by the availability and accessibility of the Internet in school Brandstrom (2011).

Table 2 Percentage of current information system (IS) situation in terms of software application by public secondary teachers in the division of Lucena city, 2018

Software applications in teaching and learning processes	Never to sometimes	Often to almost always	Rank
Student's Pre-Assessment	40 %	60 %	3
Lesson Planning	28 %	72 %	1
Lesson Implementation	39 %	61 %	2
Evaluation of Students Performance	41 %	59 %	4
TOTAL	37 %	63 %	

4.2 Current information system situation in terms of technical infrastructure

The respondents perceived that there was available technical infrastructure for teaching and learning such as hardware, software, and network & communication. Among these network and communication tools, internet and phone were the most often times utilized for teaching and learning related job. On the other hand, used of available hardware ranked next. Use of available software were also maximized, however, use of database appeared to have the least percentage of responses. The result suggests that teachers need to be aware of the used and benefits of adopting databases as part of their teaching. Awareness of the databases among users is important because the ultimate use of the databases is

for users to be aware and utilize them effectively to contribute to academic achievement in academia (Larson, 2017).

Table 3 Percentage of current Information System (IS) situation in terms of Technical Infrastructure by public secondary teachers in the Division of Lucena City, 2018

Technical infrastructure	Never to sometimes	Often to almost always	Rank
Hardware	27 %	73 %	2
Software	28 %	72 %	3
Network and Communication	13 %	87 %	1
TOTAL	23 %	77 %	

4.3 Current information system situation in terms of people

The respondents perceived that they were provided enough training on IS. They were also equipped with skills and competencies on the positive use of information technology. In the same manner, they also given job feedback regularly for further improvement and thorough understanding of their job functions. Additionally, the study revealed that the respondents have the skills on the selection of teaching and learning resources using IS. However, the respondents revealed that majority of them lacks awareness on ICT issues and concerns in schools. As a result, not all of them were motivated to apply the gained skills and knowledge in teaching and learning. It is expected that if the teachers are fully aware, they will be able to guide their learners for their bright future (Thakur, 2014).

Table 4 Percentage of agreement on the current information system (IS) situation in terms of people by public secondary teachers in the division of Lucena city, 2018

People competencies	Not applicable	Disagree to strongly disagree	Agree to strongly agree	Rank
Positive use of Information Technology	0 %	20 %	80 %	2
Selection of teaching & learning resources using IS	0 %	21 %	78 %	3
Training	0 %	19 %	81 %	1
Job Feedback	1 %	19 %	80 %	2
Communication	1 %	24 %	76 %	5
Job	1 %	22 %	77 %	4
TOTAL	1 %	21 %	79 %	

4.4 Current information system situation in terms of processes

The study revealed that teachers are more familiar with the software application management processes and understand the system management processes as they can initiate good practices on data recovery and back-up storage, as well as basic installation and configuration management. However, problem management as one of the system management processes should be addressed. The results further show that the respondents understand the process of resources management, however, they still need to be knowledgeable on them especially on facilities management, security management, IS strategic planning and inventory & asset management. Nevertheless, teachers still need to be familiar with the manage business relationship which involves understanding technology needs of the school, market information technology offerings for teaching, service level management and client satisfaction management. Customer relationship management is an IS-based enterprise application that was designed to help achieve business profitability by understanding its customers (Clemoris, 2015). Understanding this business or customer

relationship most especially by the top management would probably help the entire division to increase the chance of SISP implementation.

Table 5 Percentage of agreement on the current I\information system (IS) situation in terms of processes by public secondary teachers in the division of Lucena city, 2018

IS processes	Not applicable	Disagree to strongly disagree	Agree to strongly agree	Rank
Manage System	1 %	23 %	76 %	2
Manage Software Application	0 %	21 %	79 %	1
Manage Business Relationship	7 %	34 %	59 %	3
Manage Resources	10 %	37 %	54 %	4
TOTAL	4 %	29 %	67 %	

4.5 Strength and weaknesses of current information system in the areas of software application, technical infrastructure, people and processes

The study revealed that the strengths and weaknesses of the current IS situation, as perceived by the respondents shows that teachers in public schools have an almost equal level of assessment on the strengths and weaknesses on software applications and technical infrastructures used as well as with the strengths and weaknesses in terms of people. This implies that teachers received the same trainings and acquired the same competencies and skills in utilizing available software applications and technical infrastructure.

The study revealed that current software applications in use are consistent, flexible, reliable and user friendly. The result denotes that application software utilized by the respondents is easy to use such as Microsoft Productivity Tools and involves human intervention to keep information reliable and consistent. However, these applications do not support paperless environment, do not continually make process improvement in the organization, do not require low level of maintenance and do not increase student's engagement. Commonly used software applications require printed output such as lesson plans. Its features also do not increase student's engagement because these applications are not interactive.

In technical infrastructure, the study revealed that current infrastructure in use are up-to-date with standard network components, standard hardware and software environment, functional hardware and accessible internet connectivity. This implies that technical infrastructures in the areas of: hardware, software, network, and communication in secondary schools met the standard requirement since majority of those resources were deployed by the central office and have gone thorough inspections. However, available application design needs improvement to efficiently and effectively fit to the needs of the teachers and learners. Additionally, not all computers were secured with updated-anti-virus.

In the area of people, the study revealed that teacher have an up-to-date technology skill and provided with proper orientation and training as well. They were also involved in the preparation of school improvement plan and can freely provide input into the decision making process. However, not all of the teachers were able to apply trainings and skills in the performance of their job as they showed lack of strong commitment to learn.

All of the four main schools where the study conducted were recipients of the same hardware and software packages from the national level. Therefore, it was evident that almost all the respondents have the same perceptions on the three areas of IS strengths and weaknesses. However, there was a little difference when it comes to strengths and weakness of IS processes. The respondents might have different approach and practices when it comes to the implementation of IS processes in their school. IS processes might also be influenced by the school heads or top management leadership.

Table 6 Percentage of agreement on the strengths and weaknesses of the current IS situation by public secondary teachers in the division of Lucena city, 2018

Areas of IS	Disagree to strongly disagree	Agree to strongly agree	Rank
Software application	21 %	79 %	1 %
Technical infrastructure	21 %	79 %	1 %
People	21 %	79 %	1 %
Processes	27 %	73 %	2 %
AVERAGE	23 %	78 %	100 %

The table shows the SISP chart presentation which summarizes the assessment, direction and plan.

Table 7 SISP summary chart presentation

Assessment **(Where we are today)**	**Direction** **(Where we want to be)**	**Plan** **(How we will get there)**
Software Application • Used of software applications were limited to Microsoft Productivity Programs such as MS Excel, MS Word and MS PowerPoint. • Limited used of software applications due to unavailability and inaccessibility of internet connectivity.	• A portfolio of common integrated systems that satisfy teaching and learning requirements in all learning areas.	• Provision of a common systems, primarily relying on open source available application packages or commercially available application packages with minimal cost.
Technical Infrastructure • Used different technical infrastructure that support teaching and learning. • Limited used of database as part of teaching activities. • Dated application designs and anti-virus.	• A technical infrastructure that is compatible both with the open source or commercially available software application packages, based on the scalable and interoperable components.	• Identifying technology components that are compatible both with an open source or commercially available application packages. • Acquiring or upgrading components as necessary to support the implementation of those packages.
People • Lacked awareness on IS issues and concerns in schools • Limited application of IS skills in the job performance.	• Improved performance in the development of ICT- enhanced program for the public secondary schools • Equipped with competencies on the positive used of IS.	• Provide IS awareness and capability training program.
Processes • Limited knowledge on different IS Processes.	• Improved IS processes for overall efficiency and effectiveness of teaching and learning.	• Utilize best practices throughout the IS processes. • Modify IS process to fit application software.

Inputs to the development of the Proposed Strategic Information System Plan for the Public Secondary Schools

The objective of the SISP is to formalize the organization's vision, mission, and values to help the organization identifies its future direction and maps the way the direction will be reached. Based on the findings, the following are the suggested inputs to form part of the framework for the proposed SISP implementation for pubic secondary schools.

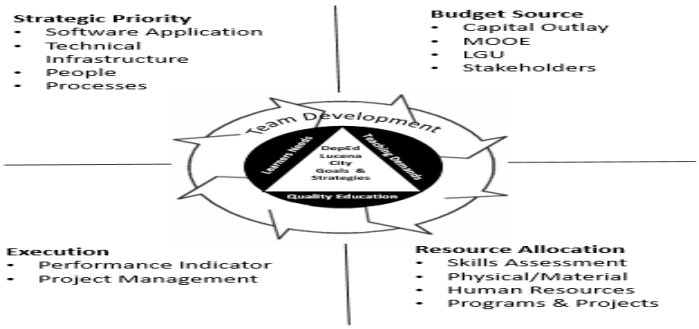

Figure 1 Strategic information system planning framework

The study found out that the goals of DepEd Schools Division of Lucena City must first be identified and strategies, such as Strategic Information System Plan, must be aligned with the goals of the department. The initial task for the SISP is to determine the quality improvements goals and strategies of the secondary schools. The consideration of the learners needs, teaching demands, and quality education are the fundamentals inputs to the identification of the goals and strategies. In the same manner, the four (4) elements of SISP must also be aligned with the goals and strategies of the Department of Education Schools Division Office of Lucena City.

Figure 1 shows the concept of continuous review and planning of strategies, budget source, resource allocation, and execution.

5. Conclusion

The study was able to discover the following: most frequently used software application in teaching and learning processes was Microsoft Productivity Programs, email, and social media among the selected four (4) main public secondary schools in the Division of Lucena City. Network and communication are the most utilized infrastructure. On the other hand, use of laptop, printers, projectors, desktop computers and copiers were also common used. Teachers were provided enough training on IS however, they should be provided proper orientation and awareness on the IS issues and concern for them to have strong commitment to learn and be encouraged to apply their skills gained from trainings. Additionally, the study revealed that teachers were familiar with the IS processes; however they still need to be trained on system management processes, resources management and manage business relationship for improvement.

Public education technology leaders may use the IS planning developed in this study and other result of the study to improve IS planning and organizational processes. This will help them to better understand IS Strategic Planning development and practices and explicitly identifies components and activities involved in the management of information technology resources and processes that are focus on teaching and learning in public schools.

This work may serve as a reference for other research studies related to the same general theme: strategic planning and IS planning or IT management in schools. The department policy makers may use study results to support them in their efforts to improve IS and prioritize funding. Results may serve as basis of a uniform policy in the entire department.

Further study in this area will require an inclusion of external environment to analyze the threats and opportunities of IS in education sector.

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7. References

Adegbenro, J. B., Gumbo, M. T., & Eunice, E. O. (2017). In-service secondary school teachers' technology integration needs in an ICT-enhanced classroom. Tojet: T : The Turkish Online *Journal of Educational Technology, 16*(3). Retrieved Jan 11, 2018, from https://search.proquest.com/docview/1953141268?accountid=173015/

Brandstrom, C. (2011). Using the internet in education – strengths and weaknesses. A qualitative study of teacher's opinions on the use of the internet in planning and instructions. Retrieved Nov, 11, 2017, from http://www.divaportal.org/smash/get/diva2:438827/FULLTEXT01.pdf

Cassidy, A. (2006). *A practical guide to information systems strategic planning. 2nd* Ed. Rback Publication. Taylor & Francis Group.

Clemoris, R. (2015). Relationships: strategic information systems planning factors and customer relationship management implementation success/failure. Capella University. Retrieved from ProQuest. ProQuest Number 3718620.

De Paula, L. G. et al. (2015). ICT strategic planning at public higher educational organizaions: Building an approach through action research at unirio. JISTEM - *Journal of Information Systems and Technology Management, 12,* (2, May/Aug), 351-370. DOI: 10.4301/S1807-17752015000200009

Larson, A. G. (2017). Faculty awareness and use of library subscribed online databases in the university of education Winneba. Ghana: A Survey. Library Philosophy and Practice e-journal). Libararies at University of Nebrska-Lincoln. Retrieved Jan 13, 2018, from https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=4322&context= libphilprac/

Nataraja, S. (2014). Perceptions of business school leaders and faculty members on strategic effective teacher training for tablet integration in K-12 classrooms planning implications at a selected business school. (UMI Number:3640290). Retrieved from ProQuest Central; ProQuest Dissertations & Theses Global

Thakur, N. (2014). A study on awareness of trained teachers in relation to information and communication technology. *IOSRJournal of Research & Method in Education (IOSR-JRME). 4*(1), 6-11.

Tinio, V. L. (2002). Survey of information & communication technology utilization in Philippine public high. Retrieved from http://www.fit-ed.org/downloads/ICT%20Utilization%20Survey.pdf