Ilocano Administrators' Adoption and Use of ICT in the Management of Public Secondary Schools

Vida Villa Antonio[1], Natividad Eder Lorenzo[2]
College of Teacher Education, Mariano Marcos State University, Laoag City, Philippines
vidavantonio@yahoo.com[1]

Asia Pacific Journal of Multidisciplinary Research
Vol. 7 No.2, 1-15
May 2019
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com
CHED Recognized Journal
ASEAN Citation Index

Date Received: March 30, 2018; Date Revised: April 4, 2019

Abstract - *This descriptive-correlational study sought to describe the ICT adoption and use of 31 Ilocano administrators, who were chosen via total enumeration, in the management of public secondary schools with fiscal autonomy in three DepEd Divisions in the Province of Ilocos Norte, Philippines, via triangulation method. Results show that the respondents have a high level of ICT knowledge readiness, an average level of ICT competence, and a very high level of social influence in using ICT. They possess positive attitudes and beliefs towards ICT use. They have a very high level of adoption and use of ICT in performing their management functions. They are very effective in terms of their management skills. Their ICT management practices include the existence of ICT leadership and ICT integration in both instructional and personnel management. Correlation tests showed that the administrators' adoption and use of ICT is significantly related to their level of ICT knowledge readiness, level of ICT competence, level of social influence, and attitudes and beliefs towards ICT use. The respondents' number of ICT-related trainings was the only demographic variable that significantly relates with their level of ICT knowledge readiness and ICT competence, attitudes and beliefs towards ICT use and social influence. Their management effectiveness significantly correlates to their level of adoption and use of ICT and beliefs towards ICT use. Among all the variables, the administrators' attitude towards ICT use is the best predictor that significantly affects ICT adoption and use in school management while the administrators' ICT adoption and use is the best predictor that significantly affects their management effectiveness.*

Keywords: *ICT Adoption and Use, Fiscal Autonomy, Information and Communication Technology, Management, Public Secondary Schools*

INTRODUCTION

Quality management and effective leadership have always been the ultimate goals of every school administrator. Rapid and pervading technological inventions like mobile phones, computers in the form of tablets and laptops, internet, closed circuit television (CCTV) camera and liquid crystal display (LCD) television, which most people around the globe use to create, store and communicate information, have made governance in the academic sector a seemingly complex task. Complex in the sense that the cultural context of ICT adoption, language barriers and attitudes towards ICT affect the rate at which it is adopted. The perceived difficulty in the integration of ICT in education is based on the belief that technology use is challenging, its implementation requires extra time and technology skills are difficult to learn [1]. But these gadgets are designed to make tasks, including governance simpler. For this reason and because almost everyone is now information and communication technology (ICT) – afflicted, ICT-based governance is an imperative.

Scholars like Adebayo and Adesope describe ICT as scientific, technological and engineering disciplines and the management technologies used in the handling of information, processing and applications related to computers [2]. Purnomo and Lee stressed that ICT has tremendous potential to revolutionise the way information, knowledge and new technology is managed, developed and delivered. ICT tools enhance the flow of information in society and in school administration. ICT can be efficiently used to manage information in the three components of information administration, namely: student administration, staff administration and general administration with

communication as an integral part of these three components [3]. It is safe to say then that the more ICT is utilized in managing a school, the more benefits the students and staff receive from it.

Computers and other ICT gadgets and their role in teaching and learning have been the subject of many studies but their role in management, especially in schools, has not yet been thoroughly explored. Today, the issue of educational management in the information age must not be ignored anymore because improving school leadership is vital in view of the current global revolution in education due to the changing nature of work, realities of the information age, new global partnerships and awareness of technological changes [4].

ICT utilization in school management is an important issue. There are two key assertions which affect the use of ICT in school management. These issues are: (1) Senior managers in schools have a major impact upon classroom and curriculum practices, and the ways in which changes are introduced and (2) Use of ICT within schools is permeating aspects of school practice increasingly, and will impact upon the practice of all staff at present and in the near future. The implication of these issues is: if senior managers lead or support the utilization of ICT in the school, positive change will be inevitable.

Computers, in its many forms, are increasingly being used for management or administrative tasks at all levels of education. Computers may improve efficiency in many of the tasks required in the operation of organizations. BECTA indicates the strong relationship between ICT and management in ICT-based environments [5].

In order to accomplish and achieve the mission, vision, goals and objectives of a school, administrators must perform the three facets of administrative practice, which are administration, management and leadership. Administration is the universal process of efficiently planning, organizing, leading and controlling people and resources [6]. Young and Dulewicz define management as an executive function involving organizing, planning, staffing, directing and controlling, where the aim of the manager is to maximize the output of the organization through administrative implementation [7]. Leadership, on the other hand, is the exercise of high-level conceptual skills and decisiveness, mission, developing strategy, inspiring people and changing culture [8].

While he performs these in these facets, the administrator brings with him a set of demographic characteristics, a level of literacy regarding ICT, and his attitudes and beliefs. Along with these are the conditions of the school where he exercises leadership. These factors could affect the way he exercises his management function. When an administrator is ICT literate, he can integrate ICT in school operations. ICT can be used in administration, and more so in the classroom. This is true in all levels of education.

ICT could be helpful in the implementation of the K to 12 Basic Education Curriculum which is now on its 6th year of implementation all over the country. It is noted that this curriculum is integrative, inquiry-based, constructivist and technology-enhanced because it fosters the development of information, media and technology skills among students. But in order to achieve this, the appropriate information technology must also be used not only in teaching and learning but also in school administration.

The focus of the present study is the use of ICT in school administration, specifically the effect of certain factors on the utilization of information and communications technology by a school administrator as he administers and manages the school, and provides leadership to his teachers and staff.

The researchers noted some observations on the use of ICT for educational and school administration purposes in Ilocos Norte, Philippines. In many cases, the potential of ICT as a teaching-learning tool is limited by the fact that many educational administrators are still not fully ICT-literate, that is why they do not encourage faculty to use ICT media in their classes and they do not attempt to learn how to use the computer and the internet in administration. One is ready to use ICT only if he/she has the appropriate knowledge, skills, attitudes and the facilities. In an initial encounter with the respondents, it was known that they were facing the issues on unregulated access to information on the internet due to weak connection, not enough technical assistance for operating and maintaining computers and/or insufficient help for solving problems with ICT; inadequate facilities such as well-furnished classrooms for ICT equipment due to inadequate funding or financial support to provide ICT equipment; and there is not enough ICT training opportunities for teachers and administrators.

Thus, anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT) which is supported by the Theory of Constructivism, this study was conceived to determine the level of adoption and use of ICT in the management of public secondary schools in Ilocos Norte, Philippines and to identify key

variables which could influence the readiness for ICT program implementation in school administration by the head of schools or administrators.

Among the various efforts to understand the process of user acceptance of information systems, this study utilized the Unified Theory of Acceptance and Use of Technology (UTAUT) which is a technology acceptance model formulated by [9]. Toward a unified view, UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. UTAUT also addresses how individual differences determine the level of adoption or acceptance and use of technology. In this theory, the implementation of an innovation uses four key constructs or dimensions which include Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) and the moderating variables.

Performance Expectancy (PE) refers to the degree to which the user believes that using the ICT can improve work performance; this is the perceived usefulness of ICT to them. There are five sub-dimensions related to PE: 1) perceived usefulness, 2) external motivation, 3) work correlation, 4) relative advantage, and 5) expectancy to the achievement. Venkatesh, Morris, Davis and Davis think that expected effectiveness refers to being able to obtain significant rewards after using the system [9]. Effort Expectancy (EE), on the other hand, refers to the easiness that an individual think of when using the system or this is the perceived ease of use of the technology to him/her. This means that whether the design of information system can allow the user to use it easily or not is one of the key factors of accepting information technology. Next, Social Influence (SI), the degree to which an individual perceives that important others believe he or she should use the technology, relates to whether or not important others influence an individual's intention to use the information system. The impact of this construct on behavior is through compliance, internalization and identification. Through internalization and identification, an individual's belief structure is altered, whereas compliance causes an individual to alter his or her intention based on social influence. Finally, Facilitating Conditions (FC) is defined as the degree to which an individual believes that an organizational or technical infrastructure exists to support use of the information system. This incorporates objective factors in the implementation context, such as management support, training and the provision of computer support.

In support to the UTAUT model above, the theory of constructivism which holds that people construct knowledge and meaning through their lived experiences and that these meanings are continually updated through a process of accommodation of new experiences, was also considered.

The use of ICT in the management of education within the sector of services could improve management functions in schools like communication, ability to exchange data, teamwork, customer relations, visibility of services, competitive advantage, and others, that is why Love and Irani stressed that management within the sector of services should use ICT because it provides many benefits [10]. This statement is based on the fact, that ICT allows schools management to obtain, to process, to accumulate and to exchange information. Furthermore, in a knowledge management context, ICT can support transformation within and between tacit and explicit knowledge. As Ruiz-Mercader, Merono-Cerdan, and Sabater-Sanchez said, successful knowledge management initiatives could transform the small management capacity into a sustainable higher performance [11].

Figure 1 presents the research paradigm showing the dependent, independent and intervening variables of the study. The independent variables include: 1) ICT literacy that includes the level of ICT knowledge and level of ICT competence, 2) the administrator's attitudes towards ICT use, 3) the administrators' beliefs towards ICT use in school management, and 4) social influence in using ICT. The administrators' adoption and use of ICT in the management of public secondary schools is a dependent variable for the above-mentioned independent variables, but it becomes an independent variable when the management effectiveness level of the administrators with ICT is the dependent variable.

The intervening variables are the socio-demographic characteristics of the respondents that include age, sex, highest educational attainment, present administrative position, number of years of as an administrator and number of ICT-related trainings.

Information and Communication Technology (ICT) has become one of the vital aspects of the present technology-driven world. For people of this modern society, especially those in the field of education, mastering the basic skills and concepts of ICT is a must for it is an inevitable part of the heart of education. The researchers believe that the findings of the study are useful in the management of schools in Ilocos Norte, Philippines if they picture the present condition of ICT utilization in schools and identify the factors that influence the adoption and use of ICT for managerial and instructional purposes.

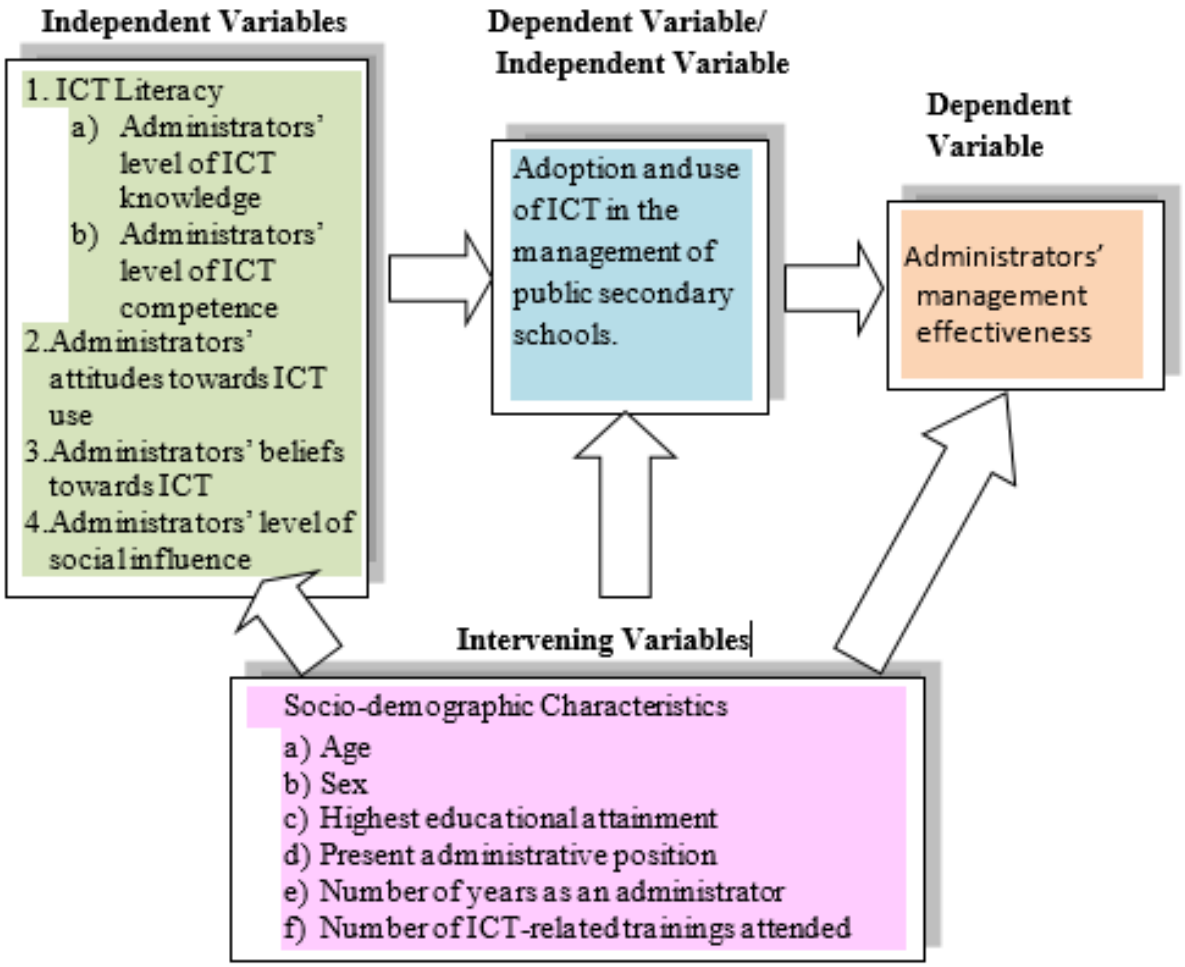

Figure 1. The Research Paradigm for ICT Adoption and Use in School Management.

The findings bring to the fore the level of ICT adoption and use in schools and thus help the policy makers and planners in ICT policy formulation and implementation by revising the existing ICT policy with the aim of tackling the challenges affecting ICT adoption and use in schools in this part of the country in particular, and the whole nation in general.

The results of the study include information that could help other professionals, parents, teachers, principals and other administrators to understand the complex and demanding work of a school administrator given the current educational landscape in the Philippines today. Results may stimulate administrators to improvise and increase the utilization of ICT in daily administrative tasks to make their work more efficient and effective. Furthermore, the data gathered could be used as basis for the planning and implementation of an effective management of the school program and a functional technology integration plan.

Results can also serve as bases for the development of a proposal for the enhancement of school curriculum involving management functions at the Mariano Marcos State University College of Teacher Education where the researchers are teaching which is not only a Teacher Training Institution (TEI) but an Intel-Teach Hub. These can also anchor the offering of training/s for school administrators as regards adoption and use of ICT in school management.

The data gathered could be used in enhancing pedagogy, as basis for the planning and implementation of an effective management of the school program and a functional technology integration plan. Results could

also be used by teacher education institutions or TEIs in enhancing their ICT-related courses especially in the field of school management.

As a whole, findings of the study could make management of schools easier and more efficient and effective.

OBJECTIVES OF THE STUDY

This study sought to determine the Ilocano administrators' level of adoption and use of ICT in the management of public secondary schools in the Province of Ilocos Norte, Philippines. Important factors which could influence the readiness towards ICT program implementation and integration in school administration by the school heads or administrators were examined.

Specifically, it sought to find out the socio-demographic profile of the administrators in terms of age, sex, educational attainment, length of service as administrator, present administrative position, and number of ICT-related trainings attended; the level of the administrators' ICT literacy in terms of knowledge readiness and competence; the attitudes and beliefs of the administrators towards ICT utilization in school management; the level of the administrators' adoption and use of ICT in performing their management functions; and how effective are the administrators in managing their schools along general management, instructional management and personnel management.

The study also investigated if there exists a significant relationship between the administrators' level of adoption and use and their ICT knowledge readiness, ICT competence, attitudes towards ICT use, beliefs towards ICT use, and social influence in using ICT; if a significant relationship also exists between each of the administrators' socio- demographic characteristics (age, sex, educational attainment, length of service as administrator, present administrative position, and number of ICT-related trainings attended) and their ICT knowledge readiness, ICT competence, attitudes towards ICT, beliefs towards ICT use, and social influence in using ICT; and if a significant relationship exists between the administrators' management effectiveness and their ICT knowledge readiness, ICT competence, attitudes towards ICT use, beliefs towards ICT use, social influence in using ICT, and level of ICT adoption and use.

Finally, the study also determined which among the independent variables, singly or in combination, significantly predict adoption and use of ICT in school management; and which among the independent variables, singly or in combination, significantly predict the administrators' management effectiveness.

MATERIALS AND METHODS

The study is a descriptive-correlation research which made use of survey to provide a detailed description of the adoption and use of ICT in the management of public secondary schools in the province of Ilocos Norte, Philippines. It looked closely at some important factors which influence the readiness of school heads or administrators for ICT program implementation in school administration.

Thirty-one school administrators who manage public secondary schools with fiscal autonomy (having their own budget) in the Province were chosen as respondents via total enumeration.

The administrators' level of ICT knowledge readiness, ICT competence, social influence, adoption and use of ICT, and management effectiveness in using ICT of the respondents were investigated. Constraints and challenges met by the administrators, their practices and trainings undergone on ICT utilization in management, as well as their attitudes and beliefs on ITC utilization were also determined. These were the independent variables. The study also looked into the administrators' ICT adoption and use and management effectiveness which were the dependent variables. The relationships between the independent and dependent variables were then measured. Furthermore, the predictors of the administrators' adoption and use of ICT and management effectiveness were also identified.

The instruments employed to gather data were the researcher-made Adoption and Use of ICT in School Management Questionnaire (AUICTSMQ) which was based on existing validated survey questionnaires used by other researchers in their studies and which was carefully modified and checked by research experts to suit the needs of the present study. An interview protocol was used to elicit qualitative data in addition to on-site observations to verify the administrators' responses to the questionnaire items, thus the triangulation technique of data gathering was done. Thirty-one Ilocano school administrators of all the public secondary schools of the Department of Education in the divisions of Ilocos Norte, Laoag City and City of Batac with fiscal autonomy were the respondents. It was made clear to the respondents that their individual profiles and all their responses in the questionnaire and interviews will be treated with utmost care and confidentiality.

Frequency counts and percentages were used to analyze nominal data while the weighted mean was used with interval data. Point-biserial and Pearson's r correlation coefficients were employed to determine relationships among variables. Regression analysis was used to determine which among the independent variables, singly or in combination, significantly predict adoption and use of ICT in school management and to identify which among the independent variables, singly or in combination, significantly predict the administrators' management effectiveness. Microsoft Excel for Windows was utilized in organizing the data before these are processed using the Statistical Package for Social Science (SPSS) program

Administrators' level of ICT knowledge and ICT competence were interpreted following range of means and their corresponding descriptive interpretations: 4.21 – 5.00 (Very High or VH), 3.41 – 4.20 (High or H), 2.61 – 3.40 (Average or A), 1.81 – 2.60 (Low or L), and 1.00 – 1.80 (Very Low or VL). In terms of the Administrators' Attitudes and Beliefs, there are fifteen statements for both the attitudes and beliefs scales of which 12 are positively stated and three are negatively states. The positive statements were scored in reverse of the positive statements. The weighted means were interpreted following the scale below.

Positive Statement		Negative Statement
Range of Means	Category/Level	Range of Means
4.21-5.00	StronglyAgree/ Very High	1.00-1.80
3.41-4.20	Agree /High	1.81-2.60
1.61-3.40	Undecided/Average	2.61-3.40
1.81-2.60	Disagree/Low	3.41-4.20
1.00-1.80	StronglyDisagree/ Very Low	4.21-5.00

In interpreting the means in the Administrators' Social Influence in Using ICT and Adoption and Use of ICT in School Management, these range of means were utilized with their corresponding category/level: 4.21 – 5.00 (Strongly Agree (SA)/Very High(VH)), 3.41 – 4.20 (Agree (A)/ High (H)), 2.61 – 3.40 (Undecided (U)/ Average (A)), 1.81 – 2.60 (Disagree (D)/Low (L)), and 1.00 – 1.80 (Strongly Disagree (SD)/ Very Low (VL)). As regards the Administrators' Management Effectiveness, the computed means were interpreted as follows: 4.21 – 5.00 (Very Effective), 3.41 – 4.20 (Effective), 2.61– 40 (Moderately Effective), 1.81 – 2.60 (Slightly Effective), and 1.00 – 1.80 (Not Effective).

RESULTS AND DISCUSSION

After carefully and intellectually analyzing the gathered data in this study, the following findings were drawn.

Socio-demographic profile of respondents

Most of the 31 respondents were female (18 or 58.06%) and majority of them (13 or 41.93%) had ages within 51 – 60 age range. The mean age of the respondents was 54.10 years. Majority (13 or 74.19%) had a master's degree and were holders of a School Principal IV position. Around one-third of the respondents (10 or 32.3%) had been school administrators already for 16–20 years. All have undergone ICT-related trainings which they consider as effective in their management functions.

Administrators' ICT knowledge readiness and ICT competence

Notably, the respondents have *very high* level of ICT knowledge and ICT competence (both with mean rating of 4.33) about electronic media like telephones and mobile phones and about television (4.30 and 4.34, respectively). This implies that the respondents are very knowledgeable, as well as very competent, in using these ICT tools. This is not surprising because the respondents' offices are equipped with TV sets and all of them claimed that they own a mobile phone or cell phone.

They have a *high* level of ICT knowledge and ICT competence in the use of 20 out of the 43 ICT facilities and resources. With the rest of the ICT equipment, their knowledge is only *average* or even *low*, particularly with regard to three (7.00%) ICT facilities and resources, namely, electronic or e-media (i.e. electronic screens in hallways) for announcement of any school matter (2.54), library data base program (2.47), and data base program for the automation of attendance and leave management of staff (2.58).

They also have *low* ICT competence on 11 (25.6%) ICT facilities and resources and that includes the use of electronic or e-media (i.e. electronic screens in hallways) for announcement of any school matter (2.38), graphic programs (2.43), graphing calculators (2.66), interactive whiteboard/smartboard/projector (2.48), database programs for schedules of school activities (2.48), grades and attendance of students (2.52), library data base program (2.20), and data base program for the automation of attendance and leave management of staff (2.58). It is noted that the ICT facilities and resources involved here are generally not

available as claimed by the administrators. This could explain the *low* level of ICT knowledge about and competence in using these ICT facilities and resources of the respondents.

Moreover, data evidently shows a pattern that in most (37 out of 43 or 86%) of the ICT facilities and resources indicated in the survey checklist answered by the administrators, the level of the respondents' ICT knowledge is the same as the level of their ICT competence. This pattern could only mean that, generally, knowledge about a certain ICT facility or resource is related to the competence in using it.

The overall mean rating of the respondents' ICT knowledge readiness is 3.41 with *high* descriptive interpretation but the mean is notably within the lower limit of the descriptive range. On the other hand, the overall mean rating of 3.32 of their ICT competences has a descriptive rating of *average*. These results imply that the school administrators in the public secondary schools are not yet very knowledgeable with ICT and not that very competent yet in using ICT. These levels could still be improved and that the idea of future ICT-related training, especially in the field of school management is an imperative. When asked if they still need ICT-related trainings, two responded:

> Administrator A. Yes, *I think I need more trainings and we need more ICT materials for ICT use in school administration.*
>
> Administrator B. *I think and I am positive that I am ICT literate since I had a lot of trainings already on ICT. However, I wish to have more trainings especially on the use of ICT in school management. I also would like to learn Edmodo, a virtual learning strategy in teaching.*

The above suggestion agrees with what Ku Ahmad stressed that school leaders need to develop teachers' skill in using computer for teaching, solving problems, making decisions and interacting in order to enhance the pedagogical methods. Efforts towards ICT change almost every ones' job in the organization causing employees at all levels to require new skills [12].

Administrators' attitudes towards ICT adoption and use

The administrators have a positive attitude towards ICT adoption and use in school management with an overall mean of 4.12 corresponding to a descriptive interpretation of *agree*. This is considered a good sign of a high level of adoption and use of ICT because it was established in previous studies that principals and teachers with positive attitudes towards implementation of ICT in their schools can facilitate its implementation to a great extent. Laaria observed that the school leaders' positive attitudes, commitment and interest towards implementation of ICT plays significant role in overcoming various challenges that are encountered during implementation of ICT in school [13].

The result also shows that, although they have some knowledge and skill regarding ICT, they are not yet confident enough to use these in their management functions because they still need somebody to assist them. Below is an interview excerpt from an ICT assistant of one of the administrators that supports this result.

> Teacher A. *My administrator always brings me along whenever she attends meetings that employs ICT so that if she needs help, I will just be there to assist her. I also often observe that I am not the only ICT teacher there, there are others like me. Many other administrators also bring with them their ICT assistants.*

Administrators' beliefs about ICT use

The overall belief mean rating of 4.17 in the gathered data indicates that generally, the administrator respondents are convinced that ICT use is indeed beneficial and could improve school management. The results imply their strong belief that ICT really plays a great role in their job as school managers.

One of the respondents said that ICT keeps them updated of the policies and guidelines of DepEd. It is also a very important tool for communication and report preparation and submission, especially now that it is online. It is also an indicator of improved performance because if one late in submitting a report, your name and school will be posted online. Moreover, another administrator noted that ICT is really a great help or indeed very important to their work as administrator especially now that all the reports from the higher ups are via electronic mode. Wherever they are, they have gadgets (like a tablet) so that anytime and anywhere, they receive reports, announcements and others, and via this, they can also contact their OIC in their school to do such report in case they are away and data are in their school and they cannot do it alone.

It is clearly stated in the remarks mentioned above that the administrators view ICT as a vital part of their life nowadays that technology is pervading every aspect of school management from updating them to report

preparation and submission. It was specified that they need to have the gadget (cellular phone or tablet) every time and anywhere since this is a very important tool for communicating important information from top level management to them and from them to their school officer-in-charge and vice versa.

Social influence on ICT adoption and use in the management of public secondary schools

Results revealed an overall mean rating of 4.20 with a descriptive interpretation of *strongly agree* indicates a *very high* level of effect of social influence on ICT adoption and use by the administrators. This means that the administrators *strongly agree* that important others influence their decision to use ICT in their management functions at a *very high* level. The important others include their fellow administrators, superiors, families, friends, teachers, DepEd officials, school stakeholders, government and other agencies.

The above results agree with the thoughts of Yuan, Shumate, Monge, Bryant, &Matsaganis, that employees within organizations are significantly impacted by their counterpart's encouragement and motivation and moral support from peers. Basically, as social human beings, individuals within organizations also need communications and interactions with others [14].

The administrators, however, identified constraints and challenges they meet in the effective implementation of ICT in their schools. In terms technical support, internet connection is sometimes weak and there is insufficient technical assistance for operating and maintaining computers for solving problems. ICT Facilities, such as well-furnished classrooms for ICT equipment, as well as funds or financial support to provide ICT equipment are insufficient. Training opportunities for teachers and administrators are likewise not enough. These findings are reflected in the following remarks from the administrators:

Administrator C. The problems we usually encounter include on and off current and Wi-Fi *ngaagmadi-madi* [not efficiently functioning] which results to the delays of reports to be submitted to the D.O.

Administrator D. One problem I was able to identify as regards ICT when I roamed around recently to monitor classes is that,*talagangakurang pay iti*[there is indeed a lack of] ICT equipment for teaching and learning. We only have 1 LCD projector in the school. It's a good thing that teachers took the initiative to buy their personal LCD projectors but I feel as their principal that we really need to provide more.

Table 1. Administrators' level of adoption and use of ICT in school management. (N = 31)

	Statements	Mean	Category/Level
1.	I guess I can operate ICT facilities & resources better in two to three months-time.	4.39	SA/ VH
2.	I predict I will use the ICT better in the next two-three months.	3.94	A/ H
3.	I plan to use the ICTs in school management every time these are needed in my job.	4.35	SA/ VH
4.	I use the ICTs in search for materials I need to perform my work well.	4.35	SA/ VH
5.	I use the ICTs when learning more about the complexities (beauty, challenges, problems & how to deal with them) of my work as administrator.	4.29	SA/ VH
6.	I use the ICTs for accessing personal materials.	4.00	A/ H
7.	I use ICT because I have adequate skills/ability/ competence to operate available ICT facilities.	3.97	A/ H
8.	I use ICT because I have the necessary knowledge needed to use the ICT facilities and resources appropriately.	3.97	A/ H
9.	I use the ICT available to enable me to accomplish more tasks in a shorter period of time for it makes my work easier and faster.	4.81	SA/ VH
10.	I use the ICT available because it makes me more productive in my job.	4.77	SA/ VH
11.	I use the ICT tools in selecting, together with the teachers, learning experience methods and procedures to employ in achieving school objectives.	4.32	SA/ VH
12.	I use the available ICT to help me supervise teaching and learning activities.	4.45	SA/ VH
13.	I use ICT to assist teachers in searching new research findings and try these in class.	4.19	A/H
14.	I use ICT to communicate effectively with my staff, parents and superiors.	4.45	SA/ VH
15.	I use ICT tools in preparing school budget together with staff and heads of departments and units.	4.45	SA/ VH
16.	I, together with my staff, use ICT to keep records of accurate financial information about our school.	4.58	SA/ VH
	OVERALL MEAN	**4.33**	**SA/ VH**

P-ISSN 2350-7756 | E-ISSN 2350-8442 | www.apjmr.com
Asia Pacific Journal of Multidisciplinary Research, Vol. 7, No. 2, May 2019 Part II

Administrator E. My heart almost melted one time when I saw a teacher letting the students view a video clip via a netbook in a class. I asked myself then how everybody in that classroom can could see and hear what was being shown with just a very small computer. That scene really triggered me to really try my very best to acquire more ICT equipment for the classes.

It is notable, however, that despite the problems stated above, the respondents highlighted the presence of helpful people around. As one respondent said that they have very supportive and benevolent alumni and *balikbayans* who are very willing to share their blessings for the improvement of our school. All they need to do is to approach them. After which, they need to show the good-hearted alumni and *balikbayans* tangible projects where their donations go.

Administrators' level of adoption and use of ICT in school management

The administrators *strongly agree* that they have adopted and used ICT in performing their roles as administrators to *very high* level with the overall mean of 4.33. They have *very high* expectations and beliefs that, given sufficient training, they can operate ICT facilities and resources better and they have the high intentions to use the ICTs in school management every time these are needed in their job. These results are reflected in Table 1.

The findings above coincide with the results of the study of Love and Irani which stressed that management within the sector of services should use ICT because it provides many benefits at different levels, especially at the operational level [10]. Many researches, like those of Kumar, Rose and D'Silva reveal that the integration of ICT helps to reduce the complexity and enhance the overall administration of higher education [15]. Computers can be used extensively for educational administration. ICT plays a vital role in supporting powerful, efficient management and administration in education sector. It is specified that technology can be used right from student administration to resource administration in an education institution [16].

Administrators' management effectiveness

The level of the administrators' management effectiveness is described along their general management skills, instructional management skills, and personnel management skills as shown in Table 2.

The administrators' *general management skills* are *very effective* as shown by the composite mean of 4.53 indicating that they perform their management functions well with the aid of ICT. The two highest mean ratings are on the ability to source out funds and to plan for school improvement whenever the school budget is not enough. The presence of ICT leadership is also evident in the schools. The respondents admitted, however, that the publicsecondary schools are not yet fully equipped with regard to ICT.

In terms of *instructional management skills*, the administrators rated themselves *very effective* in nine out of ten instructional management skills with a composite mean of 4.40. The teachers likewise are *very effective* in their instructional management with ICT use. ICT is integrated in the curriculum, in instruction and assessment which is one of the features of the new curriculum of DepEd which is ICT-based K-12 curriculum.

The administrators are also *very effective* in securing the collaborative support of the government and stakeholders (students, teachers, community). This finding supports the view of Kumar, Rose and D'Silva that in public schools of most developing countries, lack of funding for implementation of ICT has led to over-reliance on external donor funding [15]. There is inadequate funding by governments and this poses a challenge to principals to convince donors to fund the programs in their schools. Maki also suggested that to reduce the financial constraints in implementation of ICT in schools, principals should encourage private sectors participation in providing the required facilities [16]. The government should encourage private sectors to be involved in implementation of ICT through offering banks loans with low interest rates and zero rating duties and taxes for ICT infrastructures used in schools. This will encourage private sector to invest more in ICT in schools.

In spite of their self-perceived effectiveness, they indicated the desire to have more ICT-related trainings to enhance their ICT knowledge readiness and competence in the use of ICT in school management. Excerpts from the interviews done by the researchers that clarify and support these findings are as follows:

Administrator F. I am encountering difficulty in the use of ICT in school management because of my average knowledge and skills. If *nahihirapan* [hard up], I ask the assistance of the ICT coordinator.

Administrator G. I can use ICT in my work as administrator but I need more trainings to fully use it.

Along *personnel management skills*, the composite mean of 4.39 which means *very effective* signifies that

the administrators know how to use ICT tools to increase their effectiveness in managing people. Some of them use electronic media to monitor employee attendance and have CCTV cameras installed in strategic places in their schools. Personnel records are kept systematically and up-to-date using ICT. One of the administrators' remarked:

Administrator H. The CCTV installed in our school works well with strong internet and it helps me a lot in monitoring the school. Wherever I am, I can monitor and do reports faster. When data are needed, I just call the attention of my OIC and the staff and they just attach what I need in my Facebook account. For me, this is one of my best practices as a school administrator.

Table 2. Management effectiveness of the administrators. (N = 31)

Management Skills	Mean	D. I.
General Management Skills		
With the use of ICT facilities and resources, I:		
1. prepare budget for school together with staff and heads of departments and units.	4.45	Very Effective
2. identify school needs & prioritize financial allocation according to needs.	4.59	Very Effective
3. source out funds and plans for school improvement.	4.61	Very Effective
4. ensure that budget reflects agreed goals & objectives of the school.	4.58	Very Effective
5. delegate work in every unit of school governance like the mechanism of financial matters to capable staff.	4.42	Very Effective
6. keep close check on every school matter especially on financial matters delegated to staff.	4.39	Very Effective
7. work carefully on everything within the constraints of the school budget.	4.52	Very Effective
8. keep accurate records and financial information about the school.	4.58	Very Effective
9. give true and fair view of the financial position of the school.	4.65	Very Effective
Composite Mean	**4.53**	**Very Effective**
Instructional Management Skills		
With the aid of ICT tools, I, as the school administrator:		
10. define, in cooperation with the teachers, the objective/s for the school and each department and unit.	4.35	VeryEffective
11. select, together with the teachers, learning experience method and procedures to employ in achieving the school objectives.	4.32	VeryEffective
12. assign subjects to class teachers according to qualification and competence.	4.55	VeryEffective
13. allocate time tosubjects.	4.50	VeryEffective
14. make available facilities accessible to all teachers.	4.42	VeryEffective
15. make and ensures that the staff in different units and work position work cooperatively and not antagonistically for the common goal of the school.	4.35	VeryEffective
16. supervise the teacher's lesson plan.	4.39	VeryEffective
17. supervise teaching and learning activities in the classroom.	4.45	VeryEffective
18. evaluate the planning and implementation of curriculum programs.	4.42	VeryEffective
19. assist teachers to try new research findings.	4.19	Effective
Composite Mean	**4.40**	**VeryEffective**
Personnel Management Skills		
ICT tools facilitate and help me a lot in personnel management as I:		
20. model behavior I expect from others.	4.55	VeryEffective
21. identify what motivates my staff.	4.50	VeryEffective
22. communicateeffectivelywith staff.	4.45	VeryEffective
23. recognize the efforts of my staff.	4.58	VeryEffective
24. delegate duties and authority to capable staff.	4.42	VeryEffective
25. involve staff in decision-making and matters concerning them.	4.39	VeryEffective
26. praise staff in public and criticizes only in private.	4.10	Effective
27. motivate, encourage and cajole staff.	4.39	VeryEffective
28. encourage and enable appropriate professional development for staff.	4.40	VeryEffective
29. defuse tense situations and negotiates a solution.	4.23	VeryEffective
30. do not take side in conflict resolution.	4.30	VeryEffective
Composite Mean	**4.39**	**VeryEffective**
Overall Mean	**4.43**	**VeryEffective**

The above quote agrees with what Maki said that ICT has played a major role in reducing operational inefficiency and improving decision-making in many areas of governance in schools and school administrative subsystems that include personnel, student, resources, financial and general aspects of administration [16]. If well applied in the Philippines by school administrators, such role will surely be realized.

The forgoing findings are supported by what was stressed by Krishnaveni and Meenakumari in 2010. According to them, ICT provides several facilities and possibilities for educational administrators to do their tasks and communication and information systems could change the very nature of higher education, allowing information to be transferred, stored, retrieved, and processed by almost all who work, study or interact with a given institution [18]. There is an increase in managerial effectiveness and efficiency through usage of information and communication technologies. Likewise, enhancing the usage of ICT on these functional areas and especially for general administration will enable enhancement of overall information administration in higher education institutions in the realm of global competitive environment.

Management is dedicated to ensuring the highest possible standards and achievement in all areas of the school's work [19]. Good management styles can result into a clear strategic thinking and planning for improvement of the school [20]. In addition, management is an executive function which does things right and puts into action the policies, plans and decisions within the framework set by the administration [6].

Table 3. Coefficient of correlation (r_{xy}) between the administrators' adoption and use of ICT and each of the independent variables (N = 31)

Independent Variable	Dependent Variable
	Adoption and Use of ICT
ICT Knowledge readiness	0.481**
ICT Competence	0.493**
Attitudes towards ICT use	0.829**
Beliefs towards ICT use	0.702**
Social Influence in using ICT	0.458**

***significant at the 0.01 probability levelCritical Values:(2-tailed, α = 0.01, df = 29) = + 0.456*
**significant at the 0.05 probability level (2-tailed, α = 0.05, df = 29) = + 0.355*

Table 3 below shows that the administrators' level of ICT knowledge readiness (0.481), level of ICT competence (0.493), attitudes towards ICT use (0.829), beliefs about ICT use (0.702), and social influence in using ICT (0.458), are significantly related to their level of ICT adoption and use as evidenced by their respective coefficients of correlations which are all greater than the critical value of +0.456 at the 0.01 level of significance with 29 degrees of freedom.

The above finding means that in order for an administrator to have a very high level of adopting and using ICT in the performance of his/her management functions, s/he must not only know a lot about its nature and operation but also must have positive attitudes and beliefs towards ICT use. The influence of significant others who are instrumental in letting him/her use ICT must also be very high.

Similarly, Table 4 below shows that the respondents' age, sex, highest educational attainment, length of service as administrator, and present administrative positions are not significantly related to their level of ICT knowledge readiness (-0.120, 0.085,

0.061, .0132 and 0.212), level of ICT competence (-0.202, 0.113, -0.016, 0.107 and 0.149), attitudes towards ICT use (-0.223, -0.175, 0.191, 0.002 and 0.162), beliefs towards ICT use (-0.027, -0.047, 0.220, 0.128 and 0.166), and level of social influence in using ICT (-0.027, -0.015, 0.227, 0.216 and 0.125) as evidenced by their computed correlations r which are all lesser than the critical value of +0.355 at the 0.05 level of significance with 29 degrees of freedom.

The findings only mean that in general, whether young or old, male or female, at high position or not, had served long or short as administrator and whatever is the highest educational attainment of the school head, these do not directly influence significantly their being knowledgeable and competent in using ICT as well as their beliefs and attitudes towards ICT use, and their level of social influence in using ICT. It was claimed that the need to use ICT in school management in the province is deeply rooted with the creation of an information management system in the three divisions and to adhere to the demand of today's computer age.

The only socio-demographic characteristic of the respondents that has a significant correlation with their level of ICT knowledge readiness (0.414), level of ICT competence (0.392), attitudes and beliefs towards ICT use (0.252 and 0.376 respectively), and level of social influence (0.408), is the number of ICT-related trainings they have undergone because the computed r values are greater than the critical value of +0.355 at the 0.05 level of significance with 29 degrees of freedom.

Table 4. Coefficient of correlation (r_{xy}) between each of the administrators' socio-demographic characteristics and each of the independent variables (N=31)

Socio-demographic Characteristics	Independent Variables				
	ICT Knowledge Readiness	ICT Competence	Attitudes towards ICT Use	Beliefs towards ICT Use	Social Influence
Age	-0.120	-0.202	-0.223	-0.027	-0.027
Sex	0.085	0.113	-.0175	-0.047	-0.015
Highest Educational Attainment	0.061	-0.016	0.191	0.220	0.227
Length of Service as administrator	0.132	0.107	0.002	0.128	0.216
Number of ICT-related training	0.414*	0.392*	0.534**	0.376*	0.408*
Present administrative position	0.212	0.149	0.162	0.166	0.125

***significant at the 0.01 probability level* *Critical Values: (2-tailed, α = 0.01, df = 29) = + 0.456*
**significant at the 0.05 probability level* *(2-tailed, α = 0.05, df = 29) = + 0.355*

Their number of ICT-related trainings is also significantly related to their attitudes towards ICT use because the computed r value of 0.534 is greater than the critical value of +0.456 at the 0.01 level of significance.

The findings above mean that the more the administrators are trained with ICT, the more they become ICT knowledgeable, competent in using it, their beliefs and attitudes towards ICT use are enhanced, and their level of social influence is higher. This implies that there must be enough trainings in ICT for teachers and administrators to overcome other problems associated with technology integration in teaching and school management. As what Laaria had noted, school leaders' positive attitudes, commitment and interest towards implementation of ICT plays significant role in overcoming various challenges that are encountered during implementation of ICT in school [13].

The above result only shows how essential ICT trainings are in the life of an administrator. As what one of the administrators' said:

> Administrator L. I need ICT training especially now that almost everything is generated and submitted online from updates of enrolment of students, records of students like the LIS or Learners Information System. Even in our reporting of expense, we report online directly to the Central Office. No more paper document submission. *Man mano laengenngaag isubmit kami ti hard copies, isu a masapul mi a talagati training, continuous ICT training, Ma'am* [Seldom do we submit hard copies of reports already, that's why we really need training, continuous ICT training, Ma'am].

Table 5. Coefficient of correlation (r_{xy}) between the administrators' management effectiveness and each of the independent variables.

Independent Variables	Dependent Variable
	Management Effectiveness
Level of ICT Knowledge Readiness	0.173
Levelof ICT Competence	0.172
Attitudes towards ICT use	0.252
Beliefs towards ICT use	0.409*
Level of Social Influence	0.264
Level of Adoption and Use of ICT	0.572**

***significant at the 0.01 probability level; Critical Values: (2-tailed, α = 0.01, df = 29) = + 0.456*
**significant at the 0.05 probability level (2-tailed, α = 0.05, df = 29) = + 0.355*

Meanwhile, Table 5. shows that the administrators' management effectiveness level is not significantly correlated to their level of ICT knowledge readiness (0.173), level of ICT competence (0.172), attitudes towards ICT use (0.252), and level of social influence (0.264) as evidenced by the computed r values which are all lesser than the critical r value of 0.355 at the 0.05 level of significance. However, their level of ICT adoption and use in school management is

significantly related to their management effectiveness level because the computed r-value of 0.572 is higher than the critical r value of +0.456 at the 0.01 level of significance.

Likewise, the administrators' beliefs about ICT use is also significantly correlated to their management effectiveness level because the computed r value of 0.409 is greater than the critical r value of +0.355 at the 0.05 level of significance. Results of the interview also showed that the administrators have positive beliefs that ICT use is very beneficial and could improve school management.

Table 6. Regression of administrators' level of ICT adoption and use, attitudes towards ICT use, and social influence on the level of management effectiveness (N = 31)

	UnstandardizedCoefficients			
Variable	**B**	**Std. Error**	**t**	**Significance**
Constant	1.876	0.561	3.351	0.002
Adoption and Use of ICT (AUICT)	1.211	0.217	5.574**	0.000
Attitudes towards ICT use (ATICTU)	-0.987	0.251	-3.934**	0.001
Social Influence (SI)	0.337	0.143	2.361*	0.026
R^2	0.572			
Adjusted R^2	0.525			
F value for ANOVA	12.035**			
Significance of F	0.000			

It is evident in Table 6 below that of all the variables in the study, the administrators' attitudes towards ICT use (B = 0.748) is the best predictor of the administrators' adoption and use of ICT in school management. On the other hand, of all the variables of the study, the administrators' adoption and use of ICT (B = 1.211) is the best predictor of their management effectiveness. The administrators' attitudes towards ICT use (B = -0.987) and social influence (B = 0.337) are also good predictors of management effectiveness.

The above findings only mean that since the administrators reacted positively towards ICT use in school administration, they could adopt and use ICT at a very high level. A very high level of ICT adoption and use in school management could mean a very effective management. Likewise, the administrators' management effectiveness is very good if their attitudes towards ICT use and effect of social influence are very good.

CONCLUSION AND RECOMMENDATION

Based on the findings of the study, the researchers concluded that the administrators in the public secondary schools with fiscal autonomy in Ilocos Norte generally use ICT in the performance of their management functions, regardless of their age, gender, educational attainment and position. It is the amount of ICT training they have undertaken, the influence of significant others, their positive beliefs and attitudes toward ICT and its advantages that influence their decision to adopt and use it.

The administrators appreciate the benefits they have experienced in using ICT in instructional management, personnel administration, in general school management, in spite of the fact that the ICT equipment and infrastructure that most schools have and the trainings that administrators and teachers have undergone are insufficient.

This supports the Unified Theory of Acceptance and Use of Technology of [8] that user intentions to use an information system and subsequent usage behavior is influenced by performance expectancy or the degree to which the user believes that using the ICT can improve work performance which is, brief, the perceived usefulness of ICT to them, effort expectancy or the perceived ease of use of the technology to him/her, social influence or the degree to which one's decision to use ICT is influenced by significant others, and facilitating conditions or the degree to which an individual believes that an organizational or technical infrastructure exists to support use of the information system.

The very high level of adoption of ICT by the administrators in the performance of their management functions is influenced by their perception that ICT has made them very effective managers. This is why they are confident that they can become very competent in using ICT if they are provided sufficient trainings and enough time to use it. This is of course influenced by the new policy of the country's Department of Education (DepEd) of using the internet to issue memoranda and orders and to receive reports from the field. They also feel

confident that, although the schools are wanting in ICT infrastructure and equipment, these will be provided by the Department of Education and by other collaborating agencies.

These factors contribute to the administrators' very positive beliefs and attitudes toward ICT which are the predictors of the adoption and use of ICT to make them more effective as school managers.

With the conclusions that have been formed out of the results, it is recommended that an immediate action should be done by DepEd authorities on all the ICT resources and facilities that are identified generally not available, available but not functioning as well as those that are available, functioning but not used, and with those with limited accessibility. This is to assure that such facilities and resources shall be procured, fixed, updated or used properly so that the government's investment on these will not be put in vain.

It is also recommended that ICT-related seminars and trainings offered by DepEd and other granting institutions or agencies must be made compulsory to all ICT or computer teachers in particular and all teachers in general.

Likewise, DepEd in particular and the government in general, can take advantage of the school administrators' positive attitudes and beliefs to fully integrate ICT use in school management by providing them with the necessary ICT facilities and resources and greater access to ICT-infused training programs. They must be given more ICT-based management trainings, more specifically on online personnel record management, assessment in the 21st century classroom, online student record management, and collaboration in the digital classroom, must be conducted and offered to all school managers or administrators to enhance their ICT knowledge readiness and ICT competence and to harness fully the benefits of ICT in school management.

Regression result had shown that the administrators' attitudes towards ICT use is the best predictor of ICT adoption and use while ICT adoption and use is the best predictor of management effectiveness. These findings can be the bases of DepEd to plan and offer trainings tackling topics and pedagogical strategies that could maintain and further enhance the administrators' attitudes towards ICT use and level of ICT adoption and use via various modalities to yield a more effective and efficient management of the public secondary schools.

Results of the study can be used as basis for the planning and implementation of an effective management of the school program, a functional technology integration plan, and for the enhancement of courses for TEIs as regards ICT integration.

Lastly, other studies that are similar to this research more respondents from public secondary schools with fiscal autonomy in Region I and more variables that affect ICT adoption and use in management with must be conducted.

REFERENCES

[1] Njoka, M. S. (2015). The management challenge of using information and communication technology for administration of secondary schools in Kirinyaga County, Kenya. Retrieved online on April 10, 2018 from from https://www.mobt3ath.com.book-30901

[2] Adebayo, E.L. &Adesope, O.M. (2007). Awareness, access and usage of information and communication technologies between female researchers and extensions. International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 3, (1): 85-93.

[3] Purnomo, S. H. & Lee, Y. (2010). An assessment of readiness and barriers towards ICT programme Implementation: perceptions of agricultural extension officers in Indonesia. International Journal of Education and Development using Information and Communication Technology (IJEDICT), 6, (3):19-36.

[4] Feldner, L. M. (2003). The role of school administrators in supporting teachers in the integration of education technology into K-12 Classrooms. PhD thesis. North Dakota: University of North Dakota. Retrieved online on July 27, 2014 from http://0proquest.umi.com.oasis.unisa.ac.za: 80/pqdweb?did

[5] British Education Communications and Technology Agency (BECTA)(2009). Pupils and teachers perceptions of ICT in the home, school and community. Accessed online on January 28, 2014 from http://publications.becta.org.uk/download.cfm

[6] Brennen, A.M. (2007). Leadership versus administration. Accessed online on August 01, 2014 from http://www.soencoragement.org/ leadership-vs-administration.htm

[7] Young, M. &Dulewicz, V. 2008. Similarities and differences between leadership and management: High-performance competencies in the British Royal Navy. British Journalof Management, 19(1):1-5.

[8] Collis, B. (2003). Information technologies for education and training. In Adelsberger, H., Collis, B. &Palowski

[9] Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. G. (2003). User acceptance of information technology: Towards a unified view. MIS Quarterly, 27(3), 425 – 478.

[10] Love, Pe. E. D. & Irani, Z. (2004). An Exploratory study of information technology evaluation and benefits management practices of SMEs in the construction industry. Information and Management, Volume 42, Issue 1, December 2004, pp. 227 – 242.

[11] Ruiz – Mercader J., Merono-Cerdan A., & Sabater-Sanchez, R. (2006). Information, technology and learning: Their relationship and impact on organizational performance in small businesses. International JournalofInformation Management, Volume 26, Issue 1, February 2006, pp. 16 – 29.

[12] Ku Ahmad, R. (2013). Managing the use of ICT in schools: Strategies for school leaders. Accessed online on December 7, 2013 from https://www.academia.edu/528161/ Managing_the_ Use_of_ICT_in_SchoolsStrategies_for_ School_ Leaders

[13] Laaria, M. (2013). Challenges encountered by principals during implementation of ICT in public secondary schools, Kenya. Journal of Sociological Research, Vol. 4, No.2. Retrieved online on October 31, 2014 from www.macrothink.org/jour nal/index. php/jsr/article/download/3552/3283

[14] Yuan, Y., Filk, J., Shumate, M., Monge, P., Bryant, J.A., &Matsaganis, M. (2005). Individual participation in organizational information commons. Hum.Commun. Res., 31: 212-240. DOI: 10.1111/j.1468- 2958.2005. tb00870.x

[15] Kumar, N., Rose, R. C. &D'Silva, J. L. (2008). Teachers' readiness to use technology in the classroom: an empirical study. EuropeanJournalofScientificResearch. 21 (4): 603-616

[16] Maki, C. (2008). Information and Communication Technology for administration and management for secondary schools in Cyprus. Journalof Online Learning and Teaching. 4 (3).

[17] Manduku, J. G., Kosgey, A. K. And Sang, H. (2012). Adoption and use of ICT in enhancing management of public secondary schools: A Survey of Kesses Zone Secondary Schools in Wareng District of Uasin Gishu County, Kenya. Retrieved on December 08, 2013 from www.iiis.org/CDs 2012/CD2012SCI/EISTA_2012/PapersPdf/EA069V M.pdf

[18] Krishnaveni, R. &Meenakumari, J. (2010). Usage of ICT for information administration in higher education institutions – a study. International JournalofEnvironmentalScience and Development. 1 (3):282 – 286

[19] Ramalho C.P, (2006) The educational role of the Information and Communication Technologies (ICT): a Study of an intervention in a Portuguese basic level school

[20] Taylor, W. (2004). Good practice in the leadership and management of primary schools in Wales. Report to Estyn, Anchor Court, Keen Road, Cardiff CF24 5JW.

[21] Olayemi, A. O. And Omotayo, K. (2012). ICT adoption and effective secondary school administration in Ekiti State. European Journal of Educational Studies 4(1). Accessed online on November 15, 2014 from http://www.ozelacademy. com/%286%29ejes%20197%20olayemi%20gel.tar.%209 %20eyl%C3%BCl%202011%20paid.pdf