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ORIGINAL ARTICLE

Application of Information and Communication Technology (ICT) in Educational Administration: International Experiences and Vietnamese Policies

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ABSTRACT
Information and Communication Technology (ICT) has become an integral part in educational programs across the globe. Despite its prominent benefits in education perceived by most educators and administrators, key challenges to ICT adoption in educational management still exist. This study aims to review international experiences in applying ICT in educational administration and related policies in Vietnam. The research results show that while perceptions of the importance of ICT application in educational administration are diverse, ICT application has significant impacts on educational administration. Moreover, ICT application is effective in educational management in both general and higher education. The study also identifies several challenges affecting ICT application. Additionally, policies in ICT application in educational administration in Vietnam are discussed. In conclusion, the research proposes several recommendations to have effective policies on the application of ICT in Vietnamese educational administration.

1. INTRODUCTION

Information and communication technology (ICT) plays a significant role in educational administration in educational systems across the world. Many educational facilities in Vietnam are equipped with computers and IT devices to facilitate teaching and learning activities of teachers and students. In addition, some have been offering online learning schemes for those who cannot physically attend classes. However, online learning has only been blooming after the global health crisis. It can not be denied that the pandemic caused by the CoronaVirus (COVID-19) has been impacting education management. Moreover, adopting ICT in education management is a sign of innovation. It is denoted that innovation in educational management thinking is one of the decisive factors in improving the quality and effectiveness of educational activities in schools. In the era of international integration, under the influence of the 4th Industrial Revolution, new requirements and conditions have been set to transform national education, especially innovating and developing human resources for management educational theory (Tran et al, 2022). Therefore, reforming academic thinking in general and the thoughts of educational management staff is one of the critical tasks in the modern education context.

However, exploiting ICT applications depends on the user, such as teachers, school administrators, and staff from educational departments. They must recognize and understand the values brought by ICT applications so that they can perceive the benefits and try to use ICT applications more frequently. In addition, the users are also influenced by other users and how other users utilize ICT applications. Their usage behavior also depends on the quality of ICT applications. It is believed that if users do not have good experience with ICT applications, such as slow processing time, they are not willing to keep using such applications (Ng et al., 2023). It is important to identify influencing

factors at different stages of development. Consequently, barriers to successfully using ICT can be identified. An awareness of any obstacle that teachers and staff face could lead to the introduction of solutions to overcoming these barriers, developing helpful training programs, and encouraging the use of ICT.

In brief, the current study aims to investigate ICT application in educational administration in the global context to recommend ICT adoption in Vietnamese education administration. The results of this research study are expected to help policy-makers, teachers, non-teaching staff and other stakeholders recognize the role of ICT application policies in improving educational management. The research outcomes would serve as reference material for those who are interested in studying the effectiveness of ICT application policy to improve educational administration.

2. LITERATURE REVIEW

2.1. ICT concepts and impacts

The advent of ICT is regarded as a remarkable contribution of contemporary scientific and technological advancements, leading to significant transformations across several domains of daily existence. The term "ICT" emerged in the mid-1980s and was initially defined as encompassing various electronic systems utilized for broadcasting telecommunications and mediated communications (Parvez, 2011). This includes a range of examples such as personal computers, video games, cell phones, the internet, electronic payment systems, and computer software, among others. ICT encompasses the integration of computer systems and communication technologies. Computer technology serves as the means through which information is stored and processed in a digital format, while communication technology facilitates the transfer and dissemination of said digital information (Lis Education Network, 2014).

The utilization of ICT to effectively deliver services to individuals is a significant domain in which digital technologies can have a transformative impact on providing widespread benefits. ICT is a comprehensive concept that encompasses a wide range of communication equipment and application softwares. It includes various devices such as radios, televisions, mobile phones, computers, network hardware and software, and satellite systems. Additionally, ICT involves a variety of services and application software that are associated with it, such as video conferencing and distance learning. The significance of ICT lies not solely in their technological aspects, but rather in their capacity to enable improved accessibility to information and communication over vast geographical distances. ICT has been utilized in many novel manners to effectively generate societal outcomes, notably by facilitating the accessibility of fundamental services ranging from healthcare, financial services, to insurance (Shao et al., 2022). Obviously, the influence of ICT is extensive and worldwide, characterized by its significant scale, ubiquity, and utility. This is mostly attributed to its notable attributes, which include a substantial reduction in cost and size, as well as a remarkable enhancement in processing speed, storage capacity, and communication capabilities. ICT has a significant impact on the advancement and evolution of human civilisation. ICT encompasses a wide range of tools and technologies. These include computer programs, databases, communication networks, analysis and design methods, programming languages, artificial intelligence, and knowledge bases, among others. ICT has exerted a significant and enduring impact across a wide range of human endeavors (Lis Education Network, 2014).

2.2. Educational administration

The concept of educational administration has been provided in different academic research. The differences and similarities in defining educational administration among past researchers must be recognized to understand the concept in different aspects. First of all, Ali and Abdalla (2017, p.326) define educational administration as "a process of acquiring and allocating resources for the achievement of predetermined educational goals". In addition, Ali and Abdalla (2017) also highlight the difference between educational administration and its related concepts – educational management. They emphasize that educational management refers to a five-step process to achieve organizational goals in education, and this process includes planning, organization, directing, coordination, and controlling activities. Ali and Abdalla (2017) further elaborate two most important functions of educational administration namely educational goals achievement and maintaining the school's culture. Moreover, these researchers highlight the importance of keeping educational personnel in the educational administration process, from junior staff to chairpersons, to ensure high-quality education.

Moreover, Niah (2022, p.235) emphasizes educational administration as "a process or effort to achieve an educational goal by taking into account various components of education so that it can improve the education system

by utilizing various tools to support learning and teaching activities". The involvement of different educational components turns educational administration into a collaborative process. Niah (2022) further highlights that educational administration has evolved from traditional activity to Internet-based activity as education facilities adopt information technologies into their administration process to gain management advance and operation efficiency. It means that educational administration is enhanced using tools that support administrative and learning activities and it is being used intensively in modern educational organizations.

2.3. ICT application policy in educational administration

ICT has been adopted in the education context as a result of the digital era and ICT applications have been integrating deeper into every aspect of life (Pham & Nguyen, 2020). It is said that ICT adoption in education is motivated under the urgent need of innovative betterment and global connection; thus, enforcing policy-makers in both developed and developing countries to invest the effort in renovating educational environments such as using computers and Internet during the learning and teaching process (Nguyen & Le, 2012).

ICT application is being considered as an important task in the education industry of almost all countries. For example, the Ministry of Human Resource Development in India issued a National Policy on ICT in school education. This policy clearly highlights the requirements for automated and ICT managed school administration processes. For example, "library automation, locally cached offline access to internet resources, office automation, maintenance of records, student tracking, resource planning, using the existing ICT infrastructure will increase efficiencies" (Ministry of Human Resource Development, 2012, p.9). Behind that, this policy highlights the role of the school management information system (School MIS) which is acknowledged as a single clearing destination for all required information. This system is also helpful in tracking the student and the teacher's performance and early identifying corrective actions or learning/teaching needs. The US Department of Education (2017) also issued a national education technology plan with a focus on learning-engaging and empowering learning through technology, teaching with technology, technology application in assessment, high quality digital learning content, protection of student data and privacy, etc.

3. MATERIALS AND METHODS

The current research employed a qualitative research approach with document analysis. Qualitative research is a research methodology that aims to investigate and get a comprehensive understanding of complex real-world issues via exploration and analysis. This methodological approach involves the collection and analysis of participants' subjective experiences, perceptions, and behaviors. The response addresses the methods and rationales rather than the quantities or magnitudes. The study has the potential to be designed as an independent investigation, exclusively utilizing qualitative data, or alternatively, it might be incorporated into a mixed-methods research approach, which integrates both qualitative and quantitative data. This review provides an introduction to fundamental concepts, definitions, terminology, and the practical implementation of qualitative research (Tenny at al., 2022). One of the advantages of qualitative research is that it aims to generate in-depth descriptions of participants' emotions, viewpoints, and encounters, while also interpreting the significance of their behaviors (Denzin & Lincoln, 2015).

Document analysis is a qualitative research methodology employed by scholars and academics. The process entails the assessment of both electronic and physical documents in order to comprehend their content, acquire comprehension of their significance, and expand upon the information they offer. The process of document analysis facilitates the comprehension and classification of primary sources, which are first hand testimonies or original records provided by individuals who possess direct involvement or personal knowledge pertaining to the subject matter. Researchers utilize recognized sources to obtain ideas and facts in order to substantiate their assertions during the course of their study development. This procedure enables researchers to assess the quality and intended objective of the papers they utilize, with the aim of determining if the information contained therein will be advantageous to their scholarly pursuits (Indeed Editorial Team, 2023). In this study, the researcher collected documents in the form of academic papers and reports from the Google Scholar website, Web of Science, and Scopus databases. Moreover, the researcher also collected and analyzed legal documents and guidelines regulating policies on ICT application in education in Vietnam. Content analysis was used to analyze and interpret the characteristics and meanings of collected documents.

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Usage of ICT for information administration at educational institutions

The associated literature contains several studies on the use of ICT for information administration in the education sector. First of all, Krishnaveni and Meenakumari (2010) developed a theoretical model whereby student administration, staff administration, and general administration affect ICT-based information administration. To validate the relationship between factors, these researchers developed a structured questionnaire and collected the data from administrative personnel at higher education institutions. Using path analysis, they identified that student administration, staff administration, and general administration explained nearly 45% of the variance of ICT-based information administration. All of these factors had a significant and positive impact with the highest impact belonging to student administration. These researchers recommended that the schools should pay more attention to the application of ICT in general administration since it had the least impact on ICT-based information administration. In addition, they agreed that the integration of ICT into educational administration helped to reduce complexity and workload as well as to improve overall educational administration performance.

Additionally, Juma et al. (2016) conducted research on the roles of ICT in higher education administration at four universities in Uganda. They developed a questionnaire and gathered information from 40 administrators in a total of 48 selected by a convenient sampling approach. The questionnaire comprised 14 statements that represented different ICT roles, such as the support of analyzing data quickly and accurately, facilitating information gathering and dissemination, preventing financial dishonesty, etc. After the data had been collected, these researchers performed a quantitative research method, and the data was analyzed through the Chi-square test. The obtained results showed that ICT played a significant role in higher education administration in terms of facilitating effective and quick decision-making, analyzing data quickly and efficiently, facilitating information gathering and dissemination, enhancing the monitoring of educational facilities and resources, facilitating adequate data storage and enhancing data processing, improving coordination and productivity in educational administrative tasks and activities as well as reducing workload to the administrators, and enhancing educational planning process.

4.1.2. Perceptions of the importance of ICT application in educational administration

First of all, Apsorn et al. (2019) analyzed the perceptions of ICT leadership in educational administration in Thailand. There are 8 components of ICT leadership to be identified during the Confirmatory Factor Analysis, including establishing vision and operation guidelines, implementing ICT strategies and supporting ICT applications among teachers and students, developing and planning to improve ICT skills of schools' staff and teachers, creating an adequate environment and providing adequate resources for ICT usage, recognizing ICT-related challenges, serving as exemplars in daily use of ICT applications, sharing knowledge and developing ICT cultures, and supervising data storage and data update to early detect problems. In addition, these researchers identified a significant difference between schools' staff and teachers across different dimensions of ICT leadership. These researchers finally concluded that the school leaders e.g. school directors and heads of academic departments, must be equipped with adequate perceptions of ICT leadership. They should develop a vision and conduct actions to encourage teachers and staff to effectively use ICT applications that require detailed planning and training to improve ICT knowledge.

Moreover, Makewa et al. (2013) investigated the perception of the importance of ICT applications in secondary school administration among teachers and administrators at the University of Eastern Africa in Kenya. A questionnaire was developed and delivered to both teachers and administrators. 120 questionnaires were successfully retrieved, of which 89 questionnaires were filled out by teachers and 31 questionnaires by administrators. Using T-test statistics, these researchers quantified the difference in evaluation between teachers and administrators regarding the importance of ICT applications in student administration, personnel administration, financial administration, general administration, and supervision of instruction. They identified that personnel administration was the only administration area where there was no significant difference between teachers' and administrators' evaluations. However, they found that there was no significant difference between teachers' and administrators' evaluations in terms of the extent of use of ICT applications in educational administration. Overall, these researchers concluded that the values of ICT applications were undeniable since they brought benefits to ensure an advanced electronic administrative framework and aligned educational administration with information society strategies.

4.1.3. Effective ICT applications and ICT management

In general education, Palagolla and Wickramachchi (2019) studied the effective ICT applications and ICT management in secondary schools through the analysis of existing factors affecting the use of ICT. The data was collected randomly among 145 teachers from 30 secondary schools using a structured questionnaire. The factors were categorized into ICT infrastructure, leadership support, school planning, ICT competency, and attitudes towards ICT. These factors had a significant quantitative effect on the use of ICT, showing through very high R-square values when these researchers conducted correlation analysis. Moreover, these researchers quantified the effect of ICT usage on the work performance of the teachers. The obtained results showed that the use of ICT had a significant and high impact on work efficiency, saving work resources, work quantity and quality, career goals achievement, and improving students' outcomes, learning interest and creativity. To further improve the effectiveness of ICT usage in secondary schools, these researchers recommended that the schools must plan ICT applications carefully along with the conduction of training programs on both ICT knowledge and English skills. Besides, leadership and support roles must be formulated adequately to enhance the use of ICT.

Furthermore, Irene and Sprito (2020) analyzed the utilization of ICT in the effective administration of secondary schools in Uganda. They collected the data from 196 teachers and identified that the teachers had a lack of knowledge in terms of how to use ICT applications. Moreover, the teachers highlighted an issue related to the lack of computers for performing ICT applications. Another problem was raised as a result of an unstable power supply, leading to ICT equipment and hardware not being fully utilized. Based on these findings, Irene & Sprito concluded that the major problem with the effective use of ICT in the administration of secondary schools in Uganda belonged to technical issues. In addition, these researchers highlighted another issue related to the lack of ICT knowledge and skills that contributed to the underutilization of ICT. To solve the power supply-related problem, these researchers recommended the schools shift to solar energy and coordinate tightly with the Ministry of Education and Sports to ensure the adequateness of hardware and equipment provided to the teachers and the students.

In the higher education sector, Qureshi and Abro (2016) developed research on the efficient use of ICT in university administration in Pakistan. They constructed a questionnaire with 33 statements that were based on the literature review. The assessment was developed to evaluate the availability and accessibility of basic ICT applications, utilization of ICT applications, user satisfaction with ICT infrastructure, and problems faced by the administrators. The obtained results showed that the school administrators received good access to ICT hardware such as computers, but they did not have an Education Management Information System – EMIS. In addition, the utilization of ICT applications among school administrators was fairly limited given the fact that they were not well trained to effectively use ICT applications. Moreover, the administrators' satisfaction with ICT infrastructure was not so high, and they did not receive good motivation to use the ICT application and resources. This study also revealed key problems faced by the school administrators before they used ICT applications, including wastage of time, wastage of paper, transport expenditure, duplicated work, and difficulty in data retrieval.

4.1.4. Challenges affecting the use of ICT applications

The use of ICT applications has encountered a number of challenges. Yalley (2022) developed a study to identify key challenges impeding the use of ICT applications in pre-tertiary school administration in Ghana through the exploration of the satisfaction level of school administrators when they accessed and used ICT applications. A questionnaire was developed and collected from 15 administrators in two public key high schools. Key challenges to the use of ICT applications were highlighted as unstable power supply, inadequate facilities to support full integration of ICT, lack of necessary training on ICT programmes, and the reluctance among administrators to use ICT applications. Moreover, the administrators informed that they were satisfied with the ICT hardware equipment, but they were dissatisfied with Internet access and the accessibility of software and hardware as it limited the effective use of ICT. To curb these challenges, this researcher recommended that a periodic workshop/training and frequent monitoring and evaluation be conducted. In addition, Yalley highlighted the importance of establishing clear and transparent communication between the schools and State agencies such as the Ministry of Education to understand the current situation of ICT application and integration in school administration.

Additionally, Jacob (2020) investigated the ICT-related challenges faced by students of educational administration and planning at higher institutions in Nigeria. The data was collected from 50 students at each learning level, bringing the total number of respondents to 200 people. There were seven ICT-related challenges to be defined

in this study, including unstable power supply and Internet network, lack of personal laptops, lack of computer literacy among students and teachers, high ICT services cost, and poor infrastructure support for ICT. They further conducted a Chi-Square test and reached a conclusion that there were challenges preventing students of educational administration and planning from the effective use of ICT applications. Based on these findings, Jacob recommended that the government in Nigeria should develop policies to provide more laptops and personal computers to the students while education facilities must further increase the use of ICT to at least 70% of total teaching and learning courses. In addition, ICT service providers in Nigeria should review the service pricing to ensure stable and high-quality services in the education industry.

4.2. Discussion

In the context of Vietnam, the Government has developed several policies to address the need for ICT application in education, especially in educational administration. It shows through the orientation of the government on the application of ICT in education, educational policies issued by different ministries, the context of K-12 education reform, IT infrastructure and equipment, and the capacity of teachers to use ICT in teaching and learning.

First of all, the Vietnamese Government issued Decree No. 64/2007/ND-CP dated 10 April 2007 on information technology applications in operations of the State agencies. The objective of this policy is to promote the adoption and the use of ICT in the operations of the State agencies, to leverage the efficiency in their operations and transactions, and to promote publicity and transparency. Throughout this policy, the Government highlighted the importance of digital transformation, the use of electronic documents, building information infrastructure in State agencies' services, etc. Another important guidance in the Decree is the development of IT human resources that will be achieved through training quality and proper human resource planning. The Decree also recommends that State agencies elaborate investment in IT applications for the next 5 years along with the projected budget and expected benefits.

Another important policy issued by the Vietnamese Government is Directive No. 02/CT-TTg of the Prime Minister effective on 22 January 2013 on a comprehensive renovation of education and training to meet the demand of industrialization and modernization of the country. One of the key contents in this directive is the promotion of developing foreign language and IT learning contents across the national education system. Moreover, the Prime Minister assigned the Ministry of Planning and Investment to coordinate with other ministries in attracting foreign and domestic investment in education and training, especially from countries with modern ICT and high education backgrounds.

In 2017, the Vietnamese Government continued to implement Decree No. 117/QD-TTg with the objective of increasing the application of ICT in education management and administration as well as enhancing learning and teaching quality during 2016-2020 and with vision to 2025. This decree sets out clear targets for education facilities in Vietnam until 2020 and 2025. In more detail, the Decree requires the development and establishment of national education data, educational administration must be processed online in State educational agencies, 70% of meetings in State educational agencies must be online, and 70% of training sessions in State educational agencies must follow the blended training method.

Along with decrees and directives from the Government, there were different policies issued at the ministry level to support ICT adoption in Vietnam's education industry. For instance, the Ministry of Education and Training issued Circular No. 21/2017/TT-BGDDT on the 6th September 2017 to regulate the application of ICT in online training activities for teachers and education administrative personnel. This Circular highlights the need to establish an online learning management system with some basic functions, such as managing and allocating courses to the learners, so that they can access learning content and learning progress online and provide a forum for sharing learning experiences. Later, the Ministry of Education and Training continued to issue Guidance on conducting IT missions for the school year 2019-2020 (No. 3946/ BGDDT-CNTT on the 30th August 2019). This guidance highlights key ICT application activities in educational administration. The first activity is to implement and effectively use the education database and to ensure all education facilities share the data in time and in a quality manner. The second activity is to promote the application of online applications to connect the schools, the teachers, the students, and the parents. The third activity is to adopt an electronic office to share documents between educational facilities and process admission online.

5. CONCLUSION AND RECOMMENDATIONS

The application of ICT significantly contributes to the improvement of educational standards. The utilization of ICT in educational institutions is currently prevalent for administrative and managerial purposes. This is mostly attributed to its effectiveness in streamlining various administrative tasks, such as data storage, knowledge management, and decision-making processes. Several advantages of ICT application in global contexts have been observed. ICT facilitates a conducive environment wherein students, teachers, administrators, and parents can readily engage in effective communication and collaborative endeavors. With the help of ICT, school administrators have 24/7 access to a wealth of secure, globally accessible information. Through internal computerization and automation, ICT helps school administrators act more efficiently, which in turn increases openness and responsibility.

The Vietnamese Government has been aware of the importance of ICT application in education. They have put a lot of effort into renovating education and training by promoting ICT applications and technologies. However, there are still gaps between Vietnamese policies and international experiences in ICT application in educational administration. In order to narrow these gaps, several recommendations are proposed. First, the managers must conduct a gap assessment to understand critical issues related to using ICT applications. They must be aware of challenges and the concerns of their teachers to identify the gap closure actions. To do that, the managers can establish a team that takes the responsibility of reviewing the IT capabilities of the teachers and other staff. They must act like an IT-oriented business to capture the demands of the teachers and coordinate with the IT team and school management team to identify solutions.

Second, the managers should ensure adequate training for the staff on how to use ICT applications. The training content includes the benefits of using ICT applications and technique training to help the teachers operate ICT applications more effectively. In addition, the trainers must collect feedback from the teachers after every training session to understand training gaps and improvement opportunities.

Third, managers should renovate their ICT application framework and platform. It can be done by integrating cloud-based ICT applications instead of non-prime solutions. The investment into cloud-based ICT applications allows the teachers and the staff to use and proceed with educational administration anytime and anywhere. It will bring convenience to end-users and increase their positive behavioral intention to use ICT applications.

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