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Current status of school management in the industrial era 4.0: A case study in Kien Giang, Vietnam

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Abstract

Information technology has vigorously promoted renovating Vietnam's education and training system. The current status of school administration in the context of the 4.0 technology era is of concern. The widespread deployment of educational management support websites/applications helps the education sector increase the efficiency of management and the quality of teaching and learning activities in education. In this article, we survey information on using educational management support websites/applications in a specific Kien Giang province, Vietnam, case with a sample size of 85 individuals. The survey results show that academic units have not agreed on educational management software; the software is used a lot but is still fragmented and mainly uses websites from the Ministry of Education and Training of Vietnam. In addition, the article also assesses whether educational management websites/applications are practical based on the evaluation of teachers participating in the survey. Through the survey results, we propose to study further the causes of the status of using websites/software to have a more specific view of this issue.

Introduction

Education is a characteristic activity of social labor, a professional activity that transmits and perceives socio-historical experiences across generations and is a driving force for social development (Tran et al., 2011). Education must be organized into institutions for this activity to operate effectively, creating a unified system, leading to a necessity for a relatively independent field of activity in education, which is educational management. Educational management is seen as a specialized activity for managing educational institutions. There are many different conceptions of educational management; for example, according to Kondakov, *Educational management* is the systematic, planned, conscious, and goal-directed impact of managers at various levels on all system links (from the Ministry to the school) to achieve the goal. The aim is to ensure the young generation's personality formation based on awareness and application of the general laws of society,

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the laws of the educational process, and children's physical and psychological development (Kondakov, 1974). According to Pham, *education management* is a purposeful, planned, and lawful impact system of the governing body for the system to operate according to the guidelines and principles of the Party within the scope of its responsibility. that is, to bring the school to operate according to the educational principle towards educational goals and training objectives for the education sector, for the young generation and each student" (Pham, 1986).

School is a social-state grassroots educational institution directly responsible for educating the young generation. According to Pham (1986), school management implements the Party's academic line within its responsibilities, that is, operating the school according to educational principles to advance educational and training goals for the younger generation. School is the fundamental objective element of all levels of educational management, as well as an independent and self-governing system of society. Therefore, school management must necessarily be both state and social (the state and community society and cooperation in school management)" (Tran, 2012).

During the late 1970s, numerous countries worldwide recognized the profound impact of information technology on national development. As information technology became increasingly prevalent, many countries swiftly formulated strategies to implement it in education and training. By 1990, integrating information technology into teaching and educational management had become a pivotal issue, officially addressed by UNESCO in an action program leading up to the 21st century. Furthermore, UNESCO anticipated that information technology would fundamentally transform education in the early 21st century, asserting its significance as a global concern and advocating for its introduction in schools.

Confronted with the rapid advancement of information technology, the Resolution of the Communist Party of Vietnam's Central Committee during its eighth term emphasized the urgent need for educational reform. It called for a shift away from the one-way transmission of knowledge toward fostering critical thinking and creativity among students. The resolution also stressed the gradual adoption of advanced methods and tools in teaching and learning, ensuring students have sufficient time and resources for independent study and research (Central Committee of Communist Party of Vietnam, 1996).

Recently, the Ministry of Education and Training of Vietnam released Project "Strengthening the application of information technology in nanagement and supporting teaching and scientific research activities, contributing to Improving the Quality of Science and Technology" in the official letter no. 4446/BGDĐT-CTTT, dated September 8, 2017, outlines the information technology tasks for the 2017–2018 school year (Ministry of Education and Training, 2017a).

The Educational Management Information System (EMIS) is a platform for managing educational information and administrative tasks (Hua & Herstein, 2003). EMIS is the information management entity responsible for handling the country's educational data (Charles, 2003). Its core features encompass data collection, accumulation, management, analysis, and facilitation of educational processes. EMIS enables policymakers to access accurate and timely information, aiding in regulation, development, project planning, and other legal functions. It caters to the physical needs of educational institutions, facilitates resource distribution, and supports policy formulation, planning, budgeting, policy research, analysis, monitoring, evaluation, communication, access, and collaboration.

In Vietnam, the integration of information technology in education is crucial. Educators and educational institutions are encouraged to judiciously employ information technology across various domains, from administration to teaching. Companies like Viettel, VNPT, and PROSOFT actively contribute to developing and implementing EMIS for the education sector through educational management software such as SMAS, vnEdu, and VietSchool.

Kien Giang is one of Vietnam's dynamic, innovative, and wealthy Southwestern provinces, and digital transformation work has been promoted by the province's leaders from management to education (Nguyen, 2019). The education sector has deployed the electronic contact book system through VNPT's VNedu and Viettel's edu. one, furnishing 132,639 user accounts to 125 schools within Kien Giang province, and 100 percent of schools therein apply online teaching and learning platforms (Khanh Thuy, 2023).

Literature Review

According to Cao's research on "Managing information technology application activities in teaching in high schools in Vinh Long province", educational institutions in Vinh Long province are well aware of the role of information technology application in education teaching and academic management. Teachers in Vinh Long province schools have not used various management tools and often use software and

applications to support student and administrative management (Cao, 2018).

Research by Tran on the current status of using educational management information systems in An Giang province shows that the Education Management Information System (EMIS) has been put into use in many schools in countries around the world for a long time, and EMIS has also been put into use in Vietnam's education industry. Many technology corporations in Vietnam have used information system management programs for the education sector in many provinces and cities nationwide. Although educational units use many applications, they still have not been unified, so management information systems' efficiency and economic efficiency are not high (Tran et al., 2017).

The above studies show that the issue of "School administration in the 4.0 era" has been promoted by Vietnam, but research on it is still not known. Therefore, this study evaluated the current status of using websites/apps in educational management in the Mekong Delta, specifically in Kien Giang province.

Methodology

Research subjects, time, and model: This study surveyed 85 teachers working as managers at educational institutions in Kien Giang province in June 2023. The researchers employed a cross-sectional survey model to gather data and insights. This model involves collecting information from a specific population at a single time. Using this approach, the researchers could examine various variables and factors within the given timeframe (Louis, Lawrence, & Keith, 2007).

The research instrument is the questionnaire, which gathers information from Pham and Nguyen (2011). Consent, satisfaction, and response were measured using the Likert scale, as suggested by Allen and Seaman (2007). To provide relatively accurate assessments of the levels, a Likert scale range of 5 with an interval of (5–1)/5 = .8 was utilized, as recommended by Narli (2010) and Yavuz et al., (2013). Consequently, the scale's interpretations were established as follows: $1.0 \leq M < 1.8$ (Extremely inefficient); $1.8 \leq M < 2.6$ (Inefficient); $2.6 \leq M < 3.4$ (No idea); $3.4 \leq M < 4.2$ (Efficient); $4.2 \leq M \leq 5.0$ (Extremely efficient).

Sample collection and measuring the reliability of questionnaires: The survey form after the design was conducted to adjust the survey before conducting the official survey (Dinh et al., 2011a, 2011b). Cronbach's Alpha is a statistical measure to assess a scale or questionnaire's internal consistency or reliability (Cronbach & Lee, 1951). It quantifies how much the items within the scale or questionnaire measure the same underlying construct or concept. A higher Cronbach Alpha value indicates more vital internal consistency and suggests that the items in the questionnaire are reliable in measuring the intended construct. In this case, the Cronbach Alpha analysis revealed a value of .72 for the questionnaire. Since this value exceeded the commonly accepted standard of .60, the questionnaire has satisfactory internal consistency. The reliability condition set for the study was met, implying that the items in the questionnaire reliably measure the desired construct.

Data analysis: Data after the collection was encrypted and processed by SPSS v.21 software. The Mann-Whitney U test was applied to qualify the different views between male and female teachers, two groups of working seniority (teachers with ≤ 20 yrs and > 20 yrs of teaching) with a significance level of $p < .05$.

Results and Discussion

Survey Participant Information

A survey was conducted to evaluate the effectiveness of educational management support applications utilized in educational institutions within the Kien Giang province. The primary focus of the survey questions revolved around the usage and utilization of educational management support applications. The study also sought to assess the participants' perspectives on the effectiveness of each application.

The survey encompassed a random sample of 85 individuals, consisting of both male and female teachers. Female teachers represented 24.7 percent of the sample, while male teachers accounted for 75.3 percent. All participants were currently employed in educational institutions in the Kien Giang province. Furthermore, it is worth noting that most respondents possessed considerable seniority and extensive teaching experience. For a comprehensive overview of the respondents involved in the study, please refer to Table 1.

Table 1 Survey participant information

Participant information		Numbers	Percent
Sex	Female	24	24.4
	Male	61	75.3
Seniority	≤ 20 years	74	87.1
	> 20 years	11	12.9

Applications Used in Educational Units

Education and training institutions rely on effective management systems to organize and handle data, ensure confidentiality, and integrate various features that simplify the data management process. This allows institutions to meet the needs of individuals by providing efficient data backup and retrieval solutions. Education businesses, such as those involved in student administration and finances, can alleviate concerns about data loss and lack of control by implementing education management software.

In today's digital era, utilizing educational management software has become an immensely beneficial approach for education and training institutions. A survey among 85 teachers from academic units in Kien Giang province examined the usage of 13 websites/apps belonging to four educational management groups (Table 2). The survey results indicate the following:

1. *Administrative and enrollment management websites/applications:* The most frequently used websites/apps are "Education and training database management" and "Online admissions (E-GET)," with usage rates of 1.67 percent and 1.53 percent, respectively. Other software, such as entrance exam and graduation exam management (6.02%), document management (6.98%), and emulation and reward management (5.47%), are utilized to a lesser extent.

2. *Websites/apps that support student management:* The SMAS score management software from Viettel Telecommunications group demonstrates higher dominance, with a usage rate of 8.62 percent, compared to the VNEdu score management software issued by VNPT Telecommunications group, which has a usage rate of 5.47 percent.

3. *Websites/applications for quality control and inspection*: these software solutions are relatively popular, with 7.66 percent and 5.41 percent usage rates.

4. *Tax, financial, and facilities management websites/applications:* apart from the MISA human resource management software, which is utilized at 9.71 percent, the other software in this category is not widely adopted in educational management.

In general, the use of websites/applications to support database management by educational institutions differs in 4 areas. Websites/apps introduced and implemented by the Ministry of Education and Training of Vietnam are used more than websites/apps released by carriers or other units. This may be because websites/apps released by the Ministry of Education and Training of Vietnam are free and universal for high schools from urban to rural areas, whereas the reverse case is for carriers or other units. In addition, educational institutions in Kien Giang province are using many information technology applications to manage education, but this information system is still fragmented and not unified. This result is similar to the study on "the current state of education management information systems in An Giang province" (Tran et al., 2017).

Table 2 Applications used in educational institutions

Contents		Number	Percent
Administrative management, enrollment	Education and training database management	78	10.67
	Management software for entrance exams and graduation exams	44	6.02
	E-GET Online Admissions (E-GET)	77	10.53
	Document management software: VIC	51	6.98
	Emulation and reward management software	40	5.47
Student management	Point management software VNEdu	40	5.47
	Score Management Software (SMAS)	63	8.62
Quality control and inspection	Quality control software	56	7.66
	Management Information System Accreditation of Standard Schools at all levels	41	5.61
Management of taxes, finance, facilities	Personnel and asset management: MISA	71	9.71
	Tuition fee collection (Viettel/VNPT)	43	5.88
	Social insurance (VNPT)	48	6.57
	Tax Administration (VNPT)	36	4.92
	Online public service (Viettel)	43	5.88

This situation can be attributed to the role of the Ministry of Education and Training of Vietnam, which spearheads the implementation of information technology in educational management. In addition to the official dispatches such as plan No. 345/KH-BGDĐT on the performance of the Project "Strengthening the application of information technology in management and support for teaching - learning activities, scientific research, contributing to improving the quality of education and training in the period 2016–2020, with a vision to 2025" (Ministry of Education and Training, 2017b), websites that orient and support academic units in managing and teaching are also introduced and put into use. The websites of the Ministry of Education and Training are usually official websites with high reliability, so educational institutions widely use them.

The Effectiveness of Educational Management Support Websites/Apps

After analyzing the survey responses from 85 teachers working in educational institutions across Kien Giang province provinces, it was discovered that most teachers participated in the study. The survey findings indicated that the websites and applications utilized within the educational units were deemed effective in several aspects. Specifically, the evaluation scores were as follows: Functionality (Q11, 3.58±0.03 SE), Performance (Q12, 3.47±0.04 SE), User interface (Q13, 3.49±0.04 SE), Security (Q14, 3.52±0.04 SE), Flexibility & scalability (Q15, 3.42±0.04 SE), Support & maintenance (Q16, 3.43±0.03 SE), and General comment (Q17, 3.47±0.04 SE) (Table 3).

Upon analyzing the data based on gender, it was observed that male and female teachers had varying mean assessment scores, and these differences were statistically significant across several categories: Q11-Q17 (Mann-Whitney U, $p < .001$ for all cases) (Table 3). The discrepancy in ratings between male and female teachers signifies their differential proficiency in applying the software. Aside from their teaching responsibilities and professional activities within the school, female teachers often dedicate significant time to caring for their families. Consequently, some female teachers have limited opportunities to enhance and update their knowledge. Moreover, the considerable disparity in the number of male and female teachers participating in the survey also contributes to this outcome.

On the other hand, when examining the impact of seniority, there were no statistically significant differences in the average assessments between teachers who had been in the profession for over 20 years (> 20 years) and those with at least 20 years of experience (≤ 20 years). Specifically, the scores were as follows: Q21-Q27 (Mann-Whitney U, $p > .05$ for all cases) (Table 4). This outcome can be attributed to the nature of the survey respondents. The teachers who participated in the survey had a minimum of 15 years of experience in the education industry. These individuals possess significant expertise in teaching, management, and other related areas. As a result, they are more likely to adapt easily to the digital transformation process within the field of education, effectively fulfilling the educational objectives outlined by the Ministry of Education and Training of Vietnam.

Table 3 The effectiveness of educational management support websites/apps regarding sex

Code	Contents	Mean±*SE*	Female	Male	Mann -Whitney U
Q11	Functionality: completeness, accuracy, and reliability	3.58±0.03	3.86±0.06	3.47±0.05	Z= -3.66 p = .00
Q12	Performance: processing speed, smooth operation, system scalability	3.47±0.04	3.76±0.07	3.39±0.04	Z = -3.63 p = .00
Q13	User interface: easy to use, friendly, clear structure, intuitive, interactive, attractive graphics	3.49±0.04	3.77±0.05	3.41±0.04	Z = -3.48 p = .00
Q14	Security: access permissions, login control, data protection	3.52±0.04	3.75±0.06	3.45±0.04	Z = -2.63 p = .01
Q15	Flexibility & scalability: customize the configuration to suit user requirements, scale as needed	3.42±0.04	3.71±0.06	3.34±0.44	Z = -3.35 p = .00
Q16	Support & maintenance: documentation, technical support, updates, etc.	3.43±0.03	3.74±0.06	3.34 ±0.05	Z = -3.87 p = .00
Q17	General comment	3.47±0.04	3.75±0.06	3.39±0.04	Z = -3.43 p = .00

Note: 1.0 ≤ M < 1.8: Extremely inefficient; 1.8 ≤ M < 2.6: Inefficient; 2.6 ≤ M < 3.4: No idea; 3.4 ≤ M < 4.2: Efficient; 4.2 ≤ M ≤ 5.0: Extremely efficient

Table 4 The effectiveness of educational management support websites/apps regarding seniority

Code	Contents	≤20 years	>20 years	Mann -Whitney U
Q21	Functionality: completeness, accuracy, and reliability	3.66±0.05	3.49±0.05	Z = -1.53 p = .13
Q22	Performance: processing speed, smooth operation, system scalability	3.57±0.05	3.41±0.05	Z = -1.60 p = .11
Q23	User interface: easy to use, friendly, clear structure, intuitive, interactive, attractive graphics	3.56±0.05	3.44±0.05	Z = -.88 p = .38
Q24	Security: access permissions, login control, data protection	3.63±0.05	3.45±0.05	Z = -1.56 p = .12
Q25	Flexibility & scalability: customize the configuration to suit user requirements, scale as needed	3.49±0.05	3.38±0.05	Z = -.92 p = .36
Q26	Support & maintenance: documentation, technical support, updates, etc.	3.54±0.05	3.35±0.05	Z = -1.80 p = .17
Q27	General comment	3.55±0.05	3.43±0.05	Z = -.97 p = .33

Note: $1.0 \le M < 1.8$: Extremely inefficient; $1.8 \le M < 2.6$: Inefficient; $2.6 \le M < 3.4$: No idea; $3.4 \le M < 4.2$: Efficient; $4.2 \le M \le 5.0$: Extremely efficient

Vietnam's Ministry of Education and Training has also created favorable conditions for educational institutions, particularly in providing physical resources and support. This enables these institutions to successfully implement the digital transformation process, as outlined in Circular No. 39/2021/TT by the Ministry of Education and Training of Viet Nam, which addresses the "minimum list of teaching equipment" (Ministry of Education and Training, 2021).

Proposed Solutions

Improving the effectiveness of websites/apps to support school management in particular or digital transformation in education, in general, requires the development of digital learning resources that can be shared across the industry, including electronic lectures, multimedia digital learning materials, electronic textbooks, simulation software, and other learning materials; develop an online question bank system for subjects; Deploy a platform to provide online courses. Encourage the development and exploitation of big data and artificial intelligence in education. Only then can we promote and improve the effectiveness of websites/apps in educational management.

Conclusion and Recommendation

The findings indicate that educational institutions in Kien Giang province have employed diverse websites and applications to facilitate education management. However, these platforms lack consistency and centralized data management capabilities. Based on feedback from 85 teachers surveyed in Kien Giang province, these websites and apps have proven effective, yet their implementation remains limited in many regions. Given these research outcomes, further comprehensive investigations are essential to delve into the reasons behind the adoption of websites and software to provide a clearer perspective and propose measures to address this issue.

To gain a broader understanding of the challenges associated with utilizing educational management websites/applications, it is imperative to extend the scope of research and delve deeper into the root causes of these problems.

Conflict of Interest

The authors declare that there is no conflict of interest.

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