EDUCATION

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Solutions for development of smart education in the current situation of Vietnam

Abstract

Based on the determination of the connotation of smart education, and requirements on the conversion from traditional education to smart education, this article would like to estimate the number of works for building and developing smart education. From that, the article will identify difficulties and challenges, and propose solutions for the development of the smart education to the management levels from the schooling management to education and training authorities in the current situation of Vietnam.

1 Introduction

In recent years, Smart Education (**"SE"**) is a hot topic in the education development programs of many countries. The term of the SE is gradually familiar and mentioned as a necessary attribute of modern education. In Vietnam, there have been many conferences, seminars on solutions for building and developing for the SE in many management levels. However, it seems that the specific connotation on the SE is still quite unfamiliar to a part of management officers and teachers.

This article investigates several approaches for building SE; discusses difficulties and problems; then suggests new solutions for the current education background in Vietnam. The development of SE is based on analyzing deficient aspects of Traditional Education (**"TE"**), thus forming, and developing the required contents for SE. Solutions are proposed for all management levels from central to school base units, in line with the policies for education development of the country.

2 Research Contents

2.1 What are Smart Education and Smart School?

2.1.1 Smart Education

The SE has been used since 1990s of the XX century together with the application of Information Technology – Communication (**"ITC"**) in teaching activities. Since 2010, the term of SE (in English: Smart Education) has been gradually formed by five features being in line with 05 characters of the word of SMART [1], as follows:

- S: Self-directed – It is an education that will create high self-direction for learns by using online learning, learning anywhere, anytime, using the cloud, etc., increase the learning time, and create high efficiency in teaching.
- M: Motivated – It is the change, renewal, and expansion of educational methods to create a driving force to improve efficiency and educational quality.
- A: Adaptive – It is the expansion of abilities for teaching and learning, creation of various, flexible compatibility.
- R: Resource enriched – It is a variety of documents, textbooks, schoolbooks to help learners to easily approach.
- T: Technology embedded – It is an expansion of application for ITC, digital technology, means of Industry

2.1.2. Smart School

It is easy to understand that the SE will include smart schools (**"SS"**). In the Netherlands, the SS is a "kind of school that is flexible for characteristics and abilities of students" [6]. In Malaysia, the SS is considered as an educational institution where the operation of teaching process and educational management creating systematic impetus for changes which help learners to overcome challenges from the era of information technology [4].

So it might be understood that the SS is an educational institution which can create the SMART in teaching and educational activities, such as the characteristics of the SE (self-direction, innovation of methods, compatibility, digital enriched resource and application of the ITC). Therefore, in other aspect, it might be also understood that the processing of building of the SE will be from the creation of environment, conditions and building of the SS. Hence, the difficulties, solutions for building the SE in this article will not be separated between the SE and the SS.

2.2 Conversion from traditional education to smart education

2.2.1 Approach based on basic characteristics of SMART

Table 1 describes the basic differences based on 05 characteristics of the SE, which is also the necessary conversion from the TE to the SE. It will help educational managers at all levels to figure out works that need to be done based on their managerial functions.

2.2.2 Approach based categories to create educational quality

It might be imaged that the conversion from the TE to the SE by three categories, which creates the quality for education and training, are contents, means, and methods.

From a philosophical point of view, the combination of three categories of contents, means, and methods will result in the quality of an activity. Of which, the contents are contents, educational programs (expressed by documents, educational resource), methods are management methods, teaching-learning methods; means are technical and material facilities of schools. Table 2 describes the necessary conversion from the TE to the SE of such three categories.

2.3 Research methods

Based on the theoretical basis of connotations of Smart Education (SE) and Traditional Education (TE), we predict the tasks that needed to develop SE from a TE approach. We all know that the development of SE must start from the development of smart schools, as schools are the cellular units of education. Therefore, the scope of SE development encompasses the mandates of all levels of management from the policy level, the strategic level to the operational level. That is the reason to propose solutions to develop SE for all levels in accordance with Vietnam's management decentralization.

To test the assessment of the current situation, the urgency and feasibility of SE development solutions, we have built a questionnaire system for specific content group as follows:

– *Identification of the specific connotation of SE includes a question, in which suggestions about the connotation of SE are:* Creating rich learning materials, innovating teaching and learning methods, prioritizing skills training for students, expanding learning opportunities and increasing the use of Information Technology in teaching and studying.
– *Assessment of the current situation of SE in Vietnam (6 questions):* General perception of education administrators at all levels, financial resources to expand digital learning materials; technical knowledge and skills to deploy SE of teachers; facilities for teachers, students and schools.

– *Evaluation of the urgency and the feasibility of each solution:* 15 questions for 15 solutions for all education management levels from central to base units (as presented in 2.4).

Questionnaire system is designed and sent to survey subjects through the tool "Google form". Respondents do the answer objectively according to their own thoughts. Subjects who did the survey were 2,561 people with the following structure:

– *By regions of Vietnam:* The North 30%, the Central 28% and the South 42%.
– *By composition:* Education administrators 32% (820 people); teachers at all education levels 68% (1,741 people).

The results are collected and synthesized to support the assessment and reviews presented in the respective content of the article.

2.4 Difficulties, challenges in the current situation of Vietnam

From the descriptions in Table 1 and Table 2, it might be seen works that need to be done to build the SE. The workload is not small, challenges, requirements for the revolution of Industry 4.0 are coming, while the foundation of Vietnam in human resources, finance, and facilities-technologies are still low.

In world, since 1997 the project of the SE has been implemented in Malaysia. In 2006, the project named "Smart Nation Master Plan" has been carried out in Singapore, which included the SE. In 2011, Korea has issued a plan for building the SE. In 2012, Australia has designed the SE system in which learners are centered. In 2014, the U.S has implemented the project for the SS by the application of modern technology in each classroom [5].

In Vietnam, there was Resolution No. 36-NQ/TW of the Politburo (the Communist Party of Vietnam on promoting the application of IT development to satisfy requirements for sustainable development

TABLE 1 Differences between the TE and the SE based on SMART characteristics

Contents	Traditional Education	Smart Education
S: Self-directed	Learning mainly in class, restrictive, lack of flexibility	Increasing learning time by online learning, cloud technology etc.
M: Motivated	Poor forms and teaching methods, lack of innovation	Extreme expansion and innovation for teaching methodology
A: Adaptive	Lack of various teaching-learning skills and abilities	Expansion for skills and abilities which create the compatibility for all objectives
R: Resource enriched	Books/printed documents, traditional libraries being main resources; limited explored methods	Rich resource (books / printed documents, digital books/ documents, e-library, etc.), opened resources being easy to explore, use anywhere and anytime
T: Technology embedded	Not many applications of the ITC, digital technology in management education	Expansion for applications of the ITC in all stages of management and teaching.

TABLE 2 Conversion from the TE to the SE based on categories to create qualities of educational activities

Categories	Traditional Education	Smart Education
Resource (educational contents)	Main resources being books/printed documents, traditional libraries; limited explored methods	Rich resources (books / printed documents, digital books/ documents, e-library etc.), opened resources being easy to explore, use anywhere and anytime
Methods for management and education	– Poor forms and teaching methods, lack of innovation – Lack of various teaching-learning skills and abilities	– Extreme expansion and innovation for teaching forms, methods – Extreme expansion and innovation for teaching forms, methods
Means for management and teaching-learning	– Learning mainly in class, restrictive, lack of flexibility – Not many applications of the ITC, digital technology in management education	– Increasing learning time by online learning, cloud technology etc. – Expansion for applications of the ITC in all stages of management and teaching.

and international integration. Until 2017, Decision No. 117/QD-TTg on approving the project named "improving the application of information technology management and supporting teaching-learning, science research activities to improve the quality of education and training in the period 2016–2020 vision to 2025" has been issued by the Prime Minister. Those are very important prerequisite steps, but creating a foundation for building real education is just the beginning.

We have conducted a large-scale survey of 2,561 persons who are educational managers (in divisions/departments of education and training accounting accounting for 2% of the total of interviewees, 30% being managers in schools), preschool teachers (12%), and schoolteachers in all three regions of the North, Central and South of Vietnam. The reality of difficulties and challenges identified by the interviewees are as below.

2.4.1 Identification of smart education

With the characteristics of the SE as mentioned in Table 1, there are 15% of the respondents thought that it is very correct, 68.9% for correction, 15.3% for correction but insufficiency, and 0.8% for wrong.

When being asked about the importance of the SE in the current situation, there are 38.1% interviewees thought that it is very important, 59.6% for importance, and still 2.2% (58 persons) for littleness and unimportance.

Therefore, in general, the educational managers, teachers have correctly identified the basic connotation and the importance of building the SE. It is a plus point for consensus on the implementation. But the understandings of the SE connotation are not consistent.

2.4.2 Difficulties and challenges in building smart education

As for the evaluation of all level educational managers' general knowledge on smart education, there are 9.3% of them thought that it is very correct, 65.2% for correction, 25.1% for not yet correction and 0.4% for wrong acknowledge. The result has shown the possibility, but the propaganda, advocacy, training, guidance will be continuously performed.

As for the finance to expand digital resources (e-library, e-textbook, etc.), there are 31.3% of them thought that it is enough to satisfy the demand, 68.6% for being insufficient or too difficult.

As for the professional and technical knowledge and experience for the operation of the SE of teachers, there are 52.6% of interviewees thought that it is still insufficient or weak, 36% thought that it is generally sufficient, only 11.4% said that it is enough to build the SE.

As for the facilities for teachers (computer, personal Internet, etc.) which are still poor and difficult, there are 3.8% thought that it is insufficient and outdated, 50.6% evaluated that it is available but not equal, 34.5% thought that it is generally enough, and only 11.1% evaluated that it is sufficient.

As for the facilities for learners (computers, personal Internet, etc.), there are 8.6% thought that it is not too much and outdated, 58.6% evaluated that it is fulfilled but not equal, 25.8% evaluated that it is generally enough, and only 7% of subject thought that it is satisfied with the demand.

As for the facilities – technology (IT infrastructure, e-libraries, computers, Internet, etc.) of schools for building and developing the SE, there are 4.9% evaluated that it is too poor, 39.9% thought that it has had but poor and outdated, 47.5% thought that it is generally sufficient, and only 7.7% evaluated that it is satisfied with the demand.

2.4.3 General evaluation of the current situation

The views on the six issues as said above by managers and teachers though they are based on personal ideas, there is no general standard on evaluation, which might be inconsistent. However, it is a large reflection with enough scale for the acceptance of general opinion, evaluation on difficulties, challenges on building the SE in the current situation of Vietnam. It might be generalized as follows:

– Advantages: The general views on the SE of most managers and teachers are correct. They thought that the SE plays an important role in developing, improving the efficiency and quality of education. The human resources (managers, teachers, learners), facilities – technology of schools have prerequisites for building and developing the SE.

– Disadvantages and challenges: Being not equal awareness on the SE, the necessity for developing criteria, standards and training and guidance to have a consistent opinion; teachers' weakness in knowledge and skills on the ITC; facilities for teachers and learners and technical infrastructure of school being outdated; the high demand on financial investment but the limitation on ability.

2.5 Solutions for building and developing the SE

From the acknowledgment of difficulties and challenges as said above, and facing challenges on change of the current education of Vietnam, the solutions on building, developing the SE would like to propose. Such solutions have also assigned on the necessity and feasibility with the opinion of 2,561 interviewees as described above.

2.5.1 Solution for contents, educational programs

Solution 1: Implementation of building opened, flexible resources developing learner-centered; being suitable for each learner. There are 90% of interviewees thought that it is very necessary and necessary, less or unnecessary by 9.1% only. As for implementation, it is feasible or very by 79.5%, and difficult by 1.7% only.

Solution 2: Building contents of teaching documents focusing on developing STEM skills, expansion of scopes and unlimited users, which is less necessary by interviewees (necessary and very necessary by 81%; less or not necessary by 19% for). Thus, the general solution for users is more opted. As for the feasibility, there are 79.5% considered that it is feasible and very feasible, difficult in implementation by 25.1%.

2.5.2 Solutions for authorities and mangers

Solution 3: Improvement for more authorization and encouragement to educational institutions being independent and creative. This solution is necessary and very necessary by 87.5% of interviewees, unnecessary by 1.3% only; there are 81.6% of interviewees thought that it might be done, be too difficult to perform by 18.4%. It is clear that the expansion for educational institutions' independence is an urgent demand, but the belief in results from implementation is not highly appreciated. This issue needs to be concerned by the management levels.

Solution 4: Implementation of application of modern technologies to effectively manage divisions and schools, which is necessary and very necessary by 89.6% of interviewees, unnecessary by 0.8% only; there are 85% of interviewees thought that the implementation might be successful, considered the feasibility 1.2% only.

Solution 5: Increase of training, improvement, providing active supports for teachers, students to access and use

digital education resources, smart technologies. There are 22.8% of interviewees evaluated that this solution is very necessary, necessary by 67% for, less necessary only 12% only. As for the feasibility, it is high by 84.6%, unfeasible by 1.2% only. It is evidenced that the training, improvement is the actual demand of teachers, and they are willing to participate in the implementation.

Solution 6: Concentration on training, improvement to develop leadership, management ability of managers and teachers at all levels, especially in educational institutions, in the smart education environment. This solution is highly necessary by 90.1%, highly feasible by 83.8% of the interviewees. As such, it is one of solution, which also should be priority by management levels.

2.5.3 Solutions for teachers and students

Solution 7: Instruction on authorization for independence in teaching and requirements for commitments of teachers on smart teaching strategies being suitable for each learner. There are 85.7% of interviewees thought that it is highly necessary, but still, 1.7% evaluated that it is unnecessary. As for the implementation, the high feasibility is by 79.3% of interviewees, and impossibility is by 2.2%. The authorization on independence in teaching for teachers is considered being necessary, but there are some opinions that it needs to be carefully considered implementing.

Solution 8: Facilitation and encouragement for teachers to apply a variety of software, smart technological devices in teaching. This solution is highly necessary by up to 91.8%, and highly feasible by 85.8%. It is shown that the commencement on application for the ITC in teaching has been performed for a long while, but the current demand on expansion is still an urgent requirement.

Solution 9: Training, improvement on change of teaching methods for supporting teachers to play their management, educator, and consultants' roles based on the application for modern technologies, appreciating the management roles in the educational environment. There is 90.8% thought that this solution is highly necessary, and high feasible by 85.2%.

Solution 10: Enhancement for innovation of teaching methods of teachers towards supporting students in self-orienting which are suitable for personal abilities and characteristics; self-accessing to learning documents,

resources and self-learning; being compulsory for using multimedia technologies to learn. This is one of key solutions to change the teaching methods, which is necessary to immediately implement by 90.3% and 83.1% is for the high feasibility in the implementation.

Solution 11: Addition to training, improvement in knowledge, pedagogic profession for teachers, being great attention to development of the ITC, consulting, supporting skills in the smart learning. It is the solution for regular training for teachers, which is highly necessary by 91.3%, and the implementation might be feasible (84.5% of interviewees thought that the feasibility is high).

2.5.4 Solutions for inspection, monitoring and evaluation in management

Solution 12: Operating multidimensional, comprehensive supervision and publicly implementing the solutions for building the SE; using the monitoring information to be the educational evaluation criteria for each local and each school. This solution is assessed as highly critial by 86.1% and feasible in implementation by 80.6%. To implement this solution, the managerial levels, first being the Ministry of Education and Training, will promptly build and issue criteria/standards for inspection, supervision and evaluation of the performance results.

Solution 13: Based on the result of multidimensional supervision, increase of the objective and comprehensive evaluation at all management levels under smart technologies of each local and each school. The number of interviewees accounting for 89.1% (2,282/2,561 persons) agreed that it is necessary, the implementation is possible by 83% but it will not be successful by 17% still.

2.5.5 Solutions for facilities, technologies of schools

Solution 14: More investment in the diversity of smart technological devices with the synchronization based on digital technologies such as smart boards, smart podiums, projectors, tablets etc.; surveillance camera control system; schooling surveillance technology system, Broadband Internet connection, etc. This solution is considered being very necessary by 22.6%, necessary by 63.5%; being high feasible by 79.5%, but still being in doubt about the implementation by 20.5%. Therefore, the financial issue is still carefully concerned, and the determination of all management levels is required to be successful.

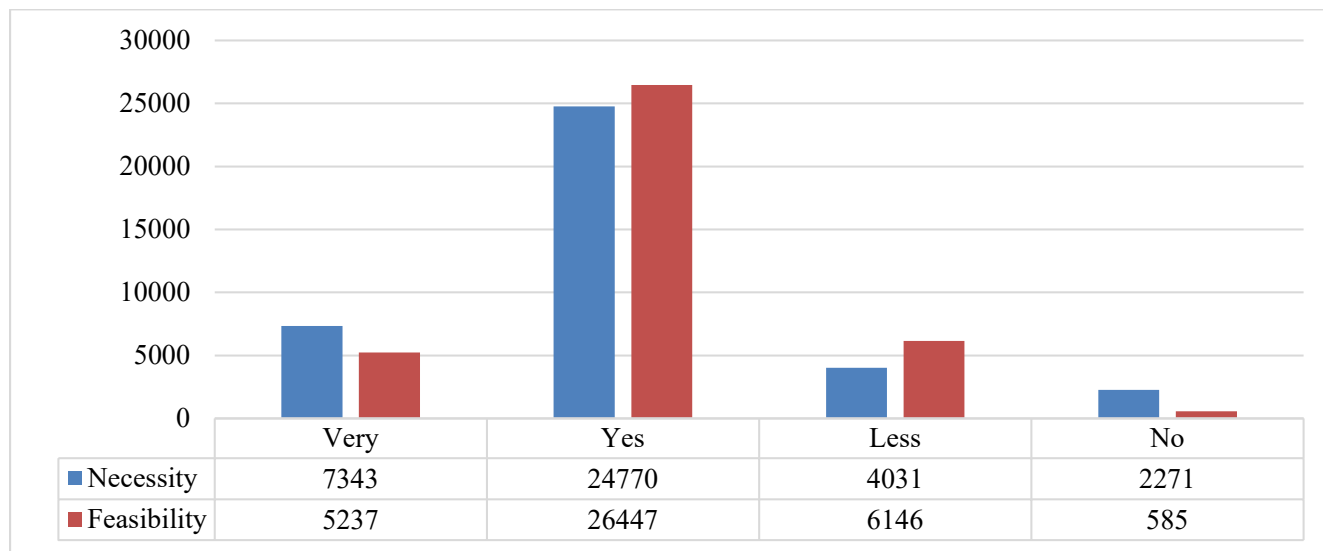|	Very	Yes	Less	No
■ Necessity	7343	24770	4031	2271
■ Feasibility	5237	26447	6146	585

FIGURE 1 Result of the survey on necessity and feasibility of 15 solutions

Solution 15: Concentration on building electronic databases, open and rich resources for managers, teachers and students to use. This solution is in line with the solutions for development of libraries and resources, which is highly necessary by 87.7% and high feasible by 82.8%. It is shown that the relation between the necessity and feasibility has not been consistent, while 17.2% of the interviewees considered being too difficult to perform.

The Figure 1 is the sum of survey results of 38,415 interviewees (2,561 people x 15 solutions) on the necessity and feasibility for the proposed solutions. The result is shown that although there are many difficulties and challenges, most of managers, teachers think that the development of the SE is very necessary, and they believe that it will be successful.

3 Conclusion

Until the date hereof, the building of the SE in Vietnam has just been commenced, the important prerequisites have been initially established, but there are still many tasks which need to be done for the purpose of the operation in a order and consistency on a large scale. First of all, it is the determination of the full and consistent connotation of the SE, based on which provisions on responsibilities for implementation of management levels (including the policy issuance, strategic direction and operation levels) will be issued; the next is to issue systems of criteria/standards for building and development management of the SE at all levels (Ministry level, Department level, Division level of education and training, school level).

Due to the latest and insufficiency of the issue, this article just would like to point some initial approaches in building the SE, propose the solutions for building and development of the SE in the current educational situation of Vietnam. The insufficiency can unavoidable. The opinions and feedbacks from scientists, educational managers, teachers and readers are highly appreciated.

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