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Applying STEAM Teaching Method to Primary Schools to Improve the Quality of Teaching and Learning for Children

Abstract

Unlike the traditional educational model with the way teachers lecture, students take notes making students feel boring and not very effective. STEAM education is a modern educational model that focuses on practice for students to discover and learn on their own. Therefore, it will inspire learning to students, sparking creativity and passion in children. Originating in the US, STEAM education has been interested in and researched for many years, in countries around the world. In the context of the industrial revolution 4.0, jobs and occupations in society related to STEAM education fields tend to increase. The overall goal of STEAM education is not only to create understanding of STEAM and the qualities of 21st century citizens, but also to develop human resources in STEAM fields such as science, technology, engineering and mathematics. Researching on STEAM education has been, and is being, interested by many educators, the research trend in this field will continue to be developed in the future not only in the world but also in the Vietnam. This article addresses the pros and cons of STEAM education, and was completed with support from survey results conducted at some International Primary School, Ho Chi Minh City. The article uses quantitative and qualitative methods of analysis as well as some results from previous studies, in order to clarify the issue of educating children to access scientific knowledge easily. The results show that we need to widely apply this method not only in primary schools but also in all primary schools in Vietnam in order to improve the quality of teaching, and to train human resources for 4.0 industries.

Keywords: Teaching, Learning, Education, STEAM, Primary Schools.

Introduction

With the development of Science and Technology has changed many professions in society and this impact will be even stronger in the future. Many reports in developed countries show that professions related to the field of science and technology have a strong growth rate compared to other occupations (Bruder et al., 2011). Facing this change, the demand for a workforce with the necessary knowledge and skills on technology control in the future is increasing. To deal with these challenges, the world in general and Vietnam in particular have gone through many stages of education reform and gradually made efforts to change towards the STEAM education perspective. STEAM has become the most searched keyword and the most interested educational topic in recent years. Education researchers have made connections between science, technology, engineering, the arts, and math through the STEAM curriculum. Previously, the arts and sciences were taught as separate subjects, and few methods showed a connection between the disciplines. Although concepts or theories are related to each other in each learning content and time. But the question is how to combine the sciences, engineering and the arts into a unity that can be applied to real life (Linh et al., 2020). This study aims to understand the views on STEAM education and the STEAM educational organization model of international primary school (Ge et al., 2015).

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Literature Review

The scientific research and development of education has a common goal of how to combine the methods of technology and the natural sciences together, thereby finding common ground to carry out a holistic educational approach. By placing learners in meaningful learning situations that are closely related to their living environment and have application situations, STEAM education creates motivation and excitement for learners (Bruder et al., 2011). The essence of STEAM education is the integration of elements of the Arts - Liberal into STEM education. This means that in order to effectively implement general education like STEAM, there will need to be a teaching process with actions that clearly show elements of the liberal arts (Liao, 2016). In Korea, STEAM education is included in the formal education system to serve as a guideline for training human resources with advanced general skills, but there are some shortcomings in this educational method, which is the elimination of the curriculum. Humanities in the STEAM system. Research in Korea has designed and applied the STEAM educational model, educational researchers have added the Humanities fields to the five main areas of STEAM (Ge et al., 2015). Therefore, the STEAM education model in Korea is considered to be the most successful model in the field of human education and training (Kim, 2016). Professor Georgette Yakman - Founder of the STEAM initiative believes that education should reflect the nature of the world. STEAM education is the key to achieving that. It gives the ability to transfer knowledge with high-order thinking between disciplines, the ability to absorb and catch up with modern world trends through personal desires and skills. STEAM incorporates non-core classes into the STEM foundation to emphasize the common link between all natural science subjects and the arts (Yakman, 2008).

The Concept of STEAM Education

STEAM stands for Science (S), Technology (T), Engineering (E), Arts (A) and Math (M). STEAM education is a modern pedagogical approach in which learners need to mobilize all resources to solve a complex problem situation in order to develop personal competencies and qualities (Hang, 2019). This method of learning is based on the theory that people can systematically apply the natural sciences and the arts. The STEAM program directs learners to the path of science, technology and art, to enhance creativity and complex skills to learn skills for the future (Kim, Chung, & Lee 2012).

Current Status of Educational Methods in Vietnam

In the context that the world is gradually entering the era of online engineering and machine industry, jobs and occupations in society related to the fields of STEAM education tend to increase, for example computer science, green energy engineering, automation technology, artificial intelligence and aerospace, the era we live in is an era of high-tech science and technology race between nations. In order to catch up with the technology powers, Vietnam needs to focus on the field of education and training of people, to do this, the first factor must be a teacher who is capable of teaching from the point of view of education. STEAM education (Liao, 2016).

In recent years, Vietnamese education has focused on teaching separate subjects, with little cohesion and connection between subjects, forming a systematic theme. Education in Vietnam is still divided at the high school level, even primary school, organized into many specialized schools and specialized classes. This invisibly creates a generation of students who only know book knowledge and are limited in school thinking (Batu, 2010). The Vietnamese educational model puts high school as the foundation for choosing a career when going to university. Some primary schools, typically International Primary School, have grasped the future trend and modern educational methods, so they introduced the STEAM model early on with the aim of training students to achieve skills, self-discovery from an early age (Liao, 2016).

Methods, Subjects and Scope of Research

The article is analyzed based on a number of previous and current research methods, however, the two main methods used in this article are qualitative and quantitative, and the scope of the research is some International Primary School. The reason for choosing is that these International Primary Schools is a pioneer primary school applying the STEAM model and currently has a model that is assessed as meeting international STEAM quality standards. This is an internationally integrated school system, contributing to the creation of generations of global citizens, respecting traditional values, and comprehensive development in both quality and quantity (Linh et al., 2020).

The Primary School's STEAM program is assessed as meeting quality standards, helping children develop and practice 6 skills as in the mentioned STEAM model. The survey is based on the evaluations of parents whose children are studying at these International Primary School.

Research Results

The decision to send their children to International Primary School because the school has a STEAM training model with international STEAM education standards has attracted the attention of parents. Because they have heard about the future education model STEAM, 6/12 (50%) parents have learned through this educational method, 1/12 (8.3%) parents have learned and let their children learn about it.

Children attend International Primary School, and the remaining 5/12 (41.7%) parents have not learned about the STEAM education program. The data shows that up to 50% of the decisions agree to send their children to this STEAM education model, and although a few have researched it carefully. This proves that STEAM education plays an important role in the future education system (Figure 1).
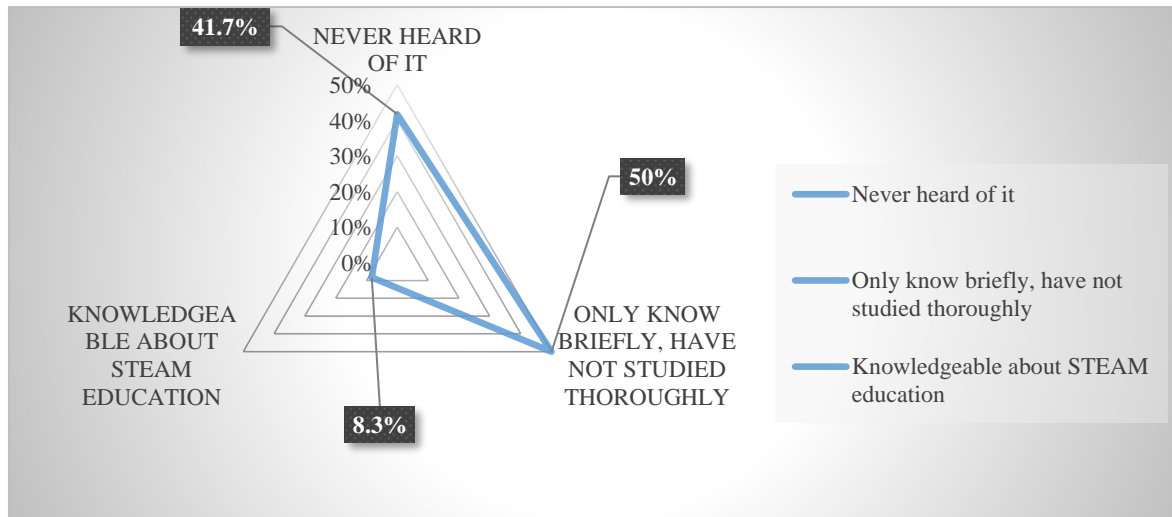

Figure 1.

Level of understanding about STEAM education methods

Besides, although according to the survey results (Figure 1), up to (41.7%) parents have not learned about STEAM education, the STEAM education model is trusted to train their children skills such as: focus on integrated skills (83.3%) and a number of life skills to direct children to practical experiences, thereby training children to be capable, towards developing abilities such as problem solving topics, cooperation and critical thinking (91.7%). Shows that STEAM education is trusted to train people in the future with integrated skills (Figure 2).
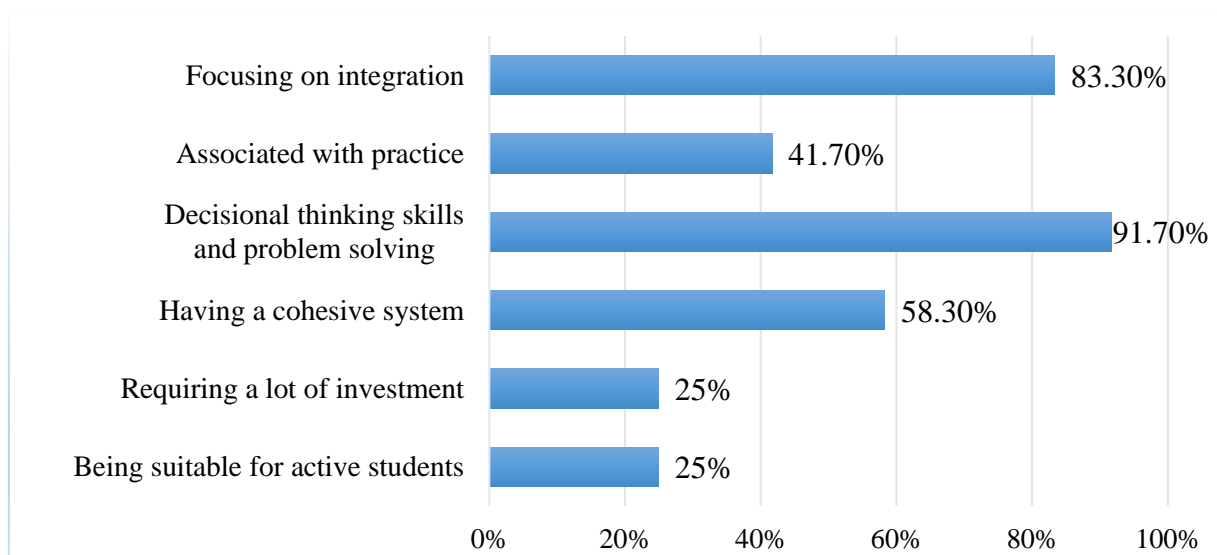

Figure 2.

Training capacity of STEAM education

Besides, by using the 4-point Likert scale to assess the advantages and disadvantages of learners when following the STEAM education method of primary school. This study focuses on 5 subjects involved in the creation and implementation of STEAM education. Thereby, it shows that the level and awareness of teachers about STEAM education at primary school is rated as having the highest favorable level of 7/12 (58.3%). It shows that teachers at primary school have met the criteria of qualifications and qualifications to be able to guide the STEAM model for learners. Curriculum and textbooks range from favorable to very favorable (8.3%-50%). Thus, the STEAM education curriculum of elementary school provides a standard student experience according to the international STEAM education model, and it is also easy for parents to follow the program their children attend (Liao, 2016). However, STEAM model design and documentation is still developing, so the source of information and materials about STEAM education has a high level of difficulty (41.6%), according to this rating, parents wanting to learn more about the STEAM program is still difficult due to limited resources (Table 1).

Table 1.

Advantages and disadvantages of implementing STEAM education model

No	Deployed objects	1	2	3	4	Total answers	Total marks	Average Scores
1	Current curriculum and textbooks	1	6	5	0	12	28	0.19
2	School facilities, equipment and laboratories	2	5	4	1	12	28	0.19
3	Resources to provide information and knowledge about STEAM education	1	6	5	0	12	28	0.19
4	Qualifications and awareness of school leaders about STEAM education	1	5	6	0	12	29	0.2
5	Qualifications and perceptions of teachers about STEAM education	0	7	4	1	12	30	0.21
							143	1

Comparing Traditional Educational Methods and STEAM Education

The traditional method of education is a method that has undergone a long history and is associated with the development of the country. This educational method is more about supplementing cultural knowledge for learners, not paying attention to the practical applicability (Hang, 2019).

The STEAM educational method is an integrated teaching method with an interdisciplinary approach through practice and application (Hang, 2019). Instead of teaching subjects as separate subjects, STEAM education combines them into a learning model based on real-world applications. Learners will be able to apply knowledge as soon as they learn into practical activities, not just book theory to apply in homework like traditional education (Yakman, 2008). This is in line with modern thought, so STEAM education needs to be strongly exploited and should be included in the new educational program (Liao, 2016).

STEAM education places great emphasis on the formation and development of learners' problem-solving abilities, real-life problems, thinking and situational criticism. On the contrary, traditional education directs people to cases that have happened in the past without pointing out how to solve problems when they occur suddenly (Batu, 2010).

Both methods have their own advantages. Although traditional education has weaknesses in terms of passivity, it provides learners with humanistic knowledge and a full background knowledge of all subjects, helping learners to develop in many aspects. STEAM education is a modern method and is increasingly being applied by countries around the world. The interactivity of STEAM education is very high, so if teachers or organizations conducting STEAM education are not fully prepared or lack facilities, it will reduce learners' ability to absorb (Bruder et al., 2011).

Some Suggestions

Currently, STEAM education has not been widely applied in primary schools across the country, only primary schools have access to facilities and qualified teachers. STEAM educational teaching organization. Therefore, creating a learning environment for STEAM training still needs to be studied more carefully to meet international STEAM model standards (Bruder et al., 2011).

The learning method of STEAM education is mainly based on the organization of hands-on activities and creative experiential activities. Forms of teaching organization such as: teaching by topic, club, and simulation of real experience. Learning by intentional play allows students to explore, ask questions, and solve problems (Bruder et al., 2011). The more complex the games, which require more skills, such as social communication, problem solving, etc., the better the learners will be able to absorb STEAM subjects. In addition, because STEAM education is highly active in the classroom, the use of STEAM educational toys such as car models, robots, etc. is aimed at thinking for children aged 4-18. Not too fussy but also bring excitement to learners (Batu, 2010).

Not only that, students must see that education is not only at school, but education also exists around, starting from their own families (Nguyen Thi Ut & Huynh Tan, 2020). Education through games at home will help children form a habit of how to learn STEAM later in the form of projects and product design in the direction of applying multi-knowledge (Liao, 2016).

Regarding STEAM education policy, knowledge is not the first object, but it is the teacher who should be considered the first object when making the transition to STEAM education. Policies on salary and teaching support are the driving force for teachers to be creative and dedicated in teaching (Batu, 2010).

Therefore, the proposal to have an international standard STEAM education model is not only to create an environment that concretizes knowledge, but also to have quality STEAM educators and trainers. That will bring the best results for learners when implementing STEAM education.

Conclusions

TEAM education plays an increasingly important role in future career fields in the context of the strong industrial revolution 4.0. Current general education needs to equip students with integrated scientific knowledge and develop skills corresponding to STEAM skills to solve future human resource problems. Therefore, the widespread implementation of STEAM education is an issue that needs to be considered.

Many studies have shown that promoting STEAM education is an important solution for countries in developing science. In the UK, the goal of STEAM education is to create high-quality scientific human resources. In the United States, the basic goal for STEAM education is to equip all citizens with STEAM skills, expanding the workforce in the STEAM field. And in Korea, the goal of STEAM education is to train people of modern science and technology combined with social humanity. Although statements about STEAM educational goals vary from country to country, the common point of these goals is the impact on learners. STEAM education can be seen as a suitable solution for national education reform, thereby towards human development in order to meet the goals of economic development as well as to develop the national position in the era of globalization competition.

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