Curriculum and Teaching Methodology (2022)
Clausius Scientific Press, Canada

DOI: 10.23977/curtm.2022.051101
ISSN 2616-2261 Vol. 5 Num. 11

The Discussion of the Current Situation and Countermeasures of Science Teachers' Teaching Literacy under the STEM Concept

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Keywords: STEM concept, science teachers, teaching literacy, status quo, countermeasure

Abstract: The concept of STEM education aims to cultivate students' comprehensive abilities and has gradually become a hot issue in education in recent years. In this context, science teachers have gradually attracted much attention, and the level of their teaching literacy is also one of the inevitable topics of education at present. In this regard, the article analyzes the current situation of science teachers' teaching literacy at this stage, and on the basis of the STEM concept, analyzes the connotation of science teachers' teaching literacy and the countermeasures for improving the teaching literacy of science teachers, so as to further improve the teaching literacy of science teachers, so that they can better carry out education and teaching activities, and effectively practice the STEM concept.

1. Introduction

The development of education needs the support of excellent teachers. In the new era, the concept of education is constantly updated, and more and more attention is paid to the cultivation of talents, with the in-depth implementation of the STEM concept, the teaching literacy of science teachers has gradually become an important content that has attracted much attention. In order to better convey knowledge to students, improve students' scientific literacy, and enable students to better achieve the all-round development of STEM ability, science teachers also need to continuously improve their teaching literacy to better meet the new requirements of education in the new era and provide students with better educational services. Based on the STEM concept, the following discussion is based on the connotation, current situation and countermeasures of science teachers' teaching literacy, aiming to improve the teaching literacy of science teachers at this stage.

2. The Connotation of Science Teachers' Teaching Literacy under the STEM Concept

STEM concept is an educational concept extracted from the first four words, namely Science, Technology, Engineering, Mathematics, etc., which aims to cultivate students' ability to solve problems using multiple disciplines, and at the same time, it is also a practice-oriented interdisciplinary educational concept, which has important guiding significance for students' scientific inquiry, practical innovation, learning ability, etc.[1] From the perspective of science

teachers' teaching literacy, it mainly covers the following aspects:

First, teaching strategy literacy. Including the design of teachers' problems, the design of teaching programs, the stimulation of students' interest, and the ability to provide students with learning to eat at least.

Second, teaching cooperation literacy. In view of the interdisciplinary educational characteristics of STEM, science teachers need to pay attention to the cultivation of students' multidisciplinary application ability, which requires teachers to form a reasonable teaching with other subject teachers and guide students to better solve practical problems.

Third, teaching role literacy. It means that teachers can flexibly transform their roles in classroom teaching, such as organizers, supporters, guides, etc., and can effectively pay attention to the learning process of students to ensure the overall quality and effect of teaching and learning.

Fourth, teaching information technology literacy. Teachers are required to be able to flexibly use modern information technology and carry out STEM courses to give students a better learning experience.

3. The Current Situation Analysis of the Teaching Literacy of Science Teachers under the STEM Concept

3.1. Lack of Scientific Teaching Strategies

The lack of teaching strategies is a major problem for science teachers today. It is mainly manifested in the lack of teaching guidance, the overall boring and tedious classroom, not only cannot effectively mobilize students' interest and thinking motivation, but also easy to cause students' learning process to be more mechanical. First of all, in terms of insufficient guidance and boring teaching, teachers do not hand over the process of inquiry to students when teaching scientific principles, but teach by directly explaining the principles, although they can make students more comprehensive and direct understanding of scientific principles, but also have a certain impact on students' awareness of inquiry and learning initiative[2]. Secondly, in terms of mechanization of the learning process, teachers focus on presenting the results to students when designing teaching activities, so that students can imitate learning. Such a way cannot mobilize students' thinking, resulting in students are difficult to truly grasp scientific knowledge and flexible use of scientific principles.

3.2. Insufficient Mutual Assistance and Cooperation in Teaching

In the past science teaching, teachers had a strong dominance, and the main position of students was not obvious. During the classroom teaching period, students are required to carry out learning activities step by step according to the teacher's plan. Under the STEM concept, the main position of students is paid more attention, and more attention is paid to the learning process of students and their practicality and experience[4], requiring teachers to be able to comprehensively combine various factors to design reasonable when designing teaching activities. However, in terms of the current teaching situation, teachers need to make further corresponding changes in this regard.

3.3. Teachers' Classroom Roles are Single

STEM education has certain open characteristics, requiring teachers to flexibly change their roles during teaching, including guides, organizers, imparters, encouragers, etc., to better help students learn. However, no matter what kind of role is changed and applied, it is necessary to base on the concept of life, regard students as the center of education, enable them to actively explore scientific

knowledge in independent thinking, and give full play to the value and significance of STEM education. In addition, because the implementation of STEM education is not fully mature, some teachers still have the problem of single teaching mode during teaching, which also has a certain impact on the flexible transformation of teaching roles.

3.4. The Application of Information Technology by Teachers is Traditional

At this stage, most teachers only have basic computer operations, including set template production of PPT courseware, Word, Excel, etc. Although schools will carry out appropriate training activities after teachers are inducted, it is difficult to provide real and effective support from the perspective of STEM education. Therefore, at present, in teaching, there is still the problem that the information technology means used by teachers are relatively traditional, and it is difficult to effectively use new technological means.

4. The STEM Concept under the Concept of Effective Improvement of Science Teachers' Teaching Quality Countermeasures and Suggestions

4.1. Teaching Strategy Literacy

Combined with the problems in teachers' teaching strategies at this stage, in terms of improving their teaching literacy, they can improve from two aspects: improving the level of practical teaching and strengthening the development of STEM courses.

First of all, in terms of improving the practical level of teachers, in general, it is mainly to cultivate and improve the teaching level and literacy ability of teachers in the form of teaching, but from the perspective of practice, it is slightly lacking. In this regard, the training method can be appropriately adjusted, combined with the STEM concept, to help teachers improve their overall teaching strategy literacy [3]. For example, a STEM teacher studio can be created so that teachers can also conduct hands-on practical exercises under conditions, and effectively participate in STEM practical activities through independent design and production of scientific experimental activities, so as to promote teachers to better feel teaching activities and experience the problems and confusions in the learning process of students. In this way, by using the classroom as a training base, it is possible to better improve the practical teaching level of teachers, so that teachers can have a deeper understanding of the essence of STEM education, so as to adopt targeted strategies for teaching.

Secondly, in terms of improving teachers' ability to develop STEM courses, based on the advantages of science and technology in the new era, teachers can use artificial intelligence and information technology means to develop curriculum resources, and then combine them with their own understanding, teaching experience and other content to develop efficient classrooms that meet the actual situation of students, so as to enhance teachers' teaching literacy capabilities.

4.2. Teaching Cooperation Literacy

Cooperative literacy is also one of the important teaching qualities that science teachers should have, especially under the guidance of the STEM concept, cooperative literacy has a direct impact on improving the quality and efficiency of teaching. In this regard, on the one hand, it is possible to build an interdisciplinary collaborative team to provide STEM teaching support for science teachers, so that teachers of various disciplines can cooperate and actively communicate with each other to ensure the smooth development of interdisciplinary education. On the other hand, social resources can be integrated and combined with science education in order to better serve science education activities. In this way, it can not only broaden the field of knowledge for students, but also enhance students'

understanding and understanding of scientific value and scientific development[5], which is conducive to improving students' interest and motivation in scientific inquiry. In this regard, schools and teachers need to actively broaden the scope of human-computer communication, integrate and utilize social resources, and carry out more distinctive scientific curriculum projects to improve the quality of teaching and enhance the teaching quality of teachers.

4.3. Teachers' Role Literacy

As one of the connotations of teacher literacy, the role of teachers has a non-negligible impact on the actual teaching effectiveness of teachers. Therefore, teachers also needs to pay attention to this aspect. Specifically, teachers need to base themselves on the STEM concept and do a good job of role transformation [6]. On the one hand, the former classroom leader needs to be transformed into a facilitator role. The STEM concept focuses on the cultivation of students' learning process and inquiry ability, and requires students to solve practical problems independently, so if only the teacher informs students of scientific knowledge, it is difficult to effectively cultivate students' practical application ability. Therefore, teachers need to do a good job in teaching and guidance, and encourage students to think positively by guiding inspiration and asking questions, so that they can truly integrate into classroom learning activities. On the other hand, they need to do their own role as an organizer. In the past, students completed learning tasks step by step under the teaching arrangement and guidance of teachers, but this process was more passive, and in the long run, it was not conducive to the development of students' thinking[7]. Therefore, in practical teaching, teachers need to respect the main position of students, organize students to carry out learning and inquiry activities independently, so that they can effectively exert their thinking motivation and conduct independent inquiry of scientific knowledge to enhance the profundity and effectiveness of their learning. In addition, teachers also need to play a good role as supporters, that is, they can provide corresponding support for students' actual learning needs, such as experimental materials, process forms, spiritual encouragement, etc.

5. Conclusions

The STEM concept, which aims to cultivate multidisciplinary problem-solving skills, has important guiding significance for science education. At the same time, it also puts forward higher requirements for the teaching literacy of science teachers, and requires teachers to be able to carry out teaching activities more scientifically, so that students really have the ability to solve scientific problems. Therefore, science teachers should be based on the STEM concept, on the basis of fully understanding the connotation of the STEM concept, based on the current status quo of teaching literacy, and constantly improve their own teaching literacy, including teaching strategy literacy, teaching cooperation literacy, teacher role literacy, etc., to fundamentally ensure the quality of teaching to meet the educational requirements that science education should have in the new era.

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