

The Special School Teachers' Perception on Implementing STEAM Education for Students with Intellectual Disabilities

Yungkeun Park¹

¹ Department of Elementary Special Education, Joongbu University, South Korea; a5890@naver.com

Abstract: Since STEAM education does not use a simple theoretical education method, it can induce interest of students, and through this, it is possible for students to take the lead in education. In addition, students will be able to cultivate problem-solving skills and creativity, and have the ability to apply knowledge in a changing society. Therefore, it is necessary to apply STEAM education, which was used only for general students, to classes for students with intellectual disabilities, which account for the majority of students with disabilities and are having great difficulties in cognitive skills. The research question to achieve the purpose of this study is to investigate current perception of educational practice as special education teacher, current perception of STEAM education as an alternative approach to traditional teaching, and the difficulties of implementing STEAM education. In this study, among teachers of special schools with intellectual disabilities, teachers who are conducting STEAM education were selected by purposive sampling. In order to develop the questionnaire, the current status of special schools with intellectual disabilities was considered, and related previous studies. The contents of the analysis of the interview results according to the research purpose were presented.

Keywords: STEAM education, Students with intellectual disabilities, Special school for students with intellectual disabilities, in-depth interview, teacher perception.

1. Introduction

The 21st century is an era of convergence based on imagination and creativity. As an interdisciplinary convergence is being appeared, our society is demanding convergent competencies [1]. A person possessing such convergence capabilities can be said to be a person possessing flexible, open-minded thinking and artistic sensibilities that can lead changes in the future society while creating new values in the changing times. STEAM that uses Science, Technology, Engineering, the Arts and Mathematics for learning as educational approach has been promoted by the Korean government since 2011. STEAM education is not an education that simply conveys knowledge, but is an education method that aims to produce new creative products by applying knowledge to real life [1].

It is an educational method to cultivate creative human who acquire theoretical and conceptual knowledge of science and mathematics, cultivate artistic sensibility, and utilize engineering and technology in real life [2].

Currently, many countries around the world, including the United States, are recognizing the importance of STEAM education, and are striving to apply such effective education to the educational field. Korea also recognizes the necessity of STEAM education and is trying to come up with a plan that can be applied to the educational field [3].

However, when the need for STEAM education was first raised in developed countries and when Korea accepted it, research and policy establishment for students without disabilities were mostly conducted.

No research has been conducted to find out the effect of STEAM education for students with disabilities, or the designation of research school for STEAM education by special schools has not been conducted at all. Looking at the field of special education in Korea, the process of investigating problems and understanding theories and principles on their own is omitted, and students was informed the conclusion usually.

However, as students with disabilities lack generalization skills, they must provide education that further develops the ability to apply skills to real life. However, by adhering to traditional teaching methods, students' thinking skills are further degraded and problem solving skills is also declining.

However, since STEAM education does not use a simple theoretical education method, it can induce interest of students, and through this, it is possible for students to take the lead in education. In addition, students will be able to cultivate problem-solving skills and creativity, and have the ability to apply knowledge in a changing society [3]. Therefore, it is necessary to apply STEAM education, which was used only for general students, to classes for students with intellectual disabilities, which account for the majority (54%) of students with disabilities and are having great difficulties in cognitive skills. Through this, it is considered that there will be a great educational effect on problem-solving ability, creativity, application ability, confidence, learning ability, and learning attitude of students with disabilities, who do not have a high effect by traditional classroom instruction. Despite these effects, realistically, STEAM education for students with intellectual disabilities is not being conducted well in the field. In order to revitalize STEAM education, it is necessary to investigate the perceptions of special teachers with intellectual disabilities have on STEAM education.

Specific research question to achieve the purpose of this study are as follows. First, what is current perception of educational practice as special education teacher? Second, what is current perception of STEAM education as an alternative approach to traditional teaching? Third, what are the difficulties of implementing STEAM education?

2. The Method of Study

2.1. Participant

In this study, among teachers of special schools with intellectual disabilities, teachers who are conducting STEAM education were selected by purposive sampling. In order to select a teacher to participate in the interview, it was selected with the recommendation of the special school administrator. The special school for students with intellectual disabilities in which the research participants are working is located in the Jeollanam-do region.

Table 1. Participant of study

Teacher	Region	Gender	Year of experience teaching students with intellectual disabilities
T1	Jeollanam-do	Female	5 years
T2	Jeollanam-do	Male	20 years
T3	Jeollanam-do	Female	4 years
T4	Jeollanam-do	Male	1 years

2.2. Interview Questionnaire

In this study, a semi-structured questionnaire was developed to carry out the purpose of study. In order to develop the questionnaire, the current status of special schools with intellectual disabilities was

considered, and related previous studies [3] were referenced. The questionnaire was verified for content validity by two professors with expertise in special education and intellectual disabilities and three special teachers working at special schools with intellectual disabilities. After that, preliminary interviews were conducted for two special teachers, and some items were deleted and corrected based on the results. The domain of specific interview questionnaire developed finally are as described in Table 2.

Table 2. Semi-structured interview questionnaire

Domain
Teachers' Teaching Experience in Special Education
Personal teachers opinions on special education
Difficulties or troubles as a special educator
Teacher's Teaching Experience in STEAM Education
Personal teachers opinions on STEAM Education
Difficulties or concerns of Implementing STEAM education

3. Result

3.1. Current Perception of Educational Practice as Special Education Teacher

3.1.1. Purpose of Special Education

As a result of asking special teachers about the main purpose of special education, teachers considered the main purpose of education to be self-reliance. The pace of learning may be slow, but special education teachers thought it was important to develop the ability to become self-reliant after graduating from school, improving the functionality of life.

In addition, it was considered that it would provide opportunities for various experiences to students through education. Teachers thought that the purpose of special education was to open up opportunities to have various experiences while living ordinary daily life like people without disabilities.

In addition, Teachers thought that it was a very important purpose of education to cultivate the competencies of students so that they could earn an economical income through work and to be able to live in harmony with society.

3.1.2. What Focuses Most on the Class

Some teachers replied that the most important thing in class is to allow the content they are teaching to be integrated with real life. If the contents learned through the class cannot be incorporated into real life, the contents are not functional education, so teachers always have tried to integrate the contents of the class with real life.

In addition, they responded that the most important thing in class is to conduct interesting class. This is because it is possible to induce students' learning when students' concentration can be increased through interesting classes.

3.1.3. The Hardest Point in Class

Regarding the greatest difficulty in teaching as a special teacher, they responded that the degree of achievement and development of students was slow and that motivation for education was insufficient.

As an educator, seeing the progress of students can be the greatest motivation. Due to the academic characteristics of students with intellectual disabilities, the pace of progress and development is slow. As an educator, this was the cause of feeling emotional burden and skepticism about their own education method.

3.1.4. *Limitations of Special Education*

There were teachers who said that the biggest limitation in educating students was the lack of social awareness and social skills. In the case of students with disabilities, the generalization ability is somewhat low, so it is necessary to help them have more learning experiences through real society. Nevertheless, it is said that there is difficult to even have an opportunity to have real experience through real society because of the lack of social awareness and skills.

3.2. *Current Perception of STEAM Education as an Alternative Approach to Traditional Teaching*

They said that they felt unfamiliar with STEAM education, an alternative to the traditional teaching approach at first. They thought it was an educational method for students without disabilities, but there were attempts to apply it to special education, and they said that they came into contact with STEAM education with a lot of doubts about whether it could be applied to students with disabilities.

3.2.1. *Definition of STEAM Education*

Teachers felt that STEAM education was similar to self-directed learning. The reason is that STEAM education naturally leads to student-centered classes, and through student-centered classes, students cooperate with each other actively.

In addition, they thought it was a class that could improve the creativity of students through self-directed learning. Teachers recognized that students naturally interact with each other during class activities, and through the process of creating something by themselves, it could be an opportunity to develop creativity.

However, some teachers thought that although STEAM education is great approach, it should be invested in a great deal of effort and time compared to traditional teaching approach.

3.2.2. *Diverse Awareness of STEAM Education*

Teachers had various perceptions of STEAM education. One teacher recognized that it was not easy to implement STEAM education for students with intellectual disabilities. Creativity is usually considered as a result of STEAM education, but it was recognized that creativity is not an ability to be easily cultivated for students with intellectual disabilities.

3.2.3. *Advantages of STEAM Education*

Regarding the strengths of STEAM education, all teachers said that students are interested in the class. They said that when students focused on the class, they saw more than expected performance from the students.

Teachers said the advantage of STEAM education is the use of a multisensory approach. Teachers recognized that teaching through a multi-sensory approach is more helpful to students' educational achievement and development because each student has different levels of development and different area of development. In addition, the strength of STEAM education is that students' participation in class is expanded, and the proportion of teacher-to-student and student-student interactions increases. Teachers recognized that it is helpful for students to improve their short-term and long-term memory because it induces students' interest and uses a multi-sensory approach.

3.3. Difficulties of Implementing STEAM Education

3.3.1 Class Preparation Time and Effort

Teachers also shared the merits of STEAM education, but they said that they had various difficulties in implementing STEAM education. Among the various difficulties, the most appealing part was that a lot of time and effort was invested in preparing for the class.

However, despite spending a lot of time and effort, he said it was difficult because the achievements of the students' classes were not visible.

3.3.2. Lack of Conceptual Knowledge for STEAM Education

Although they recognize the necessity and merits of STEAM education, teachers feel that the conceptual knowledge of STEAM education is lacking in actually planning STEAM education.

Because of this lack of conceptual knowledge, they said that there are many cases where they continues to question and lose their confidence while implementing STEAM education.

3.3.3 Difficulties due to Students Participating in STEAM Education

Teachers also complained that it is difficult to conduct STEAM education, but it is even more difficult because of the need to conduct classes at each level for students with disabilities.

In particular, among students with intellectual disabilities, there were many difficulties in conducting STEAM education for students with severe intellectual disabilities.

4. Summary and Conclusion

As a result of asking the study participants about the main purpose of their special education, teachers recognized the purpose of education as self-reliance. The pace of learning may be slow, however, teachers thought it was important in special education to improve the functionality of life as the things that could be done gradually increase, and eventually to develop the ability to become self-reliant after graduation. In order to fulfill the purpose of this special education, the most important thing in class is to prepare for living as a member of society, and to combine the contents of education with real life. Instead of expecting to be unconditionally understood in society for having an intellectual disability, education was focused on improving the functionality of life for the people with disabilities by cultivating basic competencies required in society[4].

Teacher thought that at first he felt somewhat unfamiliar with the fusion (STEAM) class as an alternative to the traditional class. It was thought that it was an educational method for general students, but there were attempts to apply it to special education, and he said that he encountered the STEAM class with a lot of doubts about whether this could be applied to students with disabilities.

Most of them shared the merits of STEAM classes. First, teachers talked about the interests of students in the class. They said that when they focused on the class, they saw unexpected and unexpected results from the students. Teachers complained of many difficulties in implementing the STEAM class. Although they agree with the merits of the fusion class, they complained of some difficulties in implementing the fusion class. One of them was that a lot of time and effort were invested in preparing the class.

In addition, although they recognized the necessity and merits of fusion class, teachers felt that they lacked conceptual knowledge for conducting fusion class in actually planning STEAM class. However, despite this much time and effort, they said that it was even more difficult because the achievements of the students' class were not visible[5].

Teachers complained that it is difficult to conduct STEAM classes alone, but it is even more difficult due to the need to conduct level-level classes for students with disabilities. In particular, among students with intellectual disabilities, there were many difficulties in conducting STEAM classes for students with moderate intellectual disabilities.

Special teachers were positively thinking about conducting the STEAM class for students, but they still feel a lot of difficulties in actual implementation, so it can be said that active support is required to activate the STEAM class.

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References

- [1] C. H. Lee, "Smart Learning Strategy of STEAM Education," *Journal of Korean practical arts education*, Vol. 25, No.4, pp.123-147, (2012)
- [2] H. H. Kim, "(A) study on instructional models of fine art education and teaching plan development applying Steam : focusing on 1st grade in arts highschool," M.S. thesis, Department of education, Jungang University, Seoul, South Korea, 2016.
- [3] M. J. Kim, "Study of Arts subject-centered instruction method utilizing STEAM: focused on primary high-grade students," M.S. thesis, Department of education, Jeju University, Jeju, South Korea, 2016.
- [4] G. Yakman, "STEAM Education: Using BADUK to each Purposefully Integrated STEM/STEAM Education, 37th Annual Conference International Society for Exploring Teaching and Learning Atlanta, USA, Oct. 11-13, 2007.
- [5] Lee & S. Jun "Introduction of STEAM based robotic camp model for the improvement of students' creative invention," *Proceeding of International Conference for Media in Education*, 2011.