

## The Perception of Special Education Teachers for Implementing STEAM Education for Students with Intellectual Disabilities

Park, Yungkeun<sup>a</sup>

<sup>a</sup>

Department of Elementary Special Education, Joongbu University, South Korea

**Article History:** Received: 10 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 28 April 2021

**Abstract:** The purpose of this study is to investigate the current perception of educational practice as special education teacher, STEAM education as an alternative approach to the traditional teaching, and the difficulties or barriers for implementing STEAM education effectively. For the purpose of this study, qualitative research design was used and continuous comparative analysis was used for the data analysis. Among teachers of special schools with intellectual disabilities, teachers who are conducting STEAM education were selected by purposive sampling. The results of this study are as follows. Special teachers have different perceptions of STEAM education. Most special teachers were positively thinking about conducting the STEAM class for students. They recognized that it could be an opportunity for students with intellectual disabilities to naturally interact with each other during class activities and to express creativity through the process of creating something by themselves. Some teachers think that STEAM classes are good, but a great deal of effort and time should be invested compared to traditional teaching methods. They felt that they lacked conceptual knowledge for conducting STEAM class in actually planning STEAM class and a lot of time and effort should be invested in preparing the class. In conclusion, special teachers were positively thinking about conducting the STEAM class for students with intellectual disabilities, but they still feel a lot of difficulties in actual implementation, thus it is necessary to provide support needed in order to activate the STEAM class.

**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 education which has been promoted by the Korean government since 2011, 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.

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	Years of experience for teaching students with intellectual disabilities
T1	Jeollanam-do	Female	7 years
T2	Jeollanam-do	Male	22 years
T3	Jeollanam-do	Female	6 years
T4	Jeollanam-do	Male	3 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 were referenced [3][4][5]. 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

**2.3. Interview Procedure**

Interview questionnaires were sent to the study participants by e-mail in advance so that they could review the questions. By sending the consent form to the study participants, the purpose of the study, the interview method, and the contents of the interview were confirmed. Interview was conducted by visiting the school where the participant worked or visiting a place where the participant felt comfortable. Prior to the interview, the researcher received written consent from directly from the study participants. In addition, the purpose of the study, the contents of the interview, the guarantee of the anonymity of the interview contents, and the necessity of recording were explained verbally, and the consent to the recording was reconfirmed. After that, the interview was conducted using the interview questionnaire. Each interview took about 40 minutes, and the researcher took care to create an atmosphere in which participants could freely express their opinions. During the interview, the researcher recorded the interview and took notes if necessary. After conducting the interview, the interview contents were transcribed within a week.

All interview data were transcribed by two undergraduate students in the department of special education. Prior to transcription, the researchers instructed these students with instructions for transcription. The researchers finally reviewed the accuracy of the completed transcription data while listening to the recorded file, and corrected the error directly. In addition, the transcribed data was sent to the study participants to check if there were any inaccurate parts in the transcribed data.

**2.4. Data Analysis And Securing The Realibility**

**2.4.1. Data analysis**

In this study, continuous comparative analysis was used as a data analysis method [6]. Researchers discussed the overall coding method and data analysis procedure before coding. Researchers conducted open coding to search for meaningful concepts by reading the interview data individually, and made reliable analysis through a continuous consultation process. Researchers set up a code system for the transcribed data, categorized it, analyzed the type, and derived the subject accordingly. The detailed procedure for data analysis is as follows. First, the researchers repeatedly read the transcribed data of in-depth interviews, found similar meanings and content that was repeatedly mentioned, and organized the topics that were meaningfully mentioned and emphasized. The researchers analyzed the words and sentences used by teachers in detail, categorized the extracted concepts, and categorized the related concepts by looking for associations. When content similar to or related to an existing concept was found through continuous comparative analysis, it was categorized into related concepts and organized, and when new concepts emerged, new categories were created. In this way, through the process of comprehensively analyzing and arranging the subject categories, domains, and relationships, the first codebook containing definitions and examples of each category was completed by dividing them into general, intermediate, and detailed categories. Second, the researchers read and analyze the transcribed interview data again and again, correcting the names of previously set categories or merging categories with similar meanings, and completing the second codebook by adding new categories if necessary. Third, in the process of categorizing the analyzed data book, the final code book was completed by adding or revising new codes while continuing discussion among researchers.

To secure the reliability of the results of qualitative analysis, after completing the analysis of the research data, two special teachers who participated in the in-depth interview were asked to read the interpretation of the research results. Member checking was conducted to determine whether the interview data analyzed by the researcher and the interpretation and conclusions made based on it were valid.

#### **2.4.2. Securing the reliability of study**

In order to secure the reliability of this study, the study was conducted through the following procedure. First, the interview was conducted by securing enough time for teachers participating in the in-depth interview to express their opinions. This is because the longer the time for the researcher to form a rapport with the research participants, and the longer the interview time, the more reliable and in-depth data can be secured. Second, in the process of data collection and data analysis, two researchers and two research assistants collaborated together to perform a researcher triangulation to minimize the intervention of individual researchers' subjectivity and prejudice. The researchers have tried to avoid subjective interpretation as much as possible while discussing overall data analysis and overall research mainly through formal meetings, phone calls, and e-mails. Third, the research was conducted by continuously receiving advice and feedback through external researchers who majored in special education to ensure that there were no errors in the procedure and interpretation of qualitative data in the overall research process.

### **3. Result**

#### **3.1. 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.

*I think our students become self-reliant after graduation. I think the purpose of special education is for students to learn at least one thing through education and learn how to write their name after a year, and learn anything necessary for living. (T1: 1)*

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.

*Teaching and educate students with disabilities so that they can live just as normal in the general society. Because students have little experience, I think it gives them an opportunity to have a variety of experiences. (T3: 3)*

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.

*I think the reason for education is to help students with disabilities become healthy members of society. It seems like that main purpose is to help them get a job and make money. (T3: 4)*

##### **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.

*The most important thing to focus on when teaching our students is whether they can be applied to real life. For example, we are doing division right now, but if we just study division*

*in a theoretical way, they will forget soon. The greatest emphasis is placed on enabling students to apply learned things in real life. (T3: 5)*

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.

*The most important thing in class is the interesting class. Students' concentration is high when they participate in the interesting classes. Compared to students without disabilities, our students with disabilities need interesting classes so that students can learn. (T4: 4)*

### 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.

*What is the most difficult thing is to feel myself at that time. when students did not show any progress despite my teaching and educating them. 'Ah, wasn't something wrong with my education? What else can I do for her, but am I not able to do that?' This is the most difficult part. It would be a tremendous strength to me if my children could see how they improved little by little, little by little, as much as I poured out, as much as I devoted and loved. No matter how much, children with intellectual disabilities do not see any progress or improvement. I think that is the most difficult time. (T2: 4)*

### 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.

*First, when choosing a place for experiential learning. In the case of baristas, it seems that there are some things that they do not want to receive our students just because they are students with disabilities. So I think it's a little difficult in that part. (T1: 6)*

In addition, he said that the limitation was that it was not connected to the final goal of employment through education. The fact that it is not possible to connect to employment, which is the gateway to becoming a member of society, is the difficulty of teachers teaching students with intellectual disabilities.

*In the case of students with intellectual disabilities, I think the biggest problem is that we are not pioneering a lot of career paths after graduation. Social integration is what our students need most, isn't it? The limitation of being a member of society but not being able to do so. Despite being educated, there are not many parts where our students can get a job after graduation. It is mandatory to hire, but it is difficult for people with intellectual disabilities to enter there. It is so hard that students cannot become members of our society after graduation. (T2: 3)*

Teachers said they felt a lot of regret and limitations because their education seemed to end only with childcare. Even after graduating from school, they are said to be feeling limited in the reality that they cannot get a job and move to another facility and receive education again.

*I think that education can only end with childcare. I'm teaching the third year of high school, and when students graduate, it seems that there are really only a few students who actually get a job. When most of the students graduate and go to the facility, they need to be educated again, don't they? It seems that transition education that supports students to have as many jobs as possible is needed. (T4: 7)*

As education is implemented for students with intellectual disabilities, as mentioned above, it often takes a long time for the results of education to be visible. Nevertheless, it was considered a limitation as there were many one-off events that tried to show educational achievements through events that were immediately visible.

*I think there are so many one-off events. I think there are many events like festivals. It has an event like the Career Experience Day, but I think it is because the time, data, and budget are limited. For example, when we make a desk, we have to start with the basics, but many thing is made in a way that students just assemble the parts for event. I think there are too many one-off events. (T3: 3-4)*

### 3.2. 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 intellectual disabilities.

*When I first heard it, it was very new. Can we apply STEAM to our students with disabilities? I thought first like that. However, when I looked at the science textbooks for the first-year middle school students in the revised curriculum and the teacher's guide, STEAM education came out. At first it felt very unfamiliar. (T1: 1)*

### 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.

*STEAM education seems a little like self-directed learning. Because, as I said before, it's not professor-centered, but students-centered, so the weight of the class is more focused on students than on teachers. I think it's a class where students speak and collaborate on their own. (T1: 1)*

In addition, 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.

*STEAM education is student-centered, self-directed learning, and I think it is a class that fosters students' creativity through self-directed learning. (T2: 1)*

*I think that it is a class where students can create something creatively while sharing ideas. In other words, I think this is a class where students' own creativity can be expressed. (T4: 1)*

### 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.

*It is really difficult to take STEAM classes in special education. I wonder if it is only possible for really good students to bring out creative ideas from students. (T4: 1)*

Some teachers thought that the STEAM class was good, but a great deal of effort and time should be invested compared to the traditional teaching method.

*I think it's a really good class if you can do STEAM class. In order to do that, there is something difficult because it takes more effort and time than usual when teachers prepare lesson plans and implement STEAM class. (T2: 1)*

### 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.

*The class is very fun. The students laugh a lot together in class. Students are also good at focusing and being able to learn while laughing together. (T4: 3)*

*There are countless advantages beyond words. First of all, students' concentration and interest in class improves, and participation increases. In addition, there are times when students come up with novel ideas that we really didn't even think of. When students with intellectual disabilities really come up with such brilliant ideas, I am really surprised. (T2: 1-2)*

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.

*I think STEAM education is so good for students. Some students have artistic intelligence, while others have advanced math and engineering. STEAM education shows a lot of good effects while stimulating various areas together. (T1: 2)*

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.

*I think the fact that students participate in class is very good. It's not a one-sided class by teachers, but I think it's very nice to have students interact with the teacher together. It is also very good that the students show their creativity and make something. (T4: 1)*

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.

*When it comes to STEAM education, classes are led by themselves, so when it comes to evaluation, it's definitely different. In the evaluation part, students' long-term and short-term memory seems to increase. (T1: 3)*

## 3.3. Difficulties Of Implementig 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.

*There is not enough time to prepare. So, when I'm chased by work, I don't have much time to prepare for class, but taking STEAM class itself seems to be a little burdensome because I can't do it without preparation. (T3: 2)*

*Since there are many students with intellectual disabilities, there are at least two or three students in class that are likely to be alienated from the class, and it is difficult to continue supporting those students while conducting the class. (T1: 3)*

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.

*I don't think there are a lot of things that I don't know yet about what kind of subject I will bring and combine it with this class, and how to make the class more interesting for students. (T2: 3)*

*I am not sure if the STEAM we are thinking is the STEAM education that is being presented academically. It's simply called STEAM, so I thought like this as just attaching the subject, but it wasn't. Since I am going to take a STEAM class, I have a lot of thoughts on how to lead the class. (T2: 6)*

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

*I think there are always questions about whether I am doing STEAM education properly. I am worried that I can give the students something wrong. (T3: 3)*

### 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.

*It's great to see a lot of creative aspects of students through STEAM classes. To be honest, it's really easy to prepare a class by looking at only one student. It's really easy to prepare a class by thinking of only one really good student, but it's really difficult to do class by level while watching all the other students. The cognitive level of students with disabilities is very different. (T4: 3)*

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

*There is a problem that it is difficult for students with severe disabilities when they have to show their creative aspects. Students with severe disabilities have a hard time expressing their creative side. Because there are a lot of students who are a little clumsy and can't speak, and there are a lot of students who can't even paint well. Even if a student has a creative idea, it is difficult for us to notice because it is difficult for them to express it. (T4: 2)*

## 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 [7].

The most difficult thing about teaching in the field was that the students' achievement and development were slow, so there was a lack of motivation for education, and there was a large difference in level between students. Watching the progress of students can be the greatest motivation as an educator. The slow pace of progress and slow pace of development due to the academic characteristics of students with intellectual disabilities had a psychological burden as an educator. In addition to these difficulties, what teachers felt as a limitation of special education was that the level of social awareness toward students with disabilities was low, and the students were not connected through education to the ultimate goal of employment. Also, there are times when it feels like childcare rather than education, and there are many one-off events.

Teacher thought that at first he felt somewhat unfamiliar with the 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.

Teachers felt that STEAM instruction was similar to self-directed learning. The reason for this is that the student-centered class naturally takes place during STEAM classes, and the proportion of students cooperating and interacting with each other through student-centered classes increases. In addition, teachers recognized that students' creativity could be enhanced through this self-directed learning method. Teachers recognized that it could be an opportunity for students to naturally interact with each other during class activities and to express creativity through the process of creating something by themselves.

Teachers have different perceptions of STEAM classes. One teacher recognized that it was difficult for the STEAM class to target special education students. Creativity is mentioned a lot as a result of STEAM classes, and for students with disabilities, creativity is often perceived as a competency only for excellent students. Some teachers think that STEAM classes are good, but a great deal of effort and time should be invested compared to traditional teaching methods. Most of them shared the merits of STEAM classes. Teachers talked about the interests of students in the class. They said that when they focused on the class, they saw unexpected results from the students. Teachers complained of many difficulties in implementing the STEAM class. Although they agree with the merits of the STEAM class, they complained of some difficulties in implementing the STEAM 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 STEAM class, teachers felt that they lacked conceptual knowledge for conducting STEAM 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 [8].

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.

#### Acknowledgments

This study was supported by the 2020 Joongbu University Research Fund.

#### References

1. C. H. Lee, "Smart learning strategy of STEAM education," *Journal of Korean practical arts education*, vol.25.4 (2012): 123-147.
2. RAJESHWARI, SHEELA, and SUBHASH CHANDER. "Student teacher's perception and preparedness towards inclusive Education of learners with intellectual disability." *International Journal of Research in Applied, Natural and Social Sciences* 2.3 (2014): 1-6 (2014).
3. H. H. Kim, "(A) study on instructional models of fine art education and teaching plan development applying Steam : focusing on 1st grade in arts high school," M.S. thesis, Department of education, Jungang University, Seoul, South Korea, 2016.
4. Imonje, Rosemary, and Grace Nyagah. "INFLUENCE OF CAPACITY BUILDING OF ACADEMIC TEACHING STAFF IN MAINSTREAMING DISABILITY INTERVENTIONS FOR STUDENTS WITH SPECIAL NEEDS IN PUBLIC UNIVERSITIES IN KENYA." *International Journal of Humanities and Social Sciences (IJHSS)* 7.6, Oct - Nov 2018; 55-68
5. 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
6. Y. J. Shin & S. W. Han, "A Study of the elementary school teachers' perception in STEAM (Science, Technology, Engineering, Arts, Mathematics) education, vol.30.4 (2011): 514-523.
7. Kulkarni, Shraddha. "Inclusion of Corporate Social Responsibility Practices as a Part of Curriculum@ Indira School of Business Studies, India and its Impact Over the Awareness & Sense of Responsibility of Students towards Community." *International Journal of Business and General Management (IJBGM)* 6.3 (2017): 1-18.
8. J. H. Shim, Y. R. Kim, & H. K. Kim, "Understanding STEM, STEAM education, and addressing the issues facing STEAM in the Korean context, vol.35.4 (2015): 709-723.
9. J. M. Corbin & A. L. Strauss, "Basics of qualitative research: Techniques and procedures for developing grounded theory," Sage Publications, Inc, 2008.
10. SANDHU, PUNEET, and DAZY ZARABI. "SELF-REGULATED LEARNING AND WELL-BEING IN MAINSTREAM CLASSROOMS: FOCUSING THE LENS ON STUDENTS WITH LEARNING DISABILITY." *International Journal of Educational Science and Research* 8.1 (2018): 75-90.
11. 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, 2007.
12. KHALIL, AMAL I., and NUSRATH YASMEEN. "DOES ASSISTIVE TECHNOLOGY HELP CHILDREN HAVING DISABILITIES IN MIDDLE EAST AND NORTH AFRICA (MENA)

- REGION: A LITERATURE REVIEW." *International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)* 10.3, Jun 2020, 3209–3224
13. Y. K. Park "The Special School Teachers' Perception on Implementing STEAM Education for Students with Intellectual Disabilities," *Journal of Education and Social Science(JESS)*, HolyKnight, vol. 2, 23-28. doi: 10.46410/jess.2021.1.2.03.