Science learning for children with learning disabilities

D A Karlina*, C Sunaengsih, A A Syahid, R Irawati and D Nugraha
Primary School Teachers Education Program, Sumedang Campus, Universitas Pendidikan Indonesia, Bandung, Indonesia

*dety@upi.edu

Abstract. The purpose of this study is to identify students with learning disabilities in science subject in inclusive primary schools. The first stage of the study involves a screening interview, in which the researchers identify the responses of students with learning disabilities to science learning. To gather data for the study, teachers are given questions to respond to: how do teachers teach science to students with learning disabilities? And what are the difficulties in teaching science to students with learning disabilities? In addition, students are also asked if they like certain subjects and why. The second stage of the study involves classroom observation to see how students learn science. Identifying problems experienced by students with learning disabilities when studying science allows the researcher to either confirm or disprove the assumption that students with learning disabilities need different method of teaching or learning science. The finding of this study will benefit those who care about learning disability education. It is also directly related to my next research on science learning method for students with learning disabilities.

1. Introduction
Indonesia has been considered as an inadequate country for children growth and development. This is based on a 2017 survey on best countries for children growth and development conducted by Save the Children, in which Indonesia was ranked 101 of 172 countries [1]. One of the reasons is because child education in Indonesia has not fully developed and evenly distributed. Among the child education systems that have not been fully developed in the nation are inclusive schools. Inclusive schools are schooling system that is open to all children without exception, including those with special needs [2]. While many children are refused enrollment in public schools due to their special needs, inclusive schools facilitate all children to receive education. Inclusive schools implement the Education for All (EFA) system [3]. The success of inclusive schools also depends on the success of school leadership in managing the schools [4].

In inclusive schools, a particular kind of students will be found, i.e. those with learning disabilities. It is difficult to notice a student with learning disabilities without evaluation from an expert because they appear just like any other student [5]. Individuals with Disabilities Education Act Amendment (IDEA) describes that students with learning disabilities have problems in using spoken or written language. They have difficulties in listening, speaking, writing, reading, spelling, or counting [6]. Like other students, students with learning disabilities will learn all lessons the school provided, including science. In primary schools in Indonesia, science curriculum involves lessons on natural science. Students are directly involved in observing or practicing the lessons [7, 8]. The scope of science subject covers two aspects, i.e. scientific work and conceptual understanding and implementation. Scientific
work involves observation/research, scientific communication, creativity development and problem solving, scientific attitude and values. Meanwhile, conceptual understanding and implementation covers the topics of: living creatures and life process (human, animals, plants, and their interaction with the environment), health, objects/matters, matters’ nature and uses (liquid, solid, and gas), energy and its changes (force, sound, heat, magnet, electricity, light, and simple planes), the Earth and the universe (soil, earth, galaxy, and heavenly bodies), and science, environment, technology, and society [9, 10].

The present study relies on the findings of previous studies. One of them was Schneider et al, who studied the remedial method to teach reading to students with learning disabilities. Their findings show that remedial method in learning had positive effects on students with learning disabilities. Another study by Schneider et al on teachers’ social capabilities in teaching students with learning disabilities. Such social skills are necessary, and even becomes a standard, in teaching; particularly for students with learning disabilities. The last study referenced in the present study is Adam and Tatnall’s study on the use of ICT to improve the education for students’ with learning difficulties [11-13].

Based on these studies, the researchers concluded that students with learning disabilities can enroll in inclusive schools. These students need special treatment even though they do not show any physical difference with normal students. In this study, the researchers aim to find out how students with learning disabilities respond to science lesson, how teachers teach science to students with learning disabilities, and the difficulties teachers face when teaching science to students with learning disabilities.

2. Methodology

The present study employs a qualitative design. It was conducted in eight inclusive primary schools in Sumedang, Indonesia. The objects of the study were teachers who teach students with learning disabilities in inclusive schools and students with learning disabilities in those same schools. The average age of students observed in this study was between 8 to 12 years old. Hence, the researchers obtained their parents’ consent and permission before interviewing these students.

Figure 1. Students’ activity before interview in one inclusive primary school.

3. Findings and discussion

3.1. First research question

Several questions were asked to the students with learning disabilities, pertaining to the subjects they learned at school. These questions received varied responses. The following table showed the questions asked to the students.
Table 1. Questions for students.

| No | Question                                                                                                                                   |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Do you like Science?                                                                                                                      |
| 2  | Do you like Social Subject?                                                                                                               |
| 3  | Do you like Mathematics?                                                                                                                  |
| 4  | Do you like Language Lessons?                                                                                                              |
| 5  | What are the reasons that you like Science/Social/Mathematics/Language Subject(s)?                                                        |

Students’ responses to the questions above varied greatly. However, out of eight students with learning disabilities in eight inclusive schools in this study, all of them stated that they like Science subject, with various reasons. The following table displays students’ responses.

Table 2. Students’ responses about subjects that they like.

| Subjects    | Like | Do not like |
|-------------|------|-------------|
| Science     | 8    | -           |
| Social      | 2    | 6           |
| Mathematics | 3    | 5           |
| Language    | 5    | 3           |

As can be seen in the table, all students with disabilities stated that they liked Science subject. One of the reasons that they gave for liking Science more than other subjects was that because they learned using various media in Science. The use of media in learning process facilitates students to comprehend the lesson faster. Students in the age group of eight to twelve years old still need the aid of learning media to make concrete abstract concepts [14, 15]. In addition to the use of media in learning, Science lessons were also conducted by directly put the concepts learned into practice so that the students could obtain more comprehension about the lesson.

3.2. Second research question

Students with learning disabilities are those who possess some limitations or deviations in their basic skills, such as reading, writing, and counting. Therefore, teachers should know the appropriate and suitable ways to teach science to students with learning disabilities [16]. Teachers who taught science to students with learning disabilities observed in this study stated that there were special treatments given to those students. The teaching methods that they used included:

3.2.1. Remedial. Remedial is a learning remedial program that teachers employed through several steps, including: analysis/diagnosis, determining areas to remedied, developing remedial program, implementing remedial program, and evaluating learning remedial.

3.2.2. Tutoring. Providing direct treatment to difficult areas that students experienced.

3.2.3. Compensation. This method is implemented only if the difficulties that students face had negative effects to students’ self-concept development process [17, 18].

3.3. Third research question

Several difficulties that teachers faced when teaching science to students with learning disabilities were found in this study. The first is that teachers should know the students’ preliminary diagnosis, i.e. what learning disabilities that any particular student face. Teachers would provide different treatments to each student with learning disabilities, depending on the student’s condition. The second difficulty is that teachers felt a little overwhelmed because they did not have any special education background. The last
difficulty is that teachers had to prepare various learning media to accommodate every student with different learning difficulties. Thus, teachers should always update their knowledge through various trainings, seminars, or symposiums on ways to handle students with learning disabilities.

4. Conclusion
Based on the findings of this study, it is concluded that students with learning disabilities in inclusive primary schools in Sumedang, Indonesia liked Science subject more than other subjects. This is because Science subject was taught using various learning media and direct practice. Teachers also implemented various methods to teach science to students with learning disabilities. The difficulties that teachers faced in teaching science to students with learning disabilities are basically due to their non-Special Education background, which means that they are not experts in teaching students with learning disabilities.

References
[1] Olyvia F Satu Juta Anak Berkebutuhan Khusus Tak Bisa Sekolah CNN Indonesia (online) accessed on Tuesday 29/8/2017
[2] Erten O and Savage R S 2011 Moving Forward in Inclusive Education Research *International Journal of Inclusive Education* 16 2 pp 221-233
[3] Miles S and Singal N 2009 The Education For All and Inclusive Education Debate: Conflict, Contradiction or Opportunity? *International Journal of Inclusive Education* 14 1 pp 1-15
[4] Ainscow M and Sandill A 2008 Developing Inclusive Education Systems: The Role of Organisational Cultures and Leadership *International Journal of Inclusive Education* 14 4 pp 401-416
[5] Gilbert S L 2010 Another Type of Diversity: A Student Teacher with A Learning Disability *International Journal of Qualitative Studies in Education* 11 2 pp 323-340
[6] Mangungsong F 2009 *Psikologi dan Pendidikan Anak Berkebutuhan Khusus* (Depok: LPSP3UI)
[7] Philips M C, Vowell J E, Lee Y H and Plankis B J., How do Elementary Science Textbooks Present the Nature of Science? *The Educational Forum* 79 2 pp 148-162
[8] Ballou M T 1960 Science in the Elementary School *NASSP Bulletin* 44 260 pp 27-35
[9] Tiarani V A 2012 *Pembelajaran IPA di SD.* www.scribd.com (online)
[10] Gunckel K L 2018 Repairing Elementary School Science *LGBTQ Topics in Elementary Education, Research & Practice*
[11] Scheider M F, German D and Johnson B 2006 Service Overlap for the Reading Disabled Student: A Survey of Learning Disability and Remedial Reading Professionals *Reading Psychology* 7 3 pp 153-162
[12] Sandier A B, Murdock J Y, Dopny E and Berber P J 1991 Teaching Social Perceptual Skills to Students with Learning Disabilities *Journal of Behavioral Education* 11 pp 131-143
[13] Adam T and Tatnall A 2008 Using ICT to improve the education of students with learning disabilities *In Learning to live in the knowledge society* (Boston: Springer) pp 63-70
[14] Cropp D 1990 Are media needs being met for the beginning teacher? *Journal of Educational Technology Systems* 18 3 pp 215-234
[15] Kelly S N 2015 The influence of student teaching experiences on preservice music teachers’ commitments to teaching *Journal of Music Teacher Education* 24 2 pp 10-22
[16] Hallahan D P and Kauffman J M 2006 *Exceptional Learner: An Introduction to Special Education. International Edition* (Boston: Allyn and Bacon)
[17] Gearheart B R 1981 *Learning Disabilities: Educational Strategies* (St Louis: Mosby Co.)
[18] Harwell J M 1982 *How to Diagnose and Correct Learning Disabilities in the Classroom* (New York: Parker Publ. Co. Inc.)