# +THE EFFECT OF CLUSTER-BASED INSTRUCTION ON MATHEMATIC ACHIEVEMENT IN INCLUSIVE SCHOOLS

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*The research aimed to investigate the effect of Cluster-Based Instruction (CBI) on the academic achievement of Mathematics in inclusive schools. The sample was 68 students in two intact classes, including those with learning disabilities, selected using a cluster random technique among 17 inclusive schools in the regency of Surakarta. The two classes were pretested and the result showed no significant difference. The research was primarily quantitative using a post test only control group design. One group learnt mathematics in a Cluster-Based Instruction (CBI) setting, another group learnt in a Full Inclusion Instruction (FII) setting. Student achievement was measured using a teacher constructed test with a reliability of .70 in the try out. Data were analyzed using T-test for independent means. Qualitative data from interviews with students with learning disability were used to support the quantitative data. The research found that mathematic achievement of students in the CBI setting (mean = 7.01 , SD = 1.37) was significantly better than that of students in the FII setting ( mean = 5.04, SD = 1.53 ), t = 6.16, p < .01)*

## Introduction

During the last two decades, Education for All (EFA) has been on the agenda in world gatherings such as the World Conference on EFA in Jomtien Thailand 1990, Salamanca Conference and Declaration on Special Needs Education in Spain 1994, and World Education Forum, Dakar, Senegal in 2000. The last gathering in Senegal 2000 finally agreed upon the Dakar Framework for Action of Education for All (UNESCO, 2000). Since then, EFA has become the major program of educational reform in many countries, the goal of which is to assert that everyone has the right to education, particularly those with disabilities. The goal, however, is unlikely to be met in many countries. Inclusive education, furthermore, is believed to be able to secure EFA by providing education for pupils with disabilities in mainstream schools (Hegarty, 2003).

In Indonesia, the stream of inclusive education is moving even stronger since the issuance of Government Act Number 70/2009 on Inclusive Education signed by Ministry of Education in 2009. This act entails the implementation of inclusive schools in each of elementary, junior high, and senior high school levels in every sub-district area all over Indonesia. Since then, growing number of regular schools were changing to inclusive schools. Such a transformation from regular to inclusive schools is not just a matter of changing name or status. It needs some adjustments to the needs of children with special needs .
One critical point to be kept in mind is, that inclusive education requires some modifications in terms of curriculum, facilities, and teaching strategy. Modification is made to help children with special needs achieve meaningful learning from the full inclusion instruction. In many cases, being declared as an inclusive school, the classroom management is disoriented when the regular teacher is not familiar with the learning characteristics of three or four

children with special needs in her class. As a consequence, such children with special needs feel neglected academically due to the reason that the teacher is just focusing on the running curriculum which actually does not fit them. Children with special needs mainstreamed in inclusive schools are required to learn all the way the same as other children in inclusive schools under the full inclusive system of instruction.
In addition to curriculum, teaching strategy is another problem in a newly established inclusive school. Children with special needs in inclusive classes may not learn as it is expected when the instruction is not designed in such a way that it fits them. They need a specific instructional strategy that might be different from it is applied in regular classes. Differentiated instruction like individualized instructional program might be necessary to accommodate the unique needs of children with severe learning disabilities. In big classes, clustering the children with similar learning problems into smaller groups could be another way of differentiating the strategy of instruction.

The typical challenges emerging recently in the full inclusion system of instruction do not include only teaching strategy but also the evaluation system, particularly the grading system and national examination. Both are compulsory in regular schools. Nevertheless, they are problematic in inclusive schools. One of the most important findings from of a survey on the implementation of inclusive education in Indonesia (Sunardi, 2011) suggests that evaluation system does not support the implementation of inclusive education. The grading system, for instance, might become a barrier for students with special needs in inclusive schools. Such students would remain in the same level for one or two more years. Furthermore, grading system is not age-appropriate and turns to be a learning barrier for under-achieving students. The notable impact of this system is the increasing rate of drop-out students. This system, nevertheless, is inevitable since it has been running as long as the education system was first set up.

In addition to the grading system, the national examination is another learning barrier for students with special needs in inclusive schools. National examination refers to a nation-wide standardized test administered at the final grade of school education level. It is a compulsory measurement for all students except those who are learning under the curriculum below standard. (Ministry of Education Rule no 70/2009). However, national examination causes a great anxiety for most under-achieving students. The students might experience examination nerves due to perceiving their specific learning disability at the subject matter within the National Examination. Furthermore, a survey reported that several students with disabilities learning in inclusive schools demonstrated an increasing failure in three main subject areas; Language, Science, and Mathematics in the National Examination (Annual Report of Inclusive Education Teachers Forum, 2013). To be more specific, the study found that the under-achieving students with learning disability achieved the lowest score in Mathematics.

Given the limitations of national education system, various teaching strategies have been innovated and elaborated. Teachers are required to employ an approach involving active, creative, and fun teaching strategies suggested by Bultzin (2005) in *Joyful-Classrooms*. The primary focus of this program is to improve the students' learning process that enhances their academic achievement. In line with this program, The Board for Indonesian National Standard of Education strongly recommends that the process of classroom instruction should be conducted in interactive, inspiring, exciting, and challenging ways encouraging the students' initiative, creativity, and independence (Government Rule 19/2005). To some extent, the program indeed, improved academic achievement among students in regular schools, while unfortunately, it still could not solve the academic achievement issues among students with special needs. Thus, learning problems and finding ways as how to promote academic achievement among students with special needs are perceived as central issues in this study. All of these efforts, however, could not improve the achievement in Mathematics of students with learning disabilities in the full inclusive schools. Instead of learning in the full inclusive system of instruction, it is believed that differentiated instructional strategy of CBI could help them learn meaningfully. In special education, Cluster-Based Instruction (CBI) has to do with grouping system of students learning in a heterogeneous class, and it is best practiced in big classes in collaboration with a special education teacher.

*The Purposes of the Study*
The study attempted to investigate the difference in mathematic achievement between students learning in a CBI setting and those learning in a FII setting.

*Literature Review*
In general, the concept of inclusive education is an approach to education that responds to individual differences among students. It is a process of decreasing exclusion and increasing participation (Meynert, 2014) of learning within the classroom setting. In a similar statement, Ainscow (2003) defines inclusion as a process of searching for

potential alternatives to respond to the diversity of both learning how to live in and learning from diversity. It attempts to identify and remove learning barriers among primarily students who are marginalized and neglected so as to attend, participate, and achieve meaningful learning.

Historically, the changing attitude and awareness towards education for all (EFA) within this couple of decades led the concept of inclusive education in Indonesia. The traditional system in which students with special needs should only enroll in special schools has been replaced with a new system in which all children should get the educational service in mainstreamed or integrated system of education. In this regard, inclusive education serves the latest form of educational services along the special education development. In this context, the Indonesian Directorate of Special Education (2007) has issued a guide book of instructional adaptation for students with special needs in inclusive schools. The instruction covers specific adaptations and modifications adjusted to students with special needs. Modifications may be required in terms of curriculum, process of teaching, instructional media, teaching materials, and evaluation. Now that the inclusive education policy is issued by Ministry of Education no. 70/2009, inclusive education is compulsory in every sub-district of a region all over Indonesia. Since then, the number of inclusive schools grows fast. The Report of Inclusive Education (2013) indicates the number of inclusive schools in the regency of the research site has developed from 25 to 110 inclusive schools within the last two years.

Since the beginning of inclusive education, Full Inclusive Instruction (FII) has been the typical system of inclusive schools in Indonesia. Students with special needs are fully mainstreamed in regular schools regardless their kinds and severity of handicapping conditions. In the instructional context, inclusive education accommodates students with special needs in regular school where the instructional practice responds to individual differences of all students (Gregory & Chapman, 2009). This means that teaching in an inclusive school should address the unique needs of individuals with special needs. Hence, responding to such problems experienced by students with learning disabilities is deemed the most significant consequence of inclusive education (Shaeffer, 2005). In practice, however, the implementation of FII causes distress towards students with special needs, particularly those with learning disabilities. Such causes of distress could occur due to both external and internal barriers.

The external barriers are indicated by the lack of adequate human resources and facilities required by the Government rule number 70/2009 on inclusive education system issued by the Ministry of Education in 2009. A previous study conducted by Gunarhadi, Shaari, Sunardi, Munawir & Andayani (2013), for example, found more than 80 inclusive schools in a district which had only 20 special education teachers. It is, evidently, far from the required condition of inclusive education as such that at least one special education teacher for each class. This indicates that Full Inclusive Instruction (FII) was not able to provide assurance regarding the quality of education for students with special needs. It implies that inadequate learning facilitation in the respect of teaching process may hinder academic achievement due to poor cognitive stimulation.

Internal barriers, in almost the same way, can lead to more psychological distress. Psychological problems such as poor cognition, low self-esteem, and maladaptive social behavior tend to diminish learning motivation that will accumulate to general learning problems, particularly regarding learning of mathematics. For children with learning disability, in particular, cognitive barriers lead to serious difficulties in learning mathematics. Without extra individual scaffolding by applying the concept to the everyday life skills, these students may not be able to learn this subject matter meaningfully. This is in line with the statement by Vygotsky (in Daniels, 2009) who suggests a child with cognitive barriers could learn through concepts which are embedded in everyday referents.

Learning Mathematics involves cognitive processes that determine how individuals gain an understanding of themselves and their environment (Henson & Eller, 1999). Cognitive skill requires a high abstraction process which may occur when students learn mathematics. Through the cognitive process, individuals are more aware of themselves and their behaviors towards the environment (Hernowo, 2008). According to cognitive learning theory, the aspects of learning include thinking processes such as response to stimuli, memory, problem solving, and creativity (Piaget, 1980; Henson & Eller, 1999; Martin, 2000). Cognitive processing ability differs from one individual to another (Galloti, 2004). For instance, someone having a high score in intelligence tests predictably has high cognitive skills.
In line with the theory, Mayer (2008) argues that learning mathematics is interrelated to cognitive learning in which a concept is learned through abstraction and generalization such that where students learn the concept of an object beyond the numerical symbols (Hadi, 2005). Learning process happens through association, perception, and creation based on their experiences of finding the core ideas from their own conclusions. Students with mathematic

problems are characterized by specific cognitive or academic difficulties such as perception problems, distractibility, difficulty in screening out irrelevant stimuli, and impulsivity in responding to classroom tasks (Heruman, 2013). Regarding those problems, Ormrod (2011) suggests some strategies as to help such students learn better. The strategy includes executing the important information while avoiding distraction at the same time, encouraging greater reflection before responding, and pacing the instruction to allow students to think about and process the information. Nevertheless, this strategy is only feasible when the class size is not too big.

Cognitive theorists of learning are more likely to view that learning plays an important role in intellectual capability in the learning process instead of forming the habit stimulus-response and reinforcement. Piaget (1980) and Vygotsky (1997) argued that practice helps learners to internalize skills and form abstraction which could strengthen associative bonds as cognitive process (Carnell & Lodge, 2002) . Galloti (2004) explained cognitive theory as the process of mind or cognition in which a piece of information is obtained, processed, stored, and transmitted. Mental constructs are symbols represented by rules, images, or ideas between input and output of information (Parkin, 2000). In term of mental construct, Mayer (2008) stated that meaningful learning is dealing with memory which is built up from selecting, organizing, and integrating. Likewise, Ormrod (2011) argued that learning is a cognitive process in which the mind attempts to interpret and remember what is seen, heard, and studied. This means that meaning and understanding are not derived directly from the environment. They are constructed in the learner's mind instead. Cognitive learning strategies correspond to the executive control functions of information processing.

Students with learning disabilities, in particular, could not fully benefit from learning in the similar way of peer students as how they learn in full inclusive system of education where the class usually contains a big number of students. Due to their discrepancy between their normal potentials and real academic achievement, such students require extra guidance from the teachers to allow them to keep up with their peers in term of academic performance (Gargiulo, 2012). Full Inclusion Instruction, in this matter, could not fully facilitate such students in developing their cognitive skills since the teachers do not have enough opportunities to provide them with extra assistance during learning. Hence, individual and small group instruction in differentiated learning is highly required since it is believed that they could learn better in a small group or cluster (Gregory & Chapman, 2009). It implies that teachers in the full inclusive system are required to provide an instructional strategy enabling the students to learn Mathematics in cluster as well as on individual basis.

Cluster-Based Instruction (CBI) is a strategy of teaching in which few students with similar problems are gathered into a group or cluster. CBI is a model of teaching in inclusive education which can be conducted by both in class and pull-out model aligned with the inclusive school system (Gunarhadi, 2014). This teaching strategy is developed from the experiences regarding the effort to diminish traditional barriers in which teaching in a big class of more than 30 students with different abilities is less effective. It is believed that the smaller class size, the easier for the teachers to manage the class. A previous research (Gunarhadi, et.al., 2013) found that regular teachers at inclusive schools prefer teaching a class with fewer students with special needs. This is reasonable as the teachers are not keen to deal with students with special needs. Avramidis and Norwich (2002) also argued teachers are more likely to include students with mild disability in a so-called mainstream class than those with more complex impairment. The more students with learning disabilities in a class, the more difficult the instruction could be. This is true since students with disabilities in the class get less attention than those who are non- learning disabled.

Unlike the FII system, CBI is a model of instruction conducted in inclusive schools where few students with special needs are mainstreamed. In big classes, clustering the children with similar learning problems in to smaller groups could be another way of differentiating the strategy of instruction. A number of three or four students with learning disabilities in full inclusion system , for instance, is grouped to have additional help of teaching either *in class* or *pull out* cluster. At this point, teachers are entailed to be creative in seeking ways as to give assistance to students with learning disability towards better learning. Students with learning disability prefer learning in the small groups or cluster since they may feel more comfortable of having classmates with similar level of difficulties.
In comparison to the full inclusion system, CBI offers teachers better experience. It could develop new ways of thinking about teaching and how to provide adequate intervention in a cluster of students made up from different ways of grouping. At this point, teachers are required to learn the principles of applying CBI in classrooms. In some instances where children have severe learning problems, smaller group division, pair work or even individualized instruction is commonly practiced in CBI model.

## Method

*Research Design*

The research is a quantitative method of quasi-experimental research utilizing a post-test only control group design (Sekaran, 2003; McMillan & Schumacher, 2010). The research provides treatment to examine the change of value of dependent variable (Fraenkel, Wallen, & Hyun, 2012). A sample of two intact groups of students was taken under randomized sampling technique assuring that both groups of the experiment and control groups are equal (Seniati & Setiadi, 2009). To see the effect of the treatment, mathematic instruction was addressed to the class in the experimental group using CBI model, and the control group using FII model. In addition, interview with some students with learning disabilities was used as a secondary data to confirm the quantitative findings.

*Population and Sample*

The population of this research is a number of 68 students in 17 inclusive schools scattered in 4 sub-districts of the Regency of Surakarta, Central Java, Indonesia. Two intact groups of students from two different schools were assigned as sample using multistage-cluster random sampling technique (Kumar, 1999). The first stage was the selection of two districts in the District of Surakarta where the districts of Solo and Boyolali were randomly selected. The second stage was the selection of one inclusive school from each of the selected district. In this stage, 34 third grade students in *Wiropaten Primary School* (WPS) Solo were selected as an experimental group. On the other hand, other 34 third grade students from *Sukorame Primary School* (SPS) Boyolali represented the sample of the control group. Among 34 students in the experiment group of *Wiropaten Primary School* (WPS), 4 of them were identified to be mildly learning disabled. In the similar number, there are 5 students with learning disabilities in the control group of *Sukorame Primary School* (SPS).

Prior to the treatment, the two groups were pretested in mathematics, the result indicated that there was no significant difference between the experiment group (mean = 4.99, SD = 0.76) and the control group (mean 5.01, SD=0.73), t = 0.15.

**Table 1. T-Test analysis between experimental and control groups before treatment of CBI.**

| Achievement | Group | N | Mean | Std. Dev. | t | Sign. |
|---|---|---|---|---|---|---|
| Math | Experiment | 34 | 4.99 | 0.76 | -0.15 | 0.89* |
| | Control | 34 | 5.01 | 0.73 | | |

Note: *P > 0.05

*Data Collection and Analysis*

The data regarding the Mathematics achievement were collected from a teacher constructed test. To maintain the validity the test, the academic syllabus of the grade was used as main guide in the construction of the test. A try out of the test indicated a reliability value of 0.70. To measure the normality of data, the *Kolmogorov Smirnov test* was used to see the distribution of the data. Meanwhile, independent sample T-test was used to prove the hypothesis.

## Results

*Data of Academic Score of Mathematics of the Experimental Group*

The scores of the academic achievement on Mathematics were obtained from the post test administered to the sample of 34 students in WPS assigned as the experimental group. The result showed the highest score = 9.25, the lowest score= 3.25, *mean* ($\overline{X}$)= 7.65, *median* ($M_e$)= 7.25, standard deviation ($\sigma$)= 1.37, quartile I ($Q_1$)= 5.75, which means 75% of the participants have scores > 5.75, quartile 3 ($Q_3$)= 8.25, meaning that 25% of the participants scored > 8.25. The *mean* ($\overline{X}$) = 7.65 , standard deviation ($\sigma$) = 1.37 meant the data distribution was normal.

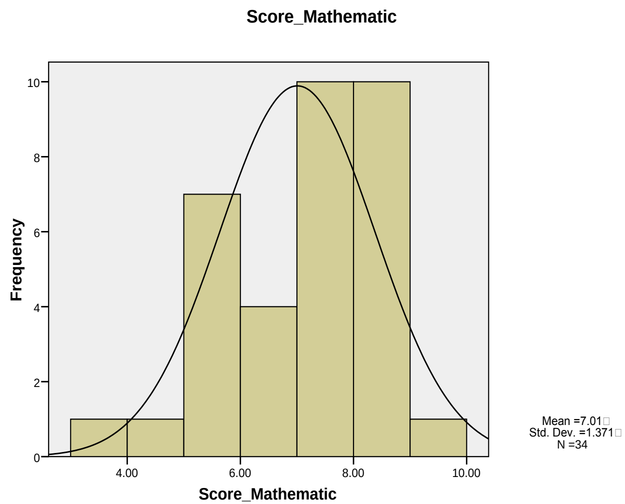


**Figure 1. The data distribution of the academic score of Mathematics Data of Academic Score of Mathematics of the Control Group**

The score of the academic achievement on Mathematics was obtained from the test of final exam administered for the sample of 34 students assigned as the control group of Sukorame Primary School (SPS). The result showed the highest score = 8.8 and the lowest = 2.3, *mean* ($\overline{X}$) = 5.04, *median* ($M_e$) = 4.50, standard deviation ($\sigma$) = 1.53, quartile 1 ($Q_1$) = 3.80, which means that 25% of the respondents had scores <3.80, and quartile 3 ($Q_3$) meaning that 25% had scores > 6,50. That the *mean* ($\overline{X}$) = 5.04 > and the standard deviation ($\sigma$) = 1.53 meant the data distribution of Mathematics scores was normal.

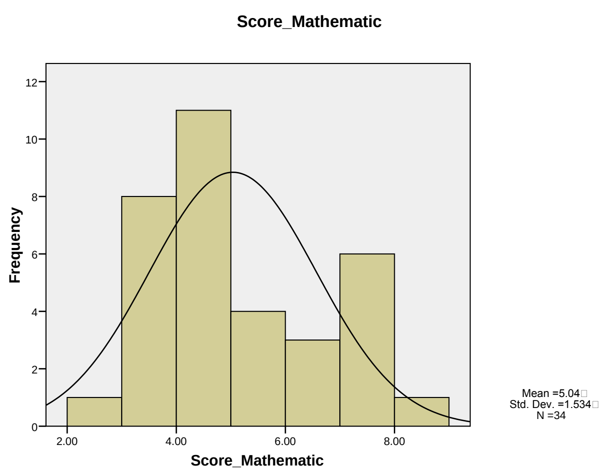


**Figure 2.The distribution of Mathematics scores of the Control Group**

In order to examine whether the cognition has the power to support the improvement of the academic achievement in Mathematics through Cluster Based Instruction, a T-test for independent means was used to analyze the data.

**Table 2. T-Test analysis between experimental and control groups after treatment of CBI**

| Achievement | Group | N | Mean | Std. Dev. | t | Sign. |
|---|---|---|---|---|---|---|
| Math | Experiment | 34 | 7.01 | 1.37 | 6.16 | 0.000* |
| | Control | 34 | 5.04 | 1.53 | | |

**Note: *P < 0.05**

Table 2 shows the *mean* of Mathematics (M = 7.01, SD = 1.37) was significantly higher than the mean within in the control group (M = 5.04, SD = 1.53, t (34) = 6.16, p = 0.000, meaning that CBI treatment had a significant effect on academic achievement in mathematics rather than that in Full Inclusive Instruction (FII).

In addition to the quantitative findings regarding the influence of CBI on Mathematic achievement, qualitative data from the interview with students with special needs were presented. The interview with students with learning disability enrolled in the inclusive schools showed the important role of cognition. CBI employs stimulating activities that involve direct experience and demonstration during learning, and reinforcement at the closing session. The result indicated that students with learning disability became increasingly enthusiastic in learning Mathematics. Four out of six students with learning disability enrolled in inclusive schools were seriously engaged in learning through CBI indeed. The students became more interested when learning mathematics. The most impressing comment expressed by the students with learning disability learning in cluster was that *learning mathematics in a group of intimate friends like this is the first time we experience.* They did enjoy learning the subject through CBI since they contextually learn through working with others.

## Discussion

The increase of *mean score* from the base line (4.99) to the posttest score (7.01) indicated an increase of academic achievement on Mathematics by CBI. The change caused by CBI was significant since the statistical analysis, showed with the value of significance 0.00< 0.05, Fo (41.92) was bigger than Ft (3.99). In the same way, the academic improvement was also contingently influenced by cognition as shown from the value of 0.00< 0.05. From these ways of statistical analysis, therefore, it is confirmed that the change of academic achievement of Mathematics was not only from the CBI treatment, but also controlled by the power cognition. In other words, there seems to be a close relation between learning mathematics and CBI in dealing with intellectual stimulation. CBI provides the teacher with learning facilities through classroom management on one side, and classroom strategy of stimulation through students' activities on the other side.

*Classroom management*

One important point as to how CBI affects the improvement of academic achievement in Mathematics is classroom management. It deals with class structures of instructional delivery. It includes classical, grouping, and individualizing approach of instruction. In the classical approach, students with learning disabilities learn together with the peers in the big class. All students learn the same material at the same time to enhance the opportunities of acquisition in Mathematics. In the case that students with learning disabilities get some problems in understanding the learning material, they are grouped in such a way that members in this group have similar level of knowledge base. Learning activity in this group so called CBI is addressed to strengthen the knowledge already mastered by remedial teaching. In the case of remaining problems, an individual instruction is necessary for personal scaffolding.

*Class activities*

In addition to classroom management, CBI allows the teacher to organize the class activities of students with learning disability both in a small group and individual basis. It is in CBI that the teacher could more easily stimulate the students' cognitive work in the process of learning (Driscall, 2005). Class activities are characterized by the students' cognitive involvement in constructing the knowledge from the teacher's instruction. Learning mathematics involves working construction of mental abstraction through attention, reasoning, categorizing, making decision, and other mental processes in the contextual situation (Parkin, 2000, & Galloti, 2004). In other words, learning mathematics involves cognitive engagement of abstraction by connecting the concepts into hands-on activities to gain insight to strengthen the associative bonds (Carnell & Lodge, 2002). In practice, teaching mathematics starts from enrolling by selecting the material that most interest the students, relating the material to knowledge already exist in the students ' mind, organizing the material, assimilating the new material through demonstration of the new knowledge, and lastly, training and transferring the new knowledge through drilling reciting, or simulating.

In addition, the class activities arranged in small group or individual do not only help the teacher manage the classroom more easily but enhance the students to feel convinced of the success in learning. This good point of CBI is supported by Florian and Linklater (2010) who argued that the students' enjoyment is a part of successful cognitive stimulation through CBI. The small number of students in CBI enhances the teacher to provide a lot of opportunities and adequate responses to the students individually. Moreover, teacher's positive attitude towards these students helps them stimulate their power of learning (Avramidis & Norwich, 2002). Feeling good in learning is more likely to solve the most common problems for students with limited skill in term of cognition.
This finding is even asserted by the conclusion of the interviews with three individuals with learning disabilities; *What makes you feel good about learning Mathematics?* Each of them responded in almost a similar manner *Mathematics is the most difficult lesson, but I feel happier to learn this topic in a small group than in a big class.* When they were
asked why, each of them commented: … *because it is easier for me to understand the topic from clear explanation, drilling, free discussion, less burden of failure, and friendly help from the teacher*. In short, this explanation suggests that mathematics learning requires vigorous cognitive skill, but soothing atmosphere and reinforcing stimulation in CBI can lessen the burden of competition anxiety likely occurring in FII.

*The underlying success of learning mathematics in CBI.*
Based on the observation during the intervention in CBI, the research found the following strong points of enhancement for children with learning disabilities in learning mathematics.

1. Timely feedback or correction.
   Children with learning disability make mistakes in writing or reading mathematic symbols (such as: -, + , x, >, or < , =). When this happens during practice due to their wrong perceptions, the teacher can make necessary correction or feedback timely. Such corrections are hardly possible in FII due to the reason that many students might need these kinds of scaffolding.
2. Individualized scaffolding.
   Individualized approach of instruction is quite possible for children in small number of group of CBI, and it is believed to be a better instruction, particularly for children with severe learning problems. On the contrary, individualized instruction is not possible in FII .
3. Group scaffolding
   Perceptual and motoric problems leading to mistakes can happen to children with specific learning disabilities. However, corrections to these problems can easily be done without consuming too much time in CBI, especially when the instruction takes place in *pull out* cluster model which is separated from the peers in FII setting.
4. Psychological traits like self-confidence, motivation, or courage to ask or answer questions as a freedom of learning also apparently happen more frequently in CBI.

*Limitation of the research*
CBI could be implemented on condition that the inclusive school has a special education teacher who can work in collaboration with the regular teacher. In this way, the *pull-out* model of CBI can be possibly implemented. Unfortunately, all inclusive schools are existing in FII model, so research on CBI model is hardly found or published.

**Conclusion**
The increase of the *mean score* from the base line (4.99) to the posttest score (7.01) indicates that the Mathematics achievement could be improved by Cluster Based Instruction (CBI) for children with learning disabilities. In addition to quantitative results, qualitative findings can be drawn as the following conclusions.

1. CBI allows the teacher to deliver the subject matter in three flexible sequences of learning arrangement; classical, small groups, and individual settings. Weaknesses of instruction in the classical setting are diminished by instruction in smaller class of learning which is called cluster-based instruction (CBI). In the same way, weaknesses of instruction in small group could be overcome by the individual approach of learning.
2. CBI, which is characterized by a small group instruction, has enabled the teacher to arrange the class activities on how the children cognitively construct the knowledge through practice of connection between the conceptual and practical understanding on realistic mathematics.

3. In practice, CBI allows the teacher to foster joyful learning through hands-on activities for students with learning disabilities by means of cognitive stimulation within the reinforcing academic atmosphere. It is believed that meaningful learning is better achieved when the students feel the joy of learning.
4. Based on the observation and interview with children with learning disabilities, typical problems due to perceptual and motor problems leading to mistakes can be promptly corrected as a timely feedback.
5. Some children with learning disabilities prefer learning in CBI to FII for psychological reasons. Instead of competition, they enjoy learning together with peers with similar learning problems in a more cooperative learning environment.

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