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WORD COUNT 6246
TIME SUBMITTED 15-FEB-2023 09:33AM
PAPER ID 96620467

International Journal of Advanced Science and Technology
Vol. 29, No. 7, (2020), pp. 3200-3211

Model of instructional strategy based on the brain's natural learning system in inclusive classrooms: special teacher perceptions

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Abstract

The problems faced by a special teacher (ST) in achieving the success of learning for students with special needs (SNS) is the difficulty of finding effective instruction that can meet the needs of SNS with typical characteristics. The purpose of this study is to explore ST's perceptions of the instructional strategy model based on the brain's natural learning system in inclusive classroom of primary school. The study involved seven of STs' primary school which came from several inclusive primary schools in several cities in Indonesia. Data were collected by classroom observation and open interviews in inclusive classrooms using instructional strategy model based on the brain's natural learning system. Data were analyzed using qualitative data analysis. The research produced five main themes consisting of student learning motivation, student learning experience, student social skills, students' talents and interests, and ST competencies. In the end, this research has contributed that ST can develop competencies that can be used in assisting SNS in instruction, and directly the benefits can be felt by SNS both academically and non-academically. Instructional strategy model based on the brain's natural learning system can be used as a model in managing inclusive classrooms by ST, together with general teachers (GT), to be more effective.

Keywords: *Instructional Strategy, Brain's Natural Learning System, Inclusive Classroom, Special Teacher*

1. Introduction

The role of special teachers (ST) in assisting special needs students (SNS) both in instruction in the classroom and outside the classroom, has had a positive impact on the development of SNS. The task of ST in assisting SNS in instruction, especially in inclusive classrooms today, also dramatically influences SNS learning outcomes. In Indonesia, ST is a teacher who has a background in special education has received training on special education assigned to inclusive schools [1]. ST must have in addition to the main competencies (pedagogic, personality, professional, and social). Also, it has other abilities, among others. In essence, general abilities used to educate general students (GS), basic abilities used to educate SNS, and special abilities used to educate SNS students with a certain type [2]. Besides, ST also has the task of one of them is carrying out assistance to the SNS along with GT, as well as assisting with dedicated services to the SNS are experiencing particular barriers in the form of remedial and enrichment [3].

In practice, ST is still challenging to provide services to SNS, especially in learning that is expected to improve SNS skills. Of course, this is closely related to collaboration between GT and ST in designing instructional in inclusive classrooms, because assignments and scope are different from GT. In general, so far, ST has followed the instructional design designed by GT ST assignments are accompany SNS to follow learning activities, both explaining and directing SNS so that they can carry out learning well. Ideally, SNS can achieve instructional objectives following the targets set by GT. For this reason, GT must be able to design instructional strategies that support learning achievement, and ST must support these instructional strategies [4]. Effective instructional strategies in inclusive classrooms are learning that must be designed according to student characteristics [5]. GT is expected to meet the competencies of students who

display not only cognitive aspects but also affective and psychomotor aspects. For students who are slow learner, cognitive aspects may be difficult to fulfill, like another GS. Still, teachers can develop and enhance their affective and psychomotor aspects optimally according to their abilities and strengths. Likewise, for autistic students, the social and emotional aspects are essential to be developed so that they can be useful for their development in the future when they have to contribute to society. Achievements for all students, including SNS must be determined by GT through instructional strategies that are varied, interesting, and easy to implement in inclusive classrooms [6], [7]. Meanwhile, ST must be able to help SNS carry out learning so that learning targets can be achieved. One model of instructional strategies that can be used by teachers in inclusive classrooms is a model of instructional strategies based on the brain's natural learning system.

The brain's natural learning systems is learning based on five learning systems, namely emotional learning systems, social learning systems, cognitive learning systems, physical learning systems, and reflective learning systems [8].

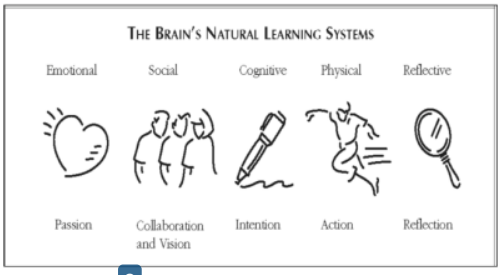

Figure 1. The Brain's Natural Learning Systems

The emotional learning system is a learning system that places teachers as mentors, which creates a conducive classroom climate, making teacher-student and student relationships a warm relationship. The teacher functions to help foster a desire to learn, have a strong desire to be the best in the future, by carrying out challenging learning, relevant following the knowledge students have. Social learning systems, placing students as part of a group with a focus on interaction with others by collaborating in a learning community, working together in making decisions, and solving problems that can foster student and teacher creativity in learning. A cognitive learning system, placing the teacher into the role of facilitator while students as problem-solvers and decision-makers. By providing learning space in a position that offers opportunities for students to explore knowledge, problem-solving, and decision making based on the learning process that has been done. A physical learning system, involving all class members in physical activity, or psychomotor and tactile on a topic being studied. The reflective learning system places the teacher to understand the learning styles, strengths, and weaknesses of students after going through the learning process. For students, this learning system illustrates, what must be improved from a lesson, measuring abilities and fostering strengths into talents that can be developed in the future [8].

Table 1 is a form of instructional strategy model based on the brain's natural learning systems:

Table 1. The Example of Form of Instructional Strategy Model Based on the Brain's Natural Learning Systems

No	Material / Topic of learning	SiPAO	Steps / Sequence of Learning	Methods	Media	materials	Assessment	Time allocation

Early learning activities								
.	Me and my ideals	Emotional Learning System	-GT plays some videos in front of the class and ST directs SNS to watch -Guru brings cardboard containing work - GT asks each student what their ideals are and ST asks SNS -ST explains the purpose of the lesson	-inquiry - lecturer - discussion	- Infocus -Paper carton board plank	short film students Books	-	15 minutes
Main activities of								
		Social learning system	GT divide students into six groups and ST explain to SNS -The teacher divides each one illustrated paper to each group. -Each group will make one sentence according to the picture, ST explains to SNS about their assignments -Each image will be distributed to other groups, to be made again sentences and ST explains the task to SNS	- Games - discussion -	Hvs paper - color	pencil - pictorial carton	Rubric	20 minutes
		Physical learning system	-Each group members practice reading sentences (poems) that have been made; ST trains SNS -Guru shows several pictures of animals to one group and demonstrates the characteristics of these animals; ST directs SNS to help GS -Other groups guess	- exercise with a friend -game -guess image	display - Paper text-book	- Carton display text-book	section	20
		cognitive learning system	-The teacher asks each member of the group sought the characteristics of animals, ST explained to SNS destination task -Each group presented the results of discussions with group members; ST gives SNS to be able to participate in activities with GS	- Discussion	- Infocus - internet	- internet - book	Rubric	20
Concluding Activities								
		Reflective learning	Teachers explain poetry and animal growth - Teachers reward each	- Discussion	Card	-	Point	15

		system -	group and motivate them to be better on the next topic. -ST explains what SNS has done during the learning.	-Stellar				
	Lecturer Reflection on learning: Strengths: - SNS enthusiastically watching videos and eager to mention their ideals - SNS looks more active when learning - SNS has wanted to be involved in group activities - General students want to give opportunities to SNS to issue opinions in group discussions - Learning media easy to use by SNS Weaknesses and improvements: - SNS should be encouraged to discuss - More media provided - Provide support and encouragement to SNS to be more confident in each learning activity							

This study aims to explore the special teacher's perceptions of the instructional strategy model based on the brain's natural learning system.

2. Methodology

This research uses a qualitative research approach to understand opinions and observations of learning outcomes for students about the implementation of an instructional strategy model based on the brain's natural learning system in inclusive classrooms in higher education. The use of qualitative research is used because it can explore people's opinions or thoughts in understanding research questions in-depth on the topic of being studied [9].

2.1. Participants

Participants involved in this study are STs who are tasked with assisting SNS in learning activities, both in the classroom and outside the classroom. The number of ST involved was as many as seven people who came from inclusive primary schools from various cities in Indonesia. ST assists the SNS in learning activities using instructional strategies based on the brain's natural learning systems. These STs have different backgrounds from educational backgrounds, as well as teaching experience in inclusive schools. Most of them are high school graduates and are currently pursuing higher education—teaching experience in inclusive classrooms between 3-5 years. Table 2 shows the data of inclusive teachers involved in the study.

Table 2. Participant Information

No	Name of the special teacher	Teaching experience	Types of SNS accompanied by	Graduates (bachelor)
1.	ST 1	Three years	Slow learner	Senior high school
2.	ST 2	Three years	ADHD	Student-teacher at University
3.	ST 3	Five years	Slow learner	Senior high school
4.	ST 4	Three years	Autism	Senior high school
5.	ST 5	Five years	Slow learner	Senior high school
6.	ST 6	Five years	Learning difficulties	Student-teacher at University
7.	ST 7	Five years	Dyslexia	Bachelor of education

2.2. Data Collection and Data Analysis

Data is collected through observation and interview. Observations were carried out in inclusive classrooms in class 4, three times for each class. Before observation, besides the GT had been given training, ST was also given an understanding of the instructional strategy model based on the brain's natural learning systems so that it could be used in instruction in inclusive classrooms. Instruction is carried out for 1.5 - 2 hours. Researchers record all learning activities from the beginning to the end. The results of this observation are field notes that have been transcribed in detail. In addition to observation, data collection is also done by semi-structured interviews and open-ended questions. Interviews were conducted in accordance with interview guidelines that had been made by researchers. The contents of the interview in the form of teacher perceptions about the implementation of the natural learning system model of the brain, related to the implementation time of learning, the sequence/steps of learning, methods, and media, as well as teaching materials used in learning.

Data analysis was achieved using qualitative data analysis [10], [11] with three steps of analysis, namely: (1) thematic analysis of all participants, analyzing the results of the observations and interviews relating to the implementation of instructional models strategy based on the brain's natural learning systems; (2) within-participant thematic analysis, identifying the general theme of needs analysis; and (3) cross participant analysis, identifying the general theme of the instructional strategy model. The final stage is analyzing the instructional strategy model finding a culture theme as a profile of the instructional strategy model in inclusive classrooms in inclusive elementary school through inductive analysis. Table 3 is the result of qualitative data analysis.

Table 3. Results of qualitative data analysis models

Included term	Semantic term	Cover term
- Increasing student learning interest - Increasing student enthusiasm for learning	is part of	Student learning motivation
- Explore of new knowledge - Practice of problem-solving	is part of	Student learning experiences
- Developing collaboration between students - Developing communication between students	are part of	Students' social skills
- Student self-development	is part of	Students' talents and interests
- Effective instructional design	is part of	Competencies of ST

3. Result and Discussion

Based on data analysis performed, this study produced a profile of the perceptions of special teachers of an instructional strategy model based on the brain's natural learning systems in inclusive elementary classrooms.

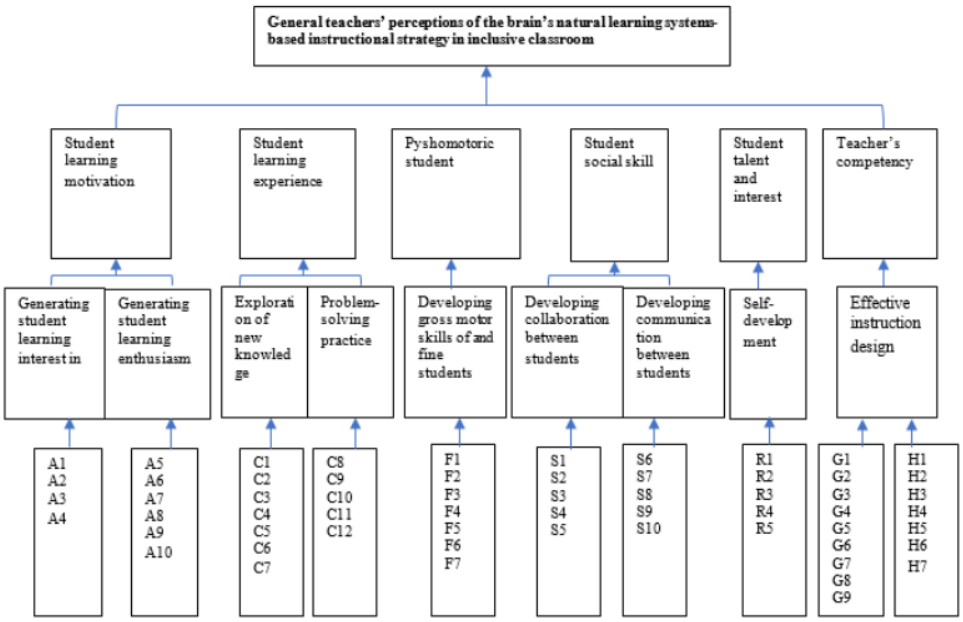

Figure 2. Profile of ST's perception of the natural brain learning system-based learning strategy model.

Note:

A1: Explain the film about soccer players to SNS
A2: Give an example of athlete achievement to SNS
A3: Ask the ideals of SNS
A4: Provide an understanding of the character's story to SNS
A5: Explain the rules of the initial game to SNS
A6: Provide an understanding of ice breaking to SNS
A7: Explain playing the role of certain characters
A8: Give examples of children's songs to SNS
A9: Give gifts/praise to SNS
A10: Explain the lesson objectives to SSN

R1: ST together with GT evaluates learning
R2: ST gives appreciation to SNS
R3: ST rewards SNS
R4: ST explains the improvement of lessons to SNS
R5: ST explains about the advantages of SNS

G1: ST understands more ABK students
G2: ST sets the time when SNS is not motivated
G3: ST gives SNS opportunities to make friends with other students
G4: ST oversees SNS interaction

C1: Make simple questions
C2: Do puzzles
C3: SNS play snakes and ladders
C4: SNS play roles
C5: ST gives snippets of images
C6: SNS Guess words and pictures
C7: SNS play connecting words from pictures
C8: ST helps explain the storyline
C9: SNS search for keywords in pictures
C10: ST helps explain the material to SNS
C11: SNS gives an opinion of the findings of the words
C12: SNS with GS presents the results Project
S1: SNS listens to the opinions of others
S2: SNS works on group questions
S3: SNS gives opinions in group
S4: SNS dares to give opinions
S5: SNS values others
S6: SNS helps friends in the group
S7: SNS appreciates the work of group members
S8: SNS is responsible for the task
S9: selects group leader
S10: Dividing the assignments of each group member

G5: ST provides a detailed explanation for SNS
G6: ST keeps distance from SNS when studying with other students
G7: ST increases SNS independence
G8: ST increases SN creativity S
G9: ST increases collaboration with general teachers in learning
G10: ST increases interaction with general teachers in handling SNS

Based on the results of the analysis, six themes become special teachers' perceptions of the instructional strategy model based on the brain's natural learning systems, namely student learning motivation, student learning experiences, student social skills, students' talents and interests, and ST competencies.

Students' learning motivation

Believes that through an instructional strategy model based on the brain's natural learning system, provides opportunities for all students, including SNS to be able to arouse interest and enthusiasm for learning. This can be seen from the activities at the beginning of instruction, which was developed from an emotional learning system that aims to make students understand the relevance and instructional objectives. ST tries to make SNS follow the example given by GT at the beginning of instruction. So, the SNS is motivated to learn in the next activity. But the most important thing from the initial instructional activities or based on an emotional learning system is that the SNS can generate interest and enthusiasm for instruction. In the example, when GT played a video featuring the figure of the badminton world champion, which would give a picture of success to all students, the SNS looked enthusiastic and followed the video to completion. The SNS accompanies and, at the end of the video, asks the SNS the purpose of the video content. The SNS can explain the contents of the video and make it interested in doing one other positive thing like in the video example. This was stated by the opinion of ST:

"I see my students enthusiastic about the video shown. When the video finished playing, I asked if he would like to be as successful as the character in the video. My student told me that he wanted to be like a video example. I think this video has influenced him so that through learning, he can become someone who is aspired to" (ST 2)

SNS interest and enthusiasm for learning shows SNS interest, have readiness and attention to a particular topic. It is not easy to arouse the excitement and enthusiasm of SNS for a specific topic, so special methods are needed so that SNS can be interested in learning, despite the limitations they have. SNS learning motivation, which tends to be low at the beginning of instruction, makes ST think hard so that SNS can follow the learning well. Meanwhile, the focus of the SNS also greatly influences the instructional activities, so an instructional method is also needed so that the SNS can successfully participate in learning in a conducive classroom atmosphere. High learning interest will increase SNS learning motivation in achieving instructional goals that have been set by the teacher in the form of learning outcomes. ST must be able to support GT in directing SNS according to SNS characteristics. ST must be able to bring SNS in conducive learning conditions, especially at the beginning of learning, because it will have a positive effect on the sustainability of the main topics in the lesson [12], [13].

Emotional learning systems designed by teachers must be able to invite all students, especially SNS, in a comfortable and mutually supportive learning atmosphere so that SNS feel that they also have the right to be successful from the learning that is carried out. ST functions to help foster a desire to learn SNS, so that they have a strong desire to be the best in the future, by implementing challenging learning, relevant following the knowledge possessed by the SNS. Learning motivation for SNS in inclusive classes must be able to come from within and outside the student so that instructional objectives can be achieved [14]. Although for SNS, fostering interest and enthusiasm for learning is sometimes not easy, because they have limitations.

Student learning experiences

The cognitive learning system is one of the learning systems that place the teacher, including ST, into the role of facilitator. At the same time, SNS as a problem solver and decision-maker can be done by providing a conducive learning space. ST has the role of providing opportunities for SNS to explore knowledge, the ability to practice problem-solving and decision making based on the instructional process that has been carried out with GS. In this study as a teacher accompanying SNS, activities that have been designed by GT use the inquiry method, collaborative learning in the form of cases that must be solved by all students [15]. In addition to explaining the contents of the ST assignments and learning tasks to the SNS, ST should also be able to provide an opportunity for the SNS to study in groups, find out, solve problems and make group decisions with GS. For example, in one of the themes/topics about "My Goals," GT gives one piece of the picture, and students find out what the picture means and give a description of the picture. The use of methods and media used through this cognitive learning system provides a pleasant learning experience for students. This is like ST's opinion:

"I see that using varied methods and media makes my students more enthusiastic and willing to participate in activities with other friends in one group. He was given the opportunity by his friends to express their opinions. In my opinion, it was a good learning experience for my students "(ST 7).

In inclusive classrooms and the use of cognitive learning systems, neither GT nor ST is central figures in instruction. Although for ST, all activities must be explained in detail to SNS to understand their intentions. Besides, although SNS has a predetermined achievement, the most critical goal in a cognitive learning system is the learning experience students will have as learning capital when learning at the next level [16]. The positive learning experience will provide the right solution for SNS to be able to solve the problem of the learning topic being studied. SNS conditions that have obstacles in learning make GS and SNS must support each other, help each other with good interactions, so that the presence of all students is precious. GT and ST as facilitators can be good mediators, by providing opportunities for all students to find new knowledge [17]. SNS can learn and discover new knowledge in a fun way, by providing opportunities for opinion, to solve problems from specific topics.

The cognitive learning system places SNS as a child who has the opportunity to know a lot of things, with or not using the help of ST so that it explores the curiosity of SNS by utilizing the enthusiasm of SNS learning at the beginning. The learning experience is obtained from the exploration of problem-solving provided by GT. ST must be able to offer opportunities to SNS to have problem-solving skills despite having limitations such as communication and low self-confidence [18]. But by mentoring and providing opportunities to SNS by practicing interaction with GS skills can be continuously achieved. SNS has the same chance as ST to provide opinions, as well as respect the opinions expressed. ST can help SNS who have difficulty understanding a particular case or topic. So that the SNS gets a positive learning experience because all class members support without discrimination [19].

Student social skills

The social learning system is placing students as part of a group with a focus on interaction with others and collaborating in a study group, working together in making decisions, and solving problems that can foster student and teacher creativity in learning. The social learning system in this study was carried out so that the SNS could develop social skills. Social skills are essential to be achieved by SNS. They have limitations in communication and interaction because it is an absolute requirement to be able to be accepted in a particular situation, especially when it must be with the community [20]. For this reason, the use of learning methods that are varied, creative, and involve the activeness of all students are included. Instruction is very effective if implemented in collaboration with one another or collaboration so that they can share knowledge, experiences, and opinions [21]. Besides that, it can foster communication seen in collaboration.

ISSN: 2005-4238 IJAST

Some activities carried out by ST on several subject topics have a positive impact related to social skills, which are demonstrated in collaborative and communication activities. Activities such as solving a case, sharing opinions, and joint decisions in small group activities have shown good learning outcomes [22]. Every student can understand each other, respect the views of other students, including SNS, which so far has not been given space to express their opinions. Some of the ST's opinions can explain this:

"In my opinion, the learning method that provides an opportunity for SNS for group work, as well as discussions of doing everything together with other friends, is progress in practicing communication and interaction. This is very important for students so that they can later interact with others when working or in the community "(ST 1).

Social skills that are carried out from social learning systems, which are practiced in inclusive classrooms with creative learning methods and media from GT, have had a positive impact on SNS. The practice of working together with others, understanding and solving problems together, is expected to provide positive results for SNS, because it is part of a group whose opinions and thoughts are also recognized. This condition will increase self-confidence to be able to contribute to a group

Students' talents and interests

The development of talents and interests is the implementation of a reflective learning system that places teachers to understand the learning styles, strengths, and weaknesses of students after going through the learning process. For SNS, this learning system provides an illustration, what still needs to be improved from a lesson, measuring abilities and fostering strengths into talents that can be developed in the future. In this study, ST can see and discover the strengths and weaknesses of SNS when activities take place. Although there is still a lot of practice and continuous encouragement from ST to SNS, it has had a positive impact during learning activities [23]. Especially in activities that require physical activities, ST requires a very significant effort so that SNS can participate in activities in addition to the limitations possessed by SNS. For example, when activities perform dance moves, it seems that SNS is less enthusiastic about dance movements because of a lack of confidence. On the other hand, SNS is very excited when it comes to drawing and is a prevalent activity. The task of ST is to encourage SNS to highlight these talents further, provide equal opportunities to become more confident with their talents and interests [24].

For SNS, the reflective learning system provides an opportunity for ST to be able to train talents and interests that have been difficult to develop. Teachers can increase student strength, especially slow learner students who is always focused on the academic field only. The teacher allows slow learner students to be actively involved in group work so that their speaking skills become more honed. Autistic students have a talent in mathematics and are confident to teach it to another GS. Confidence arises when autistic students communicate with GS, who have been more closed to learning activities. This condition is following the general teacher's opinion below:

"I can see what has become something that is disliked and liked by my students. This condition is because its limitations might cause it. I will usually direct the use of activities he wants if my students are not interested in learning" (ST5)

In an inclusive classroom, the reflective learning system gives all students the best performance in learning, including things that are lacking. The teacher must correct that. All students are assessed by teachers, both academically and non-academically. In the academic field, students who have a talent in mathematics, language must be able to increase their interest and enthusiasm for these topics to continue in the future. Also included in non-academic fields, speaking ability, leadership ability are also abilities that student's must-have in the future. Of course, the reflective learning system will be seen if four learning systems are also implemented jointly. All class members must support each other, appreciate and carry out learning in a pleasant and conducive atmosphere [25].

ST Competencies

The development of teacher competencies, especially ST is one of the essential points in the instructional strategy model based on the brain's natural learning systems. Its implementation in inclusive classroom requires ST to be able to help GT in the task of assisting SNS in implementing learning that has been designed by GT to be more effective. The success of learning in inclusive classrooms is very much determined by the instructional design that can accommodate the needs of all students fairly without discrimination [25], [26], [27], [29]. Instructional objectives must be achieved in all areas of learning, namely, cognitive, affective, and psychomotor [30]. Although the achievement of instructional objectives has been set, the achievement of each student, especially in inclusive classrooms, is not the same, especially for SNS. GT must be able to use special assessment standards for SNS so that achievement is following their abilities [31].

Achievement of learning outcomes for SNS in addition to determination by SNS, ST assistance is also very decisive. The use of an instructional strategy model based on the brain's natural learning systems has provided an opportunity for ST to be able to develop competencies consisting of pedagogic, personality, professional and social competencies to be able to handle SNS optimally according to SNS barriers and characteristics [11], [32].

The five learning systems are closely related and require ST competencies in instructional activities for SNS. For example, emotional learning systems are closely associated with pedagogical competencies that require ST to understand the characteristics, obstacles, weaknesses, strengths, and learning styles of SNS so that they can excite their learning. Personality competency makes ST as a facilitator, motivator, and trainer to SNS in learning activities [29], [30]. Cognitive and physical learning systems have developed ST professional competencies that can make the classroom a living laboratory with the SNS as the researcher, and ST as the facilitator. SNS can bring out their best abilities in addition to getting direction and assistance from ST. The social learning system has simultaneously developed social competencies that can effectively communicate all topics, tightening SNS with GS in one fun study group [31]. ST trains the independence of learning and self-confidence of SNS when studying together with GS. The reflective learning system has developed professional competencies that sustainably develop professionalism by taking reflective actions for SNS. ST can find out the weaknesses and strengths of SNS that will become talents and interests in the future. This competency development is following the opinion of ST below:

"I feel that this learning strategy makes me work harder, so I can better understand the characteristics of my students more profoundly. I become more aware of what should be improved and reduced for my students" (ST 6)

The instructional strategy model based on the brain's natural learning systems is one alternative model of instructional strategies that can develop teacher competencies, including ST, to make instruction more effective by using methods, media, and learning steps suitable for inclusive classrooms.

4. Conclusion

This study aims to explore teacher perceptions specifically toward instructional strategy model based on the brain's natural learning systems in inclusive classrooms. This study highlights the importance of instructional strategies based on learning systems as one model of instructional strategies that can be used in the inclusive classroom instruction in primary schools. All education stakeholders, especially inclusive primary schools must be able to encourage and support teachers to design effective learning that can accommodate the needs of all students who have diverse characteristics. In the end, this research has contributed that special teachers can develop their competencies that can design instruction in inclusive classrooms, and directly the benefits can be felt by SNS both academically and non-academically. It is hoped that from this finding, this instructional strategy can be used as a model in managing inclusive classrooms to be more effective and have a positive impact on all students, including SNS. Besides, this research

can be disseminated to inclusive schools in the broader scope so that input can be obtained for further research.

5. Acknowledgement

The authors wish to thank The Ministry of Research and Technology of Higher Education, which has funded research as a part of research grants. Thank also to the Directorate of Research and Service of Djuanda University which supported the research.

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