Extending students ZPD with center learning and technology

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Extending students ZPD with center learning and technology

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Abstract. Kindergarten Students along with their golden age period attracts researchers to come along with many ideas on how to enhance the potential learning skills they should possess. This golden age period urges them to be assisted by optimal and proximal help from their surrounding adults. This research tries to reveal the potential of students’ ZPD in kindergarten level with Center learning and technology method (metode sentra) applied by this school since its establishment. The instrument involved is interview, class observation, and document analysis. Learning situation provided is as the teacher made optimal efforts to empower students’ learning situation involving the students themselves and their peers. This situation is the so called extending students ZPD. Property of the learner is referred to the condition of various but different features of students’ features are gathered by the teacher in supporting and establishing students’ self-empowerment, optimized by the learning center method applied. There are 5 learning center in TK Arasy: Preparation Center, Religion Center, Role Play Center, Science Center, and Art Center. The 5 centers were equipped with sufficient equipment in developing students’ multiple intelligences. Some findings revealed from this research: first, student turns into independent learners. Second, students’ skill and knowledge are developed significantly especially the imagination skill. Third, teachers admitted that they feel confident in teaching yet sometimes unsure about the chosen learning phases. The learning center made students’ ZPD worth developing.

1. Introduction
Arasy kindergarten is one of preschools in Sumedang within which applied the center learning technology spots as its learning fields in addition to the surrounding nature. Firstly launched in 2017, the school has 12 students divided into 2 grades, A and B, also preschoolers. Located in the area of more than 2000m2, the school offers various meaningful experiences of learning with science, technology, and nature. The centers of learning technology introduced in this school are: Preparation Center, Role Playing Center, Nature Center, Religion Center and Art Center. These 5 centers promise the targeted students to have multiple intelligences proposed by Howard Gardner [1].

The teaching applies scaffolding concept in such a way that teacher enlarges students’ limit of receiving and developing the new concepts [2]. The teaching positions its principle to the fact that social interaction plays a fundamental role in the development of cognition. Social interaction means whatever happens between one with his surroundings. Vygotsky [3] states: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). What is constructed inside was initiated by what he or she has interacted with someone. This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual
relationships between individuals.” (p57). Second, he suggests that the potential for cognitive development depends upon the “zone of proximal development” (ZPD): a level of development attained when children engage in social behavior. Full development of the ZPD depends upon full social interaction. The more people exposed to social and cultural surroundings, the more likely his or her ZPD optimally developed. The range of skill that can be developed with adult guidance or peer collaboration exceeds what can be attained alone. This is how Vygotsky explains the formation and internalization of the so-called knowledge in people’s mind. How the ZPD is extended by Arasy teachers with scaffolding method through center based learning is the core of this research.

Students’ ZPD can only be extended and firmed with scaffolding teaching. Scaffolding technique is discussed in a great deal by Brunner as a developing ideas of Lev Vygotsky’s theory which has been popular in XX century [4]. In this research, scaffolding techniques employed by the teachers in the learning spots were a subject to elaborate chained to the extention of students’ ZPD.

2. Method
Based on the analytical objectives, the types of questions posed, the types of data collection instruments used, the forms of data produced and the degree of flexibility built into the study design [4], this study used a qualitative approach and a case study research design. This study was not focused on cause and effect of generalizing, but suggested people to apply to their own situations. It fits the one of qualitative design’s characteristics; teacher is one by one meticulously analyzed and framed based on theories. In conclusion, the study employed qualitative research design to meet its ends as it matches with the criteria. 4 teachers were observed and 2 classes with all the students participated within. Students’ works were also observed and analyzed in comparison to examine the first and last ZPD. Interview was also conducted to the teachers and several students.

Data conveyed through words have been labeled “qualitative” whereas data presented in number form are “quantitative”. The research employed both, and data for this study were collected from multiple sources to allow corroboration and triangulation during both data collection and data analysis [5]. Methods of data collection included questionnaires, interviews (including focus groups discussions), document analysis, and classroom observations.

3. Result and discussion

3.1 Teachers’ scaffolding effort in enhancing ZPD
Below is a description of the timeline of the teaching schedules. Names of the teachers will be in acronyms for the privacy and ethical consent of the research.

| Name   | SM Items                                                                 | AS Time: August 28th, 2017 | Theme: Water and Soil | Class: Kiddie A | Learning Spot: Nature Centre | AH Time: Sept 9th, 2017 | Theme: At the market | Class: Kiddie B | Learning Spot: Role Play Centre | AA Time: Sept 3rd, 2107 | Theme: arranging cubes | Class: Kiddie B | Learning Spot: Preparation Centre |
|--------|--------------------------------------------------------------------------|----------------------------|-----------------------|-----------------|-------------------------------|-------------------------|----------------------|-----------------|-------------------------------|-------------------------|-------------------------|-----------------|-------------------------------|
| 1st Teaching | Time: August 27, 2017 Theme: Day, Month, Date Class: Kiddie B Learning spot: Preparation Centre | Time: August 27, 2017 Theme: Hijaiyyah Class: Kiddie B Learning spot: Religion Centre | Time: October 16th, 2017 Theme: Profession Class: Kiddie A Learning spot: Preparation Centre | Time: October 15th, 2017 Theme: blending colours Class: Kiddie B Learning spot: Nature Centre | Time: October 14th, 2017 Theme: Big and small Class: Kiddie B Learning spot: Preparation Centre |
Table 1. Cont.

| Teaching | Time: Sept 22nd, 2017 | Time: February 11th, 2017 | Time: February 13th, 2017 | Time: April 6th, 2017 |
|----------|-----------------------|---------------------------|---------------------------|-----------------------|
| Theme: Prayers | Class: Kiddie B | Theme: sounds | Class: Kiddie A | Theme: Picnic day |
| Learning spot: Religious Centre | Learning spot: Art Centre | Learning spot: Role Play Centre | Learning Spot: Art Centre |
| Time: February 11th, 2017 | Theme: sounds | Class: Kiddie A | Theme: Picnic day |
| Time: April 6th, 2017 | Theme: Song | Class: Kiddie A | Theme: Picnic day |

The teaching is merely playing, students moved from one center to the others, playing around with other students and the teachers. Almost no unnecessary noises and chaos happened; students were looked hypnotized with all the activities. Students involved creatively as a child, they grow their mind and soul within the learning spots. Some scaffolding actions of the teachers were listed below.

Table 2. Scaffolding actions of the teachers.

| No | Learning Center | Teachers’ Efforts in Enhancing ZPD | Scaffolding Coining |
|----|----------------|-----------------------------------|---------------------|
| 1  | Nature         | Teacher provided all the materials categorized as water and soil, put it in some boxes, some of them were blended together, and students were asked to put each item to each category. Students were also interviewed of what happened in their perception | Classroom scaffolding, behavioral scaffolding, content scaffolding |
| 2  | Art            | Teacher points out things which were producing sounds and not. Students were asked to hit, blow, smash and roll them in. They were then asked to tell what they hear and see. It was concluded together. Students by themselves recognized sounds. | Classroom scaffolding, behavioral scaffolding, content scaffolding |
| 3  | Preparation Centre | Teacher put cubes, triangles, circles near the real objects which have the similar shapes. Students were asked to mention the shapes. Teacher asked students to draw the shapes in the paper and whiteboard, then, each student were asked to stand in line and form the shapes written. | Classroom scaffolding, behavioral scaffolding, content scaffolding |
| 4  | Religion Centre | Having introduced the Hijaiyyah, teacher correspond each alphabet with the animal shape. Students were given the song to remember each alphabet. | Classroom scaffolding, behavioral scaffolding, content scaffolding |
| 5  | Role Play Centre | Students were asked to wear profession clothes (nurse, police, fireman, postman etc.). They were also asked to do parts of their job such as examining patients. The verbal skill of the students were shaped and upgraded by the play. | Classroom scaffolding, behavioral scaffolding, content scaffolding |

All four teachers noticed that the process of teaching they performed begins with a social process (interaction between students and the teacher, students with their peers, students with other students in groups), and is individualized later on. This reflects teaching in the area of ZPD, as Vygotsky [3] states: "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)". The more students that are attained in socially developed activities, the wider their ZPD can be significantly extended. This is relevant to how ZPD is defined, as a level of development attained when children engage in social behavior [3]. Full development of the ZPD depends upon full social interaction. The more people are exposed to social and cultural surroundings, the more likely their ZPD optimally develops. The range of skills that can be developed with adult guidance or peer collaboration exceeds what can be attained alone. This is how Vygotsky explains the formation and internalization of the so-called knowledge in people’s minds.
The procedural steps of how teachers in this study extended students’ ZPD are as follows. First, they started by involving them in socially developed activities in the form of collaborative work whether they were working in groups, with peers, or even together as a whole class (interpsychological process). Later on, the teachers with their typical considerations internalized what students had been exposed to earlier by giving individual tests and similar actions. In the following table, both processes are quantified based on the interaction that happened between teachers and students, as well as between students and their peers.

After the teachers explained the subject matters being learned, students were asked to work in group or with their peers under teacher’s supervision. The teacher and peers here as knowledgeable others supported and strengthened students’ understanding of the concepts delivered and students were subconsciously forced to think and work on their own finally without any help as the teacher gave them questions or individual written tests. The importance of providing ‘more knowledgeable others’ for the students was also realized by the teachers. Through working with their peers and in groups, students can share their knowledge and internalize the process individually with the help of others. Teachers realized that the existence of ‘others’ (teacher, peers) can lift the ability of the low achievers without them realizing that they have been helped [6].

As the concept of scaffolding pointed out, the teacher measured and determined students’ initial abilities, decided what assistance was to be given and removed the help after it was adequate. The process of removing the scaffolding for the four teachers was the same: by investigating the class and making sure that more than half of the students answered correctly and the students were able to do what they were asked without any instructions (with initiative).

In order to develop students’ actual development, teaching in students’ Zone of Proximal Development requires the teacher to serve as students’ close assistants, friends, or family that supports them with psychological help. Psychological help means developing mutual rapport between students, also between teachers and students coined as intersubjectivity.

Scaffolded teaching in students’ ZPD resulted in efforts in which teachers tried to consider their students’ actual development yet push them towards their potential development by leveling the tasks, projecting interpsychological and intrapsychological processes, and helping students physically and psychologically. Teaching was also framed by dialogue scaffolding as a means of interactional scaffolding in order to push students to think as required [7]. Students were enthusiastic and creatively engaged with the learning. Technological supports provided were also a big help to the students; it made them easier to grasp the concepts.

The conception of the zone of proximal development presupposes an interaction between a more competent person and a less competent person on a task, such that the less competent person becomes independently proficient at what was initially a jointly-accomplished task [8]. In this center learning and technology the situation occurs, children mingled with the raw materials given by teachers and free to explore them with simple frameworks explained previously. As a result, they worked together in happiness, helped each other in finishing certain tasks, created self-confidence for each student gradually to work alone. It reflects the idea that a person is able to perform a certain number of tasks alone, while in collaboration, it is possible to perform a greater number of tasks. What students can perform alone is the basis of how a teacher develops the materials to be leveled up in a way that they perform it in collaboration, and this is a strategy to extend the students’ ZPD [8]. For any domain of skill, a ZPD can be created [9] or in an ‘expanded’ conception formulated by Wells [10], zone of proximal development applies to ‘any situation in which, while participating in an activity, individuals are in the process of developing mastery of a practice or understanding a topic’ (p. 333). An adult/teacher/more competent person should interact with a child. Sometimes this aspect is presented as the defining characteristic. “Arguably, the notion of the zone of proximal development is little more meaningful than that of a learning situation presented to a child, where adults and/or more advanced children directly or indirectly have a positive influence on the child” [10]. Children’s future independent performance is largely dependent upon the types of guidance provided by adults in the ZPD. Adults create the zone and mediate the process of learning by providing guidance that reflects cultural values.
4. Conclusion
Based on the results of the study, it can be concluded that teaching scaffolding in Arasy kindergarten by optimizing the learning centers can improve and enhance students’ ZPD by the optimum interactional process from students and teachers. After the process of external influence in the form of assistance of the more knowledgeable others occurred, students experienced the intrapsychological process as the received knowledge owned by the individual. The learning process as a whole can be identified as successful since it was clearly shown in the process of teaching and learning that the learners’ actions were ‘driven by the critical attributes of the task.

References
[1] Gallimore R and Tharp R 1990 Teaching mind in society: Teaching, schooling, and literate discourse. In L.C. Moll (Ed). Vygotsky and Education: Instructional Implications and Applications of Sociohistorical Psychology 175-205 (Cambridge, UK: Cambridge University Press).
[2] Gibbons P 2001 Scaffolding Language, Scaffolding Learning (Heinneman: Houghton Mifflin Harcourt).
[3] Vygotsky L S 1962 Thought and Language Cambridge (MA: MIT Press).
[4] Bruner J 1975 From communication to language. A psychological perspective Cognition 3(3), 255–289.
[5] Cresswell J W 1998 Qualitative inquiry and research design: Choosing among five traditions (London: Sage).
[6] Hammond J 2001 Scaffolding: Teaching and learning in language and literacy education. Newtown (NSW: PETA).
[7] Gallimore R and Tharp R G 1989 Rousing minds to life: Teaching, learning, and schooling in social context (Cambridge: Cambridge University Press).
[8] Gillen J 2000 Versions of Vygotsky British Journal of Educational Studies 48 183-198.
[9] Hammond et.al 2001 Online Teaching Material. Learning from Others, Learning in a Social Context. Stanford University School of Education.
[10] Heinemann 2002 Scaffolding Language, Scaffolding Learning Teaching Second Language Learners in the Mainstream Classroom USA NALDIC News 29 April 2003.