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To cite this article: Sri Tirto Madawistama *et al* 2019 *J. Phys.: Conf. Ser.* **1315** 012060

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Analysis of Equilibrium Pre-service Teacher Trough Valsiner Zone Learning

Sri Tirto Madawistama[1,2*], **T Herman**[2], **and Turmudi**[2]

[1]Universitas Siliwangi, Indonesia.
[2]Universitas Pendidikan Indonesia, Indonesia.

[*]Email: sritirtomadawistama@student.upi.edu

Abstract. This study aims to thoroughly investigate how the equilibrium of pre-service teacher in the probability theory course through learning based on Valsiner theory. The method used is descriptive qualitative by taking as many as one experimental class as a sample to be traced. It was concluded that through observations and short interviews it could be shown that in the first and second meetings, students were still experiencing cognitive conflict so that there was no equilibirium in students. then at the third, fourth meeting and the next meeting students have shown a positive response so that a balance or equilibrium can be seen from each student representative's response through the given teaching material and also through inter-group discussions between groups so that there is uniformity of knowledge and no longer heterogeneous

1. Introduction

The most important element in the learning process is the occurrence of balance in students when obtaining new information, [1]. When a student receives abstract and new mathematical material, there will be two possibilities, namely the existence of balance (equilibrium) or maybe the student experiences imbalance (disequilibrium) in him. According to Piaget [2], balance can occur when new material received by students can be responded to because it is in accordance with previous knowledge. While if the newly received material is not responded based on prior knowledge, then the imbalance in students will occur or is called cognitive conflict. Because there is an innate need to reach equilibrium, the mental structure of students changes in order to be able to incorporate new material in experience and cause cognitive balancing efforts. Teachers as information givers in the class must pay attention to the stages of development of their students so that imbalances do not last long in students.

To be able to deliver prospective teacher students to achieve mathematical learning goals that have cognitive balance, then the management or approach to mathematical learning that is designed can be done using the Valsiner zone theory. This is because the theory of Valsiner Zone has several zones in learning that are able to construct student knowledge so that equilibrium can be achieved. Valsiner theory is a development of Piaget's cognitive development theory and the zone of proximal developmental (ZPD) theory and Vygotsky's constructivism. Suggests Piaget's development theory represents constructivism, which views cognitive development as a process in which children actively build systems of meaning and understanding reality through their experiences and interactions [3]. Their review of Vygotsky's Concept of Zone of Proximal Development (ZPD): Towards a Stage of Proximity states that without doubt the idea of ZPD is an undeniable fact and is a significant issue that gave birth to a new zone theory namely zone of Proximal Development (ZPD) became the Zone of Free Movement (ZFM) by Jaan Valsiner [4]. According to Vygotsky [3] the learning process will occur if children work

or handle tasks that have not been studied, but the tasks are still within their reach, called the Zone of Proximal Development. With regard to teachers adapted from the valsiner theory, Goos [5] state that the learning process or teacher development is determined by a variety of interrelated factors and is useful for analyzing the extent to which teachers can adopt new teaching practices. These factors are grouped into three zones, namely Zone of Proximal Development (ZPD) into Zone of Free Movement (ZFM), and Zone of Promotion Action (ZPA). The ZPD states teacher knowledge and trust. Knowledge about this (interaction of ZFM, ZPA, IZ, ZPD) requires the teacher to improve students' abilities when learning takes place. This is to enlarge the slice zone (zone of balance) between ZPA and ZPD students. [6] in his research applied the valsiner theory in technology-based learning. It was stated that there was a balance between teachers and students in teaching through the valsiner zone. An overview of the learning process based on the valsiner theory as shown figure 1 [7-9].
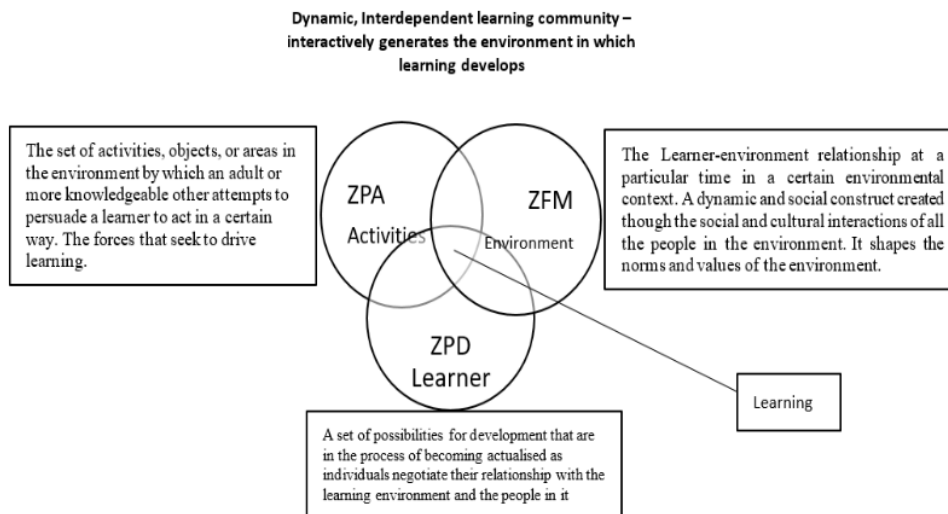
Dynamic, Interdependent learning community –
interactively generates the environment in which
learning develops

The set of activities, objects, or areas in the environment by which an adult or more knowledgeable other attempts to persuade a learner to act in a certain way. The forces that seek to drive learning.

ZPA
Activities

ZFM
Environment

The Learner-environment relationship at a particular time in a certain environmental context. A dynamic and social construct created though the social and cultural interactions of all the people in the environment. It shapes the norms and values of the environment.

ZPD
Learner

Learning

A set of possibilities for development that are in the process of becoming actualised as individuals negotiate their relationship with the learning environment and the people in it

Figure 1. The valsinal zone includes ZPD, ZFM and ZPA [7]

Description in Figure 1 at the ZPA activity stage a set of activities, objects or an area of an adult environment with an attempt to persuade learners to act in a certain way. The forces that strive to encourage learning. At the stage of ZPD activity, a set of possibilities of ongoing development becomes actualized, as individuals negotiate their relationship to the learning environment and the people in it. At the ZFM activity stage, the relationship of the learning environment, at a certain time in a particular environmental context. Dynamic and social constructs created through the social and cultural interactions of all people in the environment so as to form environmental norms and values.

Method

The method used in this study is descriptive qualitative, with the population of the study are prospective students of mathematics education at the Siliwangi University of Tasikmalaya and the sample is students who take opportunity theory courses in semester V which consists of one class with a total of 42 people, as representatives to be seen equilibrium through the interview process

3.   Result and Discussion

3.1 Equilibrium Analysis of Students in Classes

In this section the description of equilibrium or balance in opportunity theory learning is presented in the experimental class. In equilibrium researchers examine the extent to which the material with teaching materials through Valsiner theory can be accepted, understood and understood by students.

When a student receives abstract and new mathematical material, there will be two possibilities, namely the existence of balance (equilibrium) or maybe the student has an imbalance (disequilibrium) in him. Researchers here as givers of information in class must pay attention to the developmental stages of their students so that imbalances do not last long in students. During the learning the researcher constructs and examines how the balance or equilibrium of ZPD, ZPA and ZFM in students.

Equilibrium is obtained from observations during the learning process. The researcher went around watching, monitoring, and interacting with questions and answers with student representatives in each group. As in the formulation of the problem, namely how the description of student equilibrium in the opportunity material and the aim is to thoroughly investigate how student equilibrium is in the first, second, third and subsequent meetings, the following is explained in the discussion.

3.2 Equilibrium at the first and second meetings

In the first and second meetings, students in most groups experienced disequilibrium or imbalance. Through observation and short interviews, it can be shown that in the first and second meetings most students still experience disequilibrium. It can be seen from each student representative's answer, the average student still experiences confusion and uncertainty (cognitive conflict occurs both inter and between groups).

The first meeting can be described as equilibrium process for students in the class as figure 2.
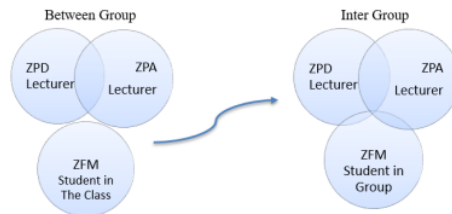

Figure 2. Between and inter group in first meeting

In Figure 2, it can be explained as follows: in the first meeting in the class as a whole, student activities between groups have not seen any ZFM (Zone Free Movement) or free movement between groups. The lecturer gave many directions and instructions in the form of ZPA and also provided one-way knowledge from opportunity theory material (ZPD) but class responses and activities (ZFM) did not exist or did not occur even though ZPA lecturers instructed them to be able to discuss and exchange information between groups. Students still experience cognitive conflict in learning so that overall equilibrium or balance has not been achieved. Whereas if viewed from the inter group side, students hold discussions but there are still only a few groups and most groups are still silent thinking about what to do and this is still called cognitive conflict and balance or disequilibrium has not been achieved.

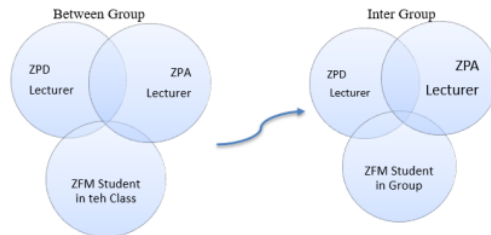The second meeting can be described for students in the class as figure 3.

Figure 3. Between and inter group in second meeting

In Figure 3, it can be explained as follows: overall the student activities between groups began to show the existence of ZFM (Zone Free Movement) or free movement between groups but only a few groups did this. The lecturer gave many directions and instructions in the form of ZPA and also provided a lot of one-way knowledge from opportunity theory material (ZPD) but the responses and class activities (ZFM) were still small even though ZPA lecturers instructed to be able to discuss and exchange information between groups. Students still experience cognitive conflict in learning so that overall equilibrium or balance is still not achieved. Whereas if viewed from the inter group side, students have shown progress to conduct discussions but there are still only a few groups and most groups are still silent thinking about what to do and this is still called cognitive conflict and balance or disequilibrium has not been achieved. The third meeting and the next meeting of the experimental class students have shown changes and improvements. From the results of monitoring students have been fluent and enthusiastic in using teaching materials and seen group discussions that live both inter and between groups.
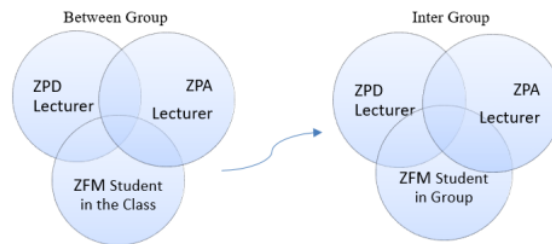The third meeting can be described as figure 4.

Figure 4. Between and inter group in third meeting

In Figure 4 can be explained as follows as a whole student activities between groups have shown the existence of ZFM (Zone Free Movement) or free movement between groups. The lecturer gave a little direction and instruction in the form of ZPA and also provided little knowledge of opportunity theory material (ZPD) and class activity responses (ZFM) had taken place. Students still experience cognitive conflict in learning but it can be overcome through discussion between and inter groups so that equilibrium or balance has been achieved. When viewed from the side of the inter group, students conduct an overall discussion both inter and between groups and cognitive conflict occurs but can be resolved quickly so that the process of equilibrium or equality is achieved.
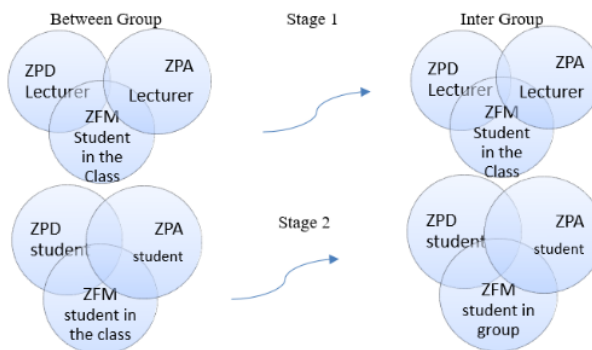The next meeting can be described as figure 5.

Figure 5. Between and inter Group in the next meeting

In figure 5, it can be explained as follows in stage 1, each ZPD and ZPA lecturer responded well through ZFM students both at inter and between groups. In stage 2 students look enthusiastic in the learning process, lecturers only supervise and pay attention so that inter-group and inter-group students have shown ZFM and provide mutual assistance and instruction to colleagues who do not understand through ZPD and ZPA students. This accelerates the process of balance or equilibrium in students.

3.3 Discussion

The first meeting in the class as a whole student activities between groups has not seen any ZFM (Zone Free Movement) or free movement between groups. The lecturer gave many directions and instructions in the form of ZPA and also provided one-way knowledge from opportunity theory material (ZPD) but class responses and activities (ZFM) did not exist or did not occur even though ZPA lecturers instructed them to be able to discuss and exchange information between groups. Students still experience cognitive conflict in learning so that overall equilibrium or balance has not been achieved [10,11]. Whereas if viewed from the inter group side, students hold discussions but there are still only a few groups and most groups are still silent thinking about what to do and this is still called cognitive conflict and balance or disequilibrium has not been achieved.

The second meeting in the class as a whole student activities between groups began to show the existence of ZFM (Zone Free Movement) or free movement between groups but only a few groups did this. The lecturer gave many directions and instructions in the form of ZPA and also provided a lot of one-way knowledge from opportunity theory material (ZPD) but the responses and class activities (ZFM) were still small even though ZPA lecturers instructed them to be able to discuss and exchange information between groups. Students still experience cognitive conflict in learning so that overall equilibrium or balance is still not achieved. Whereas if viewed from the inter group side, students have shown progress to conduct discussions but there are still only a few groups and most groups are still silent thinking about what to do and this is still called cognitive conflict and balance or disequilibrium has not been achieved.

Disequilibrium there are several factors including: 1) Students have not been able to understand well the new material, namely the theory of opportunity. While the newly received material is not based on prior knowledge, then the imbalance in students will occur or is called cognitive conflict. 2) New teaching materials can also make students disequilibrium, this is natural because new students get teaching materials with concepts based on Valsienr theory in them. 3) Mental beliefs about mathematics, information and communication systems, and information and communication between and between groups is limited.

The third meeting in the class as a whole student activities between groups has shown the existence of ZFM (Zone Free Movement) or free movement between groups. The lecturer gave a little direction and instruction in the form of ZPA and also provided little knowledge of opportunity theory material (ZPD) and class activity responses (ZFM) had taken place [12, 13]. Students still experience cognitive conflict in learning but it can be overcome through discussion between and inter groups so that equilibrium or balance has been achieved. When viewed from the side of the inter group, students conduct an overall discussion both inter and between groups and cognitive conflict occurs but can be resolved quickly so that the process of equilibrium or equality is achieved.

The next meeting in phase 1 of each ZPD and ZPA lecturer was responded well through ZFM students both at inter and between groups [14, 15]. In stage 2 students look enthusiastic in the learning process, lecturers only supervise and pay attention so that inter-group and inter-group students have shown ZFM and provide mutual assistance and instruction to colleagues who do not understand through ZPD and ZPA students. This accelerates the process of balance or equilibrium in students [16].

It was concluded that through observations and short interviews it can be shown that in the third and subsequent meetings most students have shown a positive response so that there is a balance or equilibrium. It can be seen from each student student representative (PKM) answer to his democratic beliefs through the given teaching material and also through inter and inter group discussions so that there is uniformity of knowledge and no longer heterogeneous.

4.   Conclusion

Through Learning Based on Valsiner Theory can accelerate the process of balance or equilibrium in students, because every cognitive conflict occurs students can overcome it through inter-group discussion between groups so that initially heterogeneous understanding becomes homogeneous.

When implementing Valsiner Theory Based Learning, lecturers are expected to pay attention to the following aspects: (a) Sufficient allocation of time, (b) Conducive class settings, (c) Teaching materials presented, (d) Knowledge and initial abilities of students, (e) The learning environment created by lecturers, (f) ZPD, ZPA and ZFM good lecturers can optimally develop ZPD, ZPA and ZFM students through the interaction process in learning, (g) Lecturers play an important role in forming ZPD, ZPA and ZFM so that learning runs perfectly towards the expected equilibrium point.

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