# The Data Package in Learning Mean Using LSLC AND PMRI

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### Abstract

This study aims to produce statistical learning designs in the introduction of the concept of average values and knowing student learning outcomes in learning average values by previously learning about the presentation of data consisting of tables and diagrams through learning trajectories and what happens during the learning process. This learning is based on Lesson Study for Learning Community (LSLC), the approach of Indonesian Realistic Mathematics Education (PMRI). This study uses a type of Design Research method research design type of validation study, which involves in MTs 1 in Palembang. There are three stages in design research type validation studies namely Preparing for the experiment in the form of literature study and the design of the Hypothetical Learning Trajectory (HLT); Design experiment in the form of a Preliminary Teaching Experiment (Pilot Experiment) and Teaching Experiment; and Restrospective analysis. The instruments used were written test, video and field notes. The results of learning experiments show that the design of learning provided has helped students understand the concept of Mean.

**Keywords:** Design Research, Mean, LSLC, PMRI.

### Abstrak

Studi ini bertujuan untuk menciptakan desain pembelajaran statistik dengan memperkenalkan konsep nilai rata-rata dan kinerja pembelajaran rata-rata siswa yang tahu nilai rata-rata dan nilai pembelajaran sebelum belajar tentang tanda dan grafik yang terdiri dari lintasan belajar. Belajar ini didasarkan pada LSLC (LSMR), pendekatan dari pendidikan matematika nyata Indonesia (PMRI). Penelitian ini menggunakan studi validasi jenis penelitian Design Witherspoon termasuk dalam MTs 1 oleh Pachment. Studi verifikasi jenis penelitian berkaitan dengan persiapan eksperimental, desain HLT (Litbang), dan pengujian bertahap (Piagaan Busana Explorer). instrument yang digunakan adalah tes tertulis, video, dan catatan lapangan. Hasil dari percobaan belajar menunjukkan bahwa desain pembelajaran yang diberikan membantu siswa memahami konsep rata-rata.

**Kata kunci:** *Design Research,* Rata-Rata*, LSLC, PMRI.*

## INTRODUCTION

Statistics is the study of how to plan, collect, analyze, and present the results of data analysis. Statistics as a stepping stone for learning mathematics to a higher level are studied from an early age, namely Elementary School (Surya, Zulkardi, & Somakim, 2017). Furthermore, it is further deepened in SMP / Mts (Fachurrozi, 2010), and the importance of understanding mathematics because it is often used in everyday life by converting information into tables, and vice versa with diagrams. However, statistics material is often taught abstractly, including the monotonous way of presenting data and the lack of meaningful learning, especially in using statistical concepts. According to Maryati & Priatna (2018), research conducted from 35 junior high school students showed that the ability of students to understand statistical literacy was low, namely the ability of students to read statistical data provided in the form of tables, diagrams, and graphs by 35%, the ability of students to understand concept of 32%, the ability of students to communicate the data processing process by 30%, and the ability of

students to present the results of data processing by 28%. one of the statistical concepts is the average concept.  Mean  is part of the concept of data concentration measure that is intended to be shared fairly (Franklin & Mewborn, 2007). The process of learning the mean concept is mostly carried out by giving formulas directly without first learning about basic concepts and procedures that are meaningful, such as this leads to low understanding, thus causing students to experience difficulties and errors in the average material (Lestariningsih, Ilma & Darmawijoyo, 2012). The need for a meaningful understanding of the average value and making enthusiastic in solving the problems of the assignments given, so that students remember the material concept of mean values correctly and well.

It is necessary to improve mathematics teaching that can be developed through learning where learning is based on experiences of everyday life to learn the mean. When children learn mathematics separately in their daily life experiences, children easily forget their learning (Van den, 2000). Therefore, it takes an approach oriented in their daily life experience that is using the material, then the appropriate learning approach used is the Indonesian Realistic Mathematics Learning (PMRI) approach, where in that approach learning must start from daily life for students who can encourage students to be in the situation (Wahyuni & Jailani, 2017) .

PMRI is a human activity and activity that is based on daily life as a source of development and as an application area through mathematical processes both horizontally and vertically (Zulkardi & Putri, 2010) in the use of the PMRI approach, the significance of a concept is very important so that it is appropriate for average (Mean). A knowledge that is learned meaningfully if the learning process is carried out in a context. The use of context is also useful for students in building relationships of skills in mathematical ideas and creativity to support students' development in mathematical thinking (Utari, Ilma, & Hartono, 2015). In the use of a context in the PMRI approach emphasis on the use of situations that can be imagined (Imaginable) by students (Wijaya, 2012) . So from that the researcher uses a context of meaningful, everyday life experiences and can be imagined by students, namely the context of the Data Package. . The choice of data packet context is because from the experience of everyday life people really need a data package that is useful for exploring the world of the internet to find information or things that want to know about something, especially students always want to find information about the outside world so that the context is meaningful and in accordance with daily life.

Some of the main principles in PMRI are; the discovery of guided and mathematically progressive, educational phenomena, and independent development models (Zulkari & Putri, 2010). In addition, there are five characteristics in the PMRI approach, namely; using contextual problems, using various models, student contributions, interactivity, and interrelationships (Zulkari & Putri, 2010). The need to improve the quality of teachers so as to minimize students having difficulty absorbing the knowledge that has been conveyed is one of the reasons for the low student mathematics learning outcomes(Supriyanto, Afri, & Hardianto, 2015). same for designing (plan) RPP, Learning, and others, testing (do), observing and reflecting (see) on learning that has been tested after

that there will be improvements to improve the quality of learning by redesigning it well (Lewis, 2004) .

Based on the above problems, the need to use a learning system in order to improve the learning system for the better. Learning systems are called Lesson Study for Learning Community (LSLC). Lesson study for learning community (LSLC) is collaborative learning and is constantly based on the principle of mutual learning with each other needing and collegiality to build and foster a learning community, where lesson study is not a learning method or strategy, but lesson study activities are systems that can apply various methods, approaches, or learning strategies that are appropriate to the situation, conditions, and problems faced by the teacher (Octarina, Putri, & Nurjannah, 2018).

In implementing Lesson Study for Learning Community (LSLC) at the core activity, at the beginning of the Sharing Task and the final part for Jumping Task. Task sharing to improve the ability of students in the weak category, and after trying to learn it, increasing / jumping student learning (Jumping Task) (Masaaki, 2012). Sharing Task is a task given at the student level that can still be achieved to do it. The level that can be understood is about 50% of students. While for Jumping Task assignment where the given level is rather difficult or the material provided is difficult (Asari, 2017). This study aims to produce a learning trajectory that is expected to help students understand the mean.

**METHODS**

Subject area 7th Grade at Junior High School's MTs N 1 Palembang. The method in this study is the design research type of validation studies. The study design used for this study aims to develop Hypothetical Learning Trajectory (HLT) into Learning Trajectory (LT) with a learning system LSLC of the collaboration between researchers and teachers of mathematics in order to improve the quality of teaching and learning activities in mathematics. stages of validation studies of type Design Research (DR) starting from 3 stages, ie preliminary design, teaching experiment, and retrospective analysis (. Data collection consists of observations at the stage of pilot experiment and teaching experiment, interviews were conducted with a model teacher who was teaching at the time of the teaching experiment conducted after the observation, documentation of all results of the activities of the students in the form of photo and video activities and learning results of the students' answer as evidence of the implementation of the research. This research, only until the Preliminary Teaching Experiment (Pilot Experiment), Because this study only evaluates the learning designs that have been made up to the pilot experiment stage or cycle 1 only.

**RESULTS AND DISCUSSION**

In preparation for the experimental stage for the research design and planning stage at LSLC, the following literature studies were carried out, the materials used, the use of LSLC and PMRI. The results are used to create LKPD. In detail, the things that are done are designing instruments with researchers and mathematics teachers, analyzing the material, making indicators, then designing with several activities starting from the planning stage to the implementation stage using LSLC and PMRI, but before designing with the teacher the researcher conducts a focus discuss group with colleagues to improve this instrument to be better in terms of improving language and content.

Focus Group Discussion

The research that took place in this study were: This learning trajectory shows whether learning theory The average value produces better learning based on the PMRI and LSLC approaches, resulting in a better learning trajectory based on theory, PMRI approach and LSLC although there is little improvement in the LKPD improvement section and collaborative learning.

The researcher prepares the LKPD (student activity sheet), RPP (lesson plan), Instructions for the teacher Students of MTs Negeri 1 in Palembang were chosen as research subjects. Data collection in this study was carried out by collecting two types of data, namely video (is the main data, which records the trial process with high, medium and low ability students) and documents (written data, including the results of student work and other records during research).

Validation of the LKPD (student activity sheet) At the beginning of the study of learning devices that the researcher made (Activity 1 was task sharing, and Activity 2 was jumping task) validated by peers in Focus Group Discussion (FGD), peers began validation by working on the questions the researcher had made, which produced conclusions on activity 1 for the concept of average values guided per step (do not immediately ask the average), in the activities of the 2 questions that are made more difficult than the questions in activity 1 because the questions are given the development of concepts of average values.

Peers suggest questions in activity 1 to clarify the structure of the language and clarify the presentation of table forms. Based on the results of the FGD, the researcher decided to redesign the HLT by changing the activity of 1 question number 1 to clarify the exact form of the table and the structure of the language and answer column enlarged according to the right size. For the last activity (jumping task) it was repaired, not in the form of LKPD, but in the form of questions as usual. Improve editorial questions about the price of the capital replaced by the purchase of the table reminder notes omitted so that students are not confused.

The order of questions is sorted by asking how much the overall purchase price is, how many internet packages and dividing the overall purchase price and the many internet packages and vice versa to calculate the overall benefits of each package and the number of internet packages. And

finally, make a conclusion about the mean and formula. The researcher continued the trial by validating the questions made for high, medium and low ability students which resulted that students could understand well-made questions, but was constrained by understanding the prerequisite material (data presentation) that students still lacked in understanding, students' numeracy skills weak.

The researcher designed three activities in the learning device, Activities 1 and 2 were task sharing and Activity 3 was a jumping task. The activities are validated by peers in Focus Group Discussion (FGD), peers begin validation by working on the questions the researcher has made, which produce conclusions on activities 1 for the mean questions guided per step (don't immediately ask about mean), in the activities of 2 questions that are made more difficult than the problems before in activity 3 because the calculation results are too many numbers behind the comma which requires a lot of time in the calculation. Peers give advice that Activity 2 be made a jumping task, in Activities 3 the question number 1 is too easy (it should be used as a sharing task), the question number 2 can be used for jumping tasks. Based on the results of the FGD, researchers decided to redesign the HLT by changing the number in activity 2 to a number that is easier to count, and eliminate 1 question from activity 3.
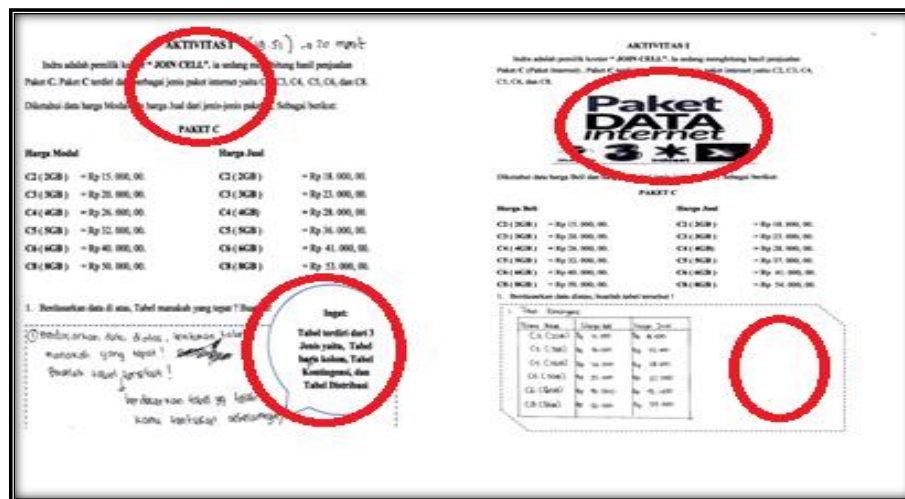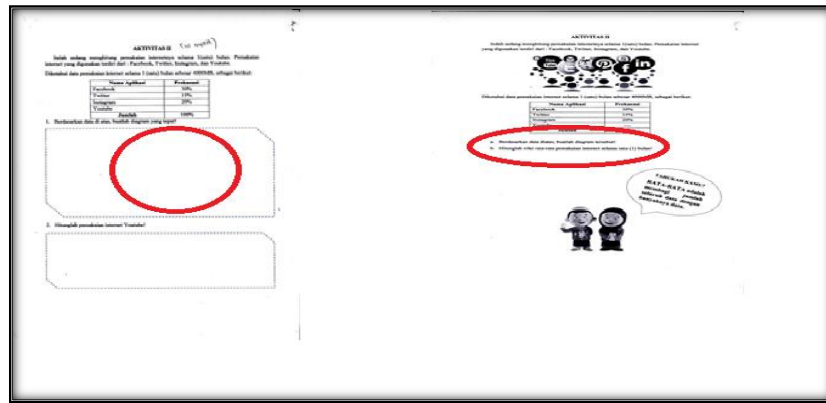


Before                                    After

**Figure 1**. Validation of Focus Group Discussion (FGD) with friends in the second activity

In  figure 1 above, revision Fix the question to understand and the given image data package on the internet is "called internet quota" and the previous sheet was given instructions but it should not because it makes completion easier

Before                                              After

**Figure 2**. Validation of Focus Group Discussion (FGD) with friends in the second activity

If you add a picture of the application on social media so that the LKPD is interesting and in accordance with the experience of everyday life, students can complete the questions. do not use the answer box to make it simpler and also add instructions so that students can complete the question.

*Pilot Experiment*

The pilot experiment aims to find out and improve the question instruments and other learning instruments that have been made by researchers and teachers. The results of the pilot experiment, in activity 2 the question number 1 is not a matter of jumping task, because more than 50% of students are unable to answer correctly.

The following are the answers of students with high, medium, and low abilities on the questions that the researcher made**:**



**Figure 3**. Students high ability answer different tables

In activity 1, the researcher makes a question in the context of the data package price along with the purchase price and selling price students are asked to make the right table with the data provided. But students experience difficulties because they do not understand the presentation of data where there are 3 table forms, students only know 1 table that is column row tables (students with high ability).

**Figure 4**. Answers about understanding the average based on students with high ability

In conclusion activities, students do not understand the meaning of the average value and the average formula.



**Figure 5.** The question of about Mean

In activity 2, the researcher made a question with the context of students' internet usage, namely Facebook, Twitter, Instagram, and Youtube. Students are asked to make a precise diagram based on the data provided. All can answer the Circle diagram but cannot make the pie chart correctly.
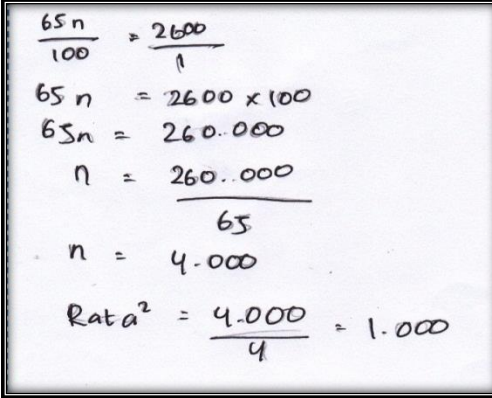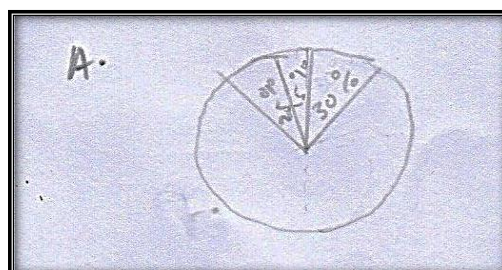


**Figure 6**. Answers to activity 2 about presenting data in the form of diagrams according to students with moderate ability.

**Figure 8**. Answers about questions the average value according to student High, ability

In activity 2 the researcher made a question about the average value if one of the data was missing, the average student had difficulty when comparing to finding the average by removing application data information but the student could answer correctly.

**CONCLUSION**

Based on the results of the analysis of student answers and interviews with students, the researchers concluded that LSLC can be applied in Palembang State MTs 1 but teachers must be given regular training on LSLC and PMRI even though it takes a long time. Students are not accustomed to being given the questions in the form of LKPD so that there are a few difficulties, therefore, it should be given these questions routinely and the teacher does not give up when the problem given is a problem should continue to fix it. When the small group of teachers must care for students who have difficulties (remind "please, Help me" directly to those concerned).

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