Jurnal Pendidikan Matematika
Volume 17, No. 1, January 2023, pp. 69-88
P-ISSN: 1978-0044, E-ISSN: 2549-1040, DOI: https://doi.org/10.22342/jpm.17.1.17208.69-88
Website: https://ejournal.unsri.ac.id/index.php/jpm
Accredited by SINTA 2: http://sinta2.ristekdikti.go.id/journals/detail?id=1811

The Reflective Teaching Practices using PMRI and Collaborative Learning

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Abstract

This research is aimed to design learning environment in which teacher can create a learning process in develop their reflective practices. Gending Sriwijaya traditional dance, which is familiar with culture in South Sumatera Indonesia, can be as a starting point for context in geometry translation. Applying The Indonesian Realistic Mathematics Learning Approach (PMRI) is one approach that uses contextual. The research used design research consisting of preparation of the experiment, design experiment and retrospective analysis. This research data were collected through classroom observation, documentation, interview, and field notes. The result of this research tries to establish that reflective teaching practice is a tool to makes room for teachers to critically examine any assumptions regarding acceptable objectives, methods, problems and solutions. By reflecting, conducting analysis, and coming to conclusions about what has occurred, the teacher might indirectly learn about the benefits and drawbacks of applying what they have learned. Collaborative learning supports and enhances learning by engaging groups which work together to solve problems, complete tasks, or learn new concepts. Students who have more ability help less-able students. On the other hand, less-able students ask for help from more-able students.

Keywords: Reflective Teaching Practices, PMRI, Collaborative Learning, Design Research

Abstrak

Penelitian ini bertujuan untuk merancang lingkungan belajar dimana guru dapat menciptakan proses pembelajaran dalam mengembangkan praktik guru reflektif. Tari tradisional Gending Sriwijaya yang akrab dengan budaya di Sumatera Selatan Indonesia dapat menjadi titik awal untuk konteks dalam geometri translasi. Menerapkan Pendekatan Pendidikan Matematika Realistis Indonesia (PMRI) adalah salah satu pendekatan yang menggunakan konteks. Penelitian ini menggunakan penelitian desain yang terdiri dari persiapan percobaan, eksperimen desain dan analisis retrospektif. Data penelitian ini dikumpulkan melalui pengamatan kelas, dokumentasi, wawancara, dan catatan lapangan. Hasil penelitian ini mencoba untuk menetapkan bahwa praktik guru reflektif adalah alat untuk memberi ruang bagi guru untuk secara kritis memeriksa asumsi mengenai tujuan, metode, masalah, dan solusi yang dapat diterima. Secara tidak langsung guru juga dapat mengetahui kelebihan dan kekurangan pelaksanaan pembelajarannya dengan merefleksikan, melibatkan analisis dan membuat keputusan mengenai apa yang telah terjadi.Pembelajaran kolaboratif mendukung dan meningkatkan pembelajaran dengan melibatkan kelompok yang bekerja sama untuk memecahkan masalah, menyelesaikan tugas, atau mempelajari konsep baru. Siswa mau kyang memiliki kemampuan lebih membantu siswa yang kurang mampu. Di sisi lain, siswa yang kurang mampu meminta bantuan dari siswa yang lebih mampu.

Kata Kunci: Praktik Guru Reflektif, PMRI, Pembelajaran Kolaboratif, Design Research

How to Cite: Rawani, D., Putri, R. I. I., Zulkardi, & Susanti, E. (2023). The reflective teaching practices using PMRI and collaborative learning. *Jurnal Pendidikan Matematika, 17*(1), 69-88.

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INTRODUCTION

Implementation of math curriculum reform has been the focus of various events. A considerable influence is the perspective that teachers are the center of how the curriculum is interpreted in classroom learning (Chapman, 2012). Learning actually occurs when teachers can

Received March 15, 2022; Revised December 5, 2022; Accepted January 4, 2023

interpret the curriculum (Bunga, 2019). In essence, teachers can determine for themselves the best way to teach learners. This is consistent with The Ministry of Education and Culture's program, which is *Merdeka Belajar* (freedom to learn) program. By implementing *Merdeka Belajar* program, there is independence because the educational environment determines for itself the best way in the learning process (Kamil, 2020).

The idea of reflective teachers is characteristic of individuals who think professionally and make changes in the classroom (Pereira, 2011). The reflection teacher is an essential element of learning (Gupta, 2019). Reflective teaching practice has become an effective movement and a focus of interest in education. The teaching requires teacher to impact their practices for their own expert development for you enhance teaching performance (Mathew et al., 2017). The reflective teaching gives teachers the possibility to renew their practice and to understand the effect of their teaching (Oduro et al., 2022). A reflective teacher will integrate the knowledge with their practical experiences and make knowledge picks based an the conditions they discover themselves (Bunga, 2019). Reflective teaching is an approach that enables teachers and teacher educators across the curriculum to understand how they use their knowledge in classroom and how to connect theory and practice more affectively (Gupta, 2019).

Ministry of Education and Culture of the Republic of Indonesia 2013 said that learners are guided to discover various facts by themselves and build concepts, as well as new values needed for their lives and the focus of learning is directed at developing students' skills in processing understanding and discovering and developing the necessary facts, concepts and values by themselves (Kemendikbud, 2013). The Indonesian Realistic Mathematics Learning Approach (PMRI) is a learning approach that is based on situations that are more real for students, emphasizing practicing mathematics, discussing and collaborating with classmates which will locate find and finally using mathematics to solve troubles both alone and in groups (Putri & Zulkardi, 2018). Putri revealed that one of the approaches that suits the 2013 curriculum is the PMRI approach (Putri et al., 2015).

PMRI is one approach that uses contextual (Putri & Zulkardi, 2019). Context in mathematics learning is a strategy in the process of creating a mathematical learning atmosphere through patterns that are in the form of real, situations, conditions, and learning environments that are suitable for students so that it is more meaningful to focus on one of the goals to be achieved. Context in this case is concrete. The context in the PMRI approach is useful for concept formation, mathematics for access to and motivation, model formation, providing tools for thinking using procedures, notations, images and rules, reality as a source and the field of applications and the special skills in specific situations (Zulkardi & Putri, 2020). This approach also guides students to understand concepts by building on previous knowledge and experiences in daily life so that learning becomes meaningful (Putri & Zulkardi, 2019).

Learning can be consistently planned together with classroom learning to systematically improve the best high quality of learning (Putri & Zulkardi, 2019). Lesson Study Learning

Community (LSLC) is a system of learning activities that is not solely focused on how teachers teach, but also pays attention to how learners learn in the classroom and what is the basis of their thinking in real situations, and discusses how teachers help learners so that the learning process of the participants is more qualified (Purwantiningsih & Suharso, 2019). Improving the quality of teaching from within strengthens the professionalism of teachers. With collaborative learning, teachers get to know their own weaknesses and strong points in teaching, so teachers will always want to develop themselves to strengthen their professionalism (Putri & Zulkardi, 2018).

Preparation of learning tools is considered to accommodate implementation as a guide for teachers in the implementation of learning. Learning will be achieved optimally if before learning, the teacher designs the learning design and determines the source of teaching materials, and the evaluation materials used (Okta Priantini & Widiastuti, 2021). Integrated collaborative learning is expected to be a more fun and meaningful learning for students and improve creative character of students (John, 2006; Tan, 2007; Wahyuni & Mustadi, 2016). The collaborative learning is a method that provides opportunities for students to learn from each other (mutual teaching relationship) (Sato, 2012). Collaborative learning does not prioritize a competition between students. Students who have more ability help less-able students. On the other hand, less-able students ask more-able students for helps, so as to create an atmosphere of learning from each other. Furthermore, reflection means linking increased learning with a broader perspective on learning-an orientation towards seeing the whole picture (Chang, 2019). Research teaching has been studied as an important part of teachers' professional development (Zydziunaite et al., 2020). Reflective teaching is a realistic and achievable way to promote student learning while developing the knowledge, skills, and abilities expected of students in today's challenging world. It is also a way to ensure that students gain the flexibility and creativity they need to continue as lifelong learners (Hinett, 2002).

Therefore, researchers are interested in conducting research to develop collaborative learning environment with the contribution of reflective teaching practices that aim to suggest strategies that can help teachers to improve themselves to better increase their professionalism by reflecting, involving analysis and making decisions regarding what has happened.

METHODS

This research uses a type of validation studies that aimed to design learning environment in which the teacher to develop their reflective teaching practices consisting of learning activities and student worksheets. This research consisted of three stages, namely preliminary design, design experiment (pilot experiment and teaching experiment) and retrospective analysis (Akker, J. V., Gravemeijer, k., McKenney, S., Nieven, 2020). This research was conducted until the design experiment. Validation studies focuses on the design of learning environments or trajectories, with the aim of developing and validating theories about learning and the design of learning environments

(Akker, J. V., Gravemeijer, k., McKenney, S., Nieven, 2020). Validation studies aims at advance theories of learning and instruction theories, which include: micro-theories: within learning activities; local theories of teaching: in the scope of the study period; field-based teaching theories: in the scope of pedagogical content knowledge (Akker, J. V., Gravemeijer, k., McKenney, S., Nieven, 2020). While to designs learning tools for translation on geometric transformation's worksheet using the context of Sriwijaya Gending Dance.

Stages of validation studies are: Preliminary Design, which is carried out by creating a preliminary instructional design based on an interpretive framework; A Design Experiment or classroom experiment conducted by testing and improving the instructional design or local instructional theory and developing an understanding of how it works; A Retrospective analysis conducted on study of each material to develop a local instructional theory and advance (strengthen) framework (Putri & Zulkardi, 2018).

In a design research perspective, the preliminary design is to formulate a local instructional theory that can be elaborated and refined while conducting the teacher experiment (Van den Akker et al., 2006). Accordingly, in this study, the initial idea was inspired and elaborated from studying literature on the history of reflective teaching practices using PMRI and collaborative learning. During this literature study, we also started to design the learning activities. This sequence of learning activites including conjecture of students' thinking and strategies was developed and served as the initial HLT. A prototypical instructional sequence was developed in a cyclic process of designing and revising instructional activities. In each cycle, we conducted an anticipatory throught experiment by envisioning how the proposed instructional activities might be used in classroom, and what students might learn as they participate in them. The teaching experiment is both to test and improve the conjectured local instructional theory that is developed in the preliminary phase, and to develop an understanding of how it works (Van den Akker et al., 2006). The teaching experiment is also aiming to collect the data in order to answer the research questions. The HLT during the teaching experiment functioned as a guideline for both the teacher and researcher to determine the focus of the teaching, interviewing, and observing.

The data analysis was conducted in the retrospective analysis phase. In this phase, the HLT was used as a guideline and points of references in analyzing of the entire data set collected during the teaching experiment. The HLT was compared with the actual teaching and learning process of students that took place in the classroom. The interpretative framework for understanding the learning process of students was primarily that of PMRI theory. The description of the analysis was not merely about the instances that support the conjecture, but also the ones that contradicted with it. The conclusion of this analysis was used as the answers for the research questions. The main result is not primarily a design that works, but the rationales of how it works (Van den Akker et al., 2006).

The research was conducted at State Junior High School 1 in Palembang, South Sumatera. It involved fifteen participants from class 9-3 in the odd semester of the 2020/2021 school year. The

concern in this study is to select a sample with executive, high, medium and low criteria (Putri & Zulkardi, 2018).The data collections used includes, interviews, classroom observations, documentation, and field notes. The interview question mostly related to the aspect of teaching practices in this study (Zakaria & Binti Maat, 2010). The interview question focused on the number of years in the teaching experience, the teachers' preparation before their mathematics class begins, the teacher setting of goals in their teaching and their expectation from the class that they teach. The teachers were also asked about their teaching method; whether they do reflection after teaching; to identify their strength and weaknesses in teaching. The aspect of the problems that the teachers encounter in class was also raised in the interview question as well as the challenges that they face during teaching. The last part of the interview ended with describing good mathematics teachers and effective mathematics teaching.

RESULTS AND DISCUSSION

At the preliminary design stage, researchers carried out an analysis of translation in geometric transformation according with the curriculum in the school concerned and the use of PMRI as a learning approach. Activities executed in this stage which is choosing a model teacher; analysis of the learning; putting and fix the starting point of the experiment; and material design and development. Then, the researcher observed the classroom, interviewed the model teacher to find out the potential of the class and the basic situation. Next, by being assisted by a cameraman, the researcher recorder a video of learning in the classroom. The results of the analysis were compiled to design a series of learning activities in the form of Hypothetical Learning Trajectory (HLT). HLT is used dynamically, so it is flexible and can be revised at the design experiment (pilot experiment and teaching experiment). The design of HLT, which includes three parts: the learning objective, the translation of the learning, and hypothesized (assumed) learning (Van den Akker et al., 2006). An overview of students' activities, goals, and thoughts is described in Table 1.

Table 1.The activities and conjecture of the learning process

Activity	Main Goal	Conjecture
Observing the video of Gending Sriwjaya dance	Figuring out the parts of Gending Sriwijaya dancer's movements	Students collect information about the movements of the Gending Sriwjaya dancers
Making a list of rules for the parts of Gending Sriwijaya dancer's movements	Describing the rules of Gending Sriwijaya dancer's movement	Students know the rules of dancers' footwork and their movement
Drawing an illustration of Gending Sriwjaya dancer's movements	Determining the coordinates of the dancers	Students used Cartesian coordinates to generalize the possible outcomes
Understanding movement of dancer (right, left, up, down)	Determining the number of movement	Students count movements (right, left, up, down)

Activity	Main Goal	Conjecture
Solving a problem related to the parts of movements	Determining the relationship between the start point of the dancers and the end point of the dancers	Students can determine the movements like the start point of the dancers and the end point of the dancers

Table 1 show several activities were planned based on the HLT and students' thought process. The relationship between students' learning trajectories, learning activities and basic ideas of the translation can be seen in Table 2.

Table 2. The relationship between students' learning trajectories, learning activities and basic concepts.

	Students' Learning Trajectories	Learning Activities	Translation Basic Concepts
Activity based on experience (Context)	Watching the Gending Sriwijaya dancing video	Watching Gending Sriwijaya dancing in video; Identifying movement of each dancers	Identifying roles of movement
(Model of)	Drawing an illustration of Gending Sriwjaya dancer's movements	Understanding to determine dancers' positon in Cartesian coordinates	The start point of translation
(Model for)	Understanding of movement of dancer (right, left, up, down)	Classifying movement of dancer (right, left, up, down)	Movement from start point and end point of geometric translation
Formal Knowledge	Writing the geometric translation of Gending Sriwijaya dancing	Defining the translation; character of translation; Writing the experience of learning	Definition and formal form of translation, character of translation

Table 2 shows that relationship activity based on Gending Sriwijaya dancing, model of, model for and formal knowledge. In addition, the design experiment phase consisted of a pilot experiment and teaching experiment. The pilot experiment involved six students with high, medium and low ability participated. The selection of students was based on pre-tests and on the evaluation of classroom teachers, who already understand the abilities and condition of the students.

Cycle 1, the first teaching experiment, was to test the HLT that has been designed for students in small groups (pilot experiment) to collect data to adapt and verify the original HLT for use in learning in a large group (teaching experiment) later (Van den Akker et al., 2006). Fifteen 9-3 grade students participated in the teaching experiment. The choice of teaching experiment subjects was made in discussing with the 9th-3rd grade math teacher.

The first data collection techniques used in this research were interview with model teacher to obtain information. The interview was conducted before the implementation of the first and the

second cycles. Therefore, the researcher had knowledge about the condition of the students, the appropriateness of the contexts used and the compatibility of the learning materials, the timing, and the opini of the teacher about HLT. Another technique was classroom observation, which was done at each stage, starting with stage 1 before the first cycle and for the during of the first and second cycles. Preliminary observations of the first cycle should help with an overview of the students' task list, the teacher's teaching technique, the organization of the lesson and the rules of the lesson. At the same time, classroom observations made at some point the first and the second cycle aimed to monitor student learning and ensure the functionality and the effectiveness of the instructional designs and the revised version of the instructional designs. In particular, observations from the first cycle were used to investigate students' techniques compared to the first version of the HLT. The third data collection technique used was data documentation of students' strategies individually or in groups while learning to use a video-digital camera. The fourth technique was field notes takes by the observer to support the data captured by the digital camera, comment sheets and interviews. A video recording of a lesson can provide very useful information for reflection. A model teacher can also do many things in the class, but won't be aware of many problems in the class that the teacher usually does not see. Recording a lesson can clearly describe the entire teaching process. It can trigger teachers' reflective thinking, make them think about their weaknesses and help them get thoughts and ideas to improve their teaching. Video recordings can be useful in showing the components of the teacher's own behavior and reflecting the factor behind the teacher's speech.

Lesson recording has several advantages, including understanding how much time the teacher spends talking to students; what is the reaction of the teacher and students; communication between students during the discussion; and understanding that the teacher is giving orders. Observation became the simplest research technique that the researcher used in classrooms. Classroom interaction is good to be take as data along with the method of teaching and learning (Vidhiasi, 2018). The researcher invited a peer member to observe the class to gather information about the lesson through a simple observation task or through notice taking. The observer may not participate in comparing the teacher's lesson. The observation of the teacher from preliminary stage to the end of the lesson was to unsure that the teacher completed the lesson according with the learning design.

There were several findings, for example, the students who were excited about learning in the preliminary stage, where the teacher showed the video of Gending Sriwijaya dance as a context. With systematic and structured body movements. In teaching mathematics, the compactness of the dancer's movement can be recommended because it helps the students visualize problems and kinetics to understand basic geometric shapes (Hariastuti et al., 2021). In the student discussion phase, the student also showed a various activities such as laughing with a group member, playing with a pen and chairs, moments of idleness, which means that learning was not focused and was silent for a moments.In the last part, one of the groups presented their answer and gave the other group a chance to refute if they difference answers. So at this stage, the group expressed their opinions to each other.

The teacher gave problems to be solved with a discussion group. For this first activity, students watched a video of a Gending Sriwijaya dance performance. After that, the students determined the nature of the dancer's footwork and movement. In this part, the teacher also used and gave the lesson by giving task to the students. Then, the teacher asked students about their knowledge, experience, and identification of Gending Sriwijaya dance. The Students' activity began by learning about one of the movements for geometric translation, which can be seen in Figure 1.

Movement in Gending Sriwijaya Dance

The main element in a dance is movement. The variety of movements in Gending Sriwjaya is a series of movement motifs derived from the response to Gending Sriwijaya lyrics and is structured into five a parts including: the movement of entering the stage, initial dance movement, middle movement, final movement and off stage.

The movement of entering the stage is a movement of the way with continued early dance movements. The whole variety of movement consists of a variety of motion rejecting currents, workship standar under the veil (right, left) of the hand. As the result, in the initial process of entering the stage, there is a movement of position from before entering the stage to the position in the real stage. To help the process of moving the position of the dancer, answer the following question. Please determine how many dancers in the picture and draw their position in the colomn below.

The movement of entering the stage (the "ngeset" movement)	**The initial dance movement (the standing worship movement)**
	
Figure 1. Dancers entering the stage	**Figure 2.** Dancers occupy positions

Figure 1. The movements in Gending Sriwijaya dance activity

Figure 1 aims discover the students' understanding and experience concerning the context of movement in Gending Sriwijaya dance and to identify the rules and character of the dancer's footwork. The conjecture in the first activity consisted of activity, predictions of student's repsonses, and the teacher's responses can be seen in Table 3.

Table 3. The conjecture of sharing task of Gending Sriwijaya dance

Activity	Predictions of Students' Responses	Teacher's Responses
The teacher asks students about their understanding and about experience Gending Sriwijaya dance	Understanding and/or having experience in associated with Gending Sriwijaya dance. Not understanding and/or not having experience in associated with Gending Sriwijaya dance	The teacher asks students to share their understanding and experience associated with Gending Sriwijaya dance. The teacher tells about Gending Sriwijaya dance, then asks the students.
Students draw the position of the	Drawing the position of the dancers of Gending Sriwijaya	The teacher offers a verbal appreciation to the student's task.

Activity	Predictions of Students' Responses	Teacher's Responses
dancers.	dance. Drawing the dancers of Gending Sriwijaya dancers without the position of the dancers	The teacher guides the students in order to draw, all the positions of the dancers of Gending Sriwijaya dancer.

In the second activity, students arranged the positions of five dancers illustrated in Cartesian coordinates. The steps for arranging the position of the dancers of Gending Sriwijaya dance had been have been identified in the previous activity. Dancer's start point is the point before their move can be seen in Figure 2.

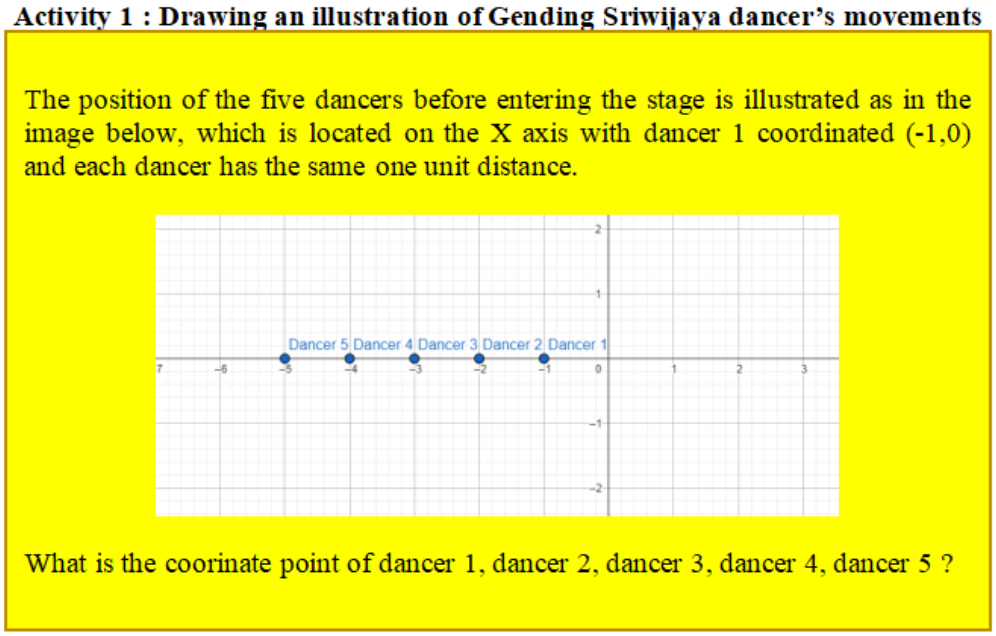


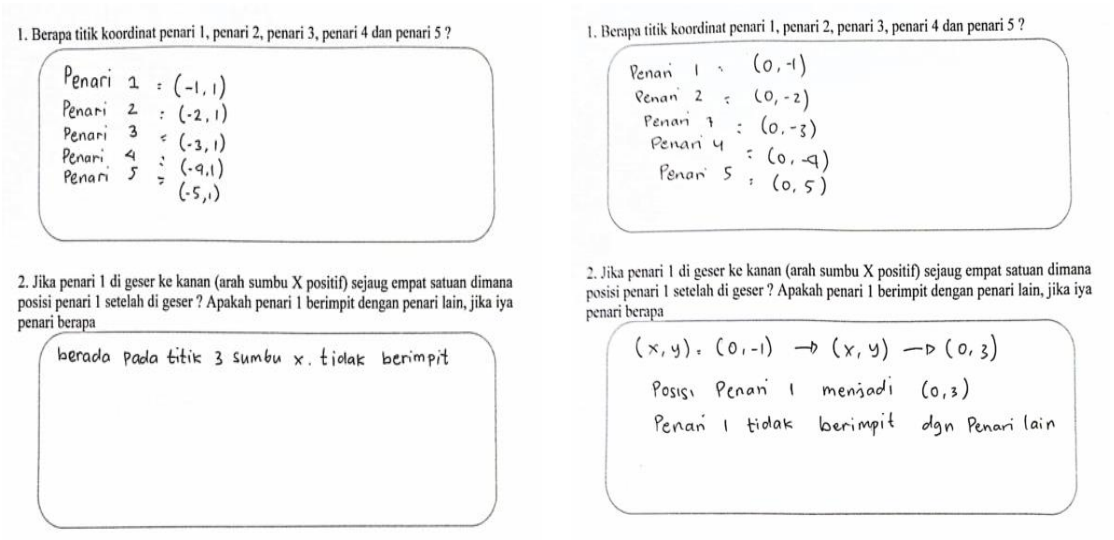
Figure 2. Drawing an illustration of GSD' activity

Figure 2 show that the purpose of this activity is to encourage students to understand and identify the starting point and ending points of dancer's pose. Teachers also face challenges in organizing collaborative, such as designing appropriate group tasks, forming groups, managing class time (Gillies, 2006) and improving and monitoring productive collaboration (Van Leeuwen et al., 2013). The conjecture in the second activity consisted of activities, predictions of students' responses, and the responses that the teacher must give in reaction to the responses given by these students can be seen in Table 4.

Table 4. The conjecture of sharing task of Gending Sriwijaya dance

Activity	Predictions of Students' Responses	Teacher's Responses
The teacher asks students about their understanding and about experience Gending Sriwijaya dance Students draw the position of the dancers.	Understanding and/or having experience in associated with Gending Sriwijaya dance. Not understanding and/or not having experience in associated with Gending Sriwijaya dance Drawing the position of the dancers of Gending Sriwijaya dance. Drawing the dancers of Gending Sriwijaya dancers without the position of the dancers	The teacher asks students to share their understanding and experience associated with Gending Sriwijaya dance. The teacher tells about Gending Sriwijaya dance, then asks the students. The teacher offers a verbal appreciation to the student's task. The teacher guides the students in order to draw, all the positions of the dancers of Gending Sriwijaya dancer.

An example of the students' worksheet can be shown in Figure 3.



(a) (b)

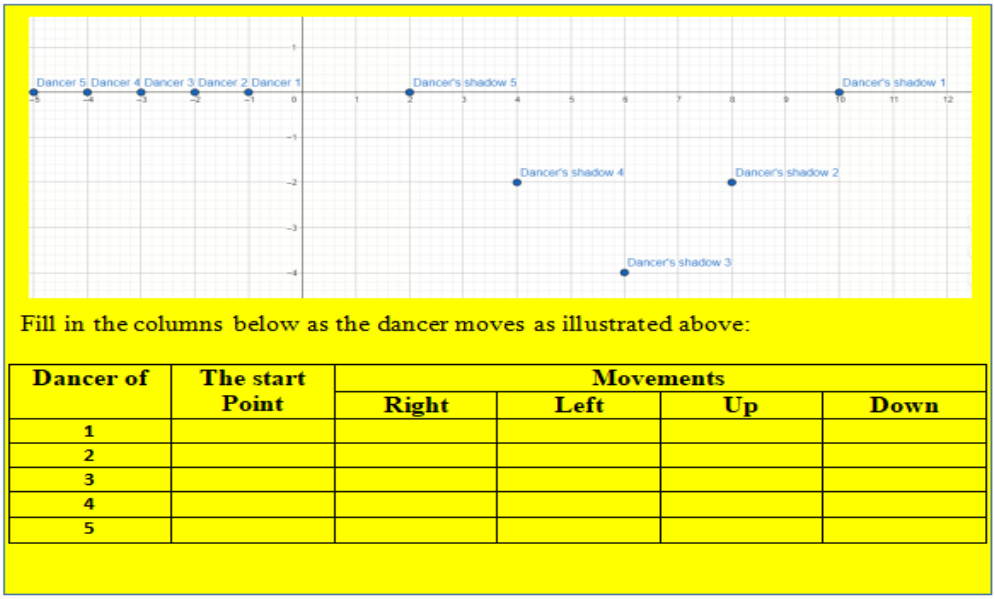
Figure 3. (a) Answer of the 1st group; (b) Answer of the 2nd group

According to Figure 3, it can be seen that the students did it wrong. The first group showed that the position of the first dancer was at the point (-1,1), the position of the second dancer was at the point (-2,1), the position of the third dancer was at the point (-3,1), the fourth dancer at the point (-4,1), and fifth dancer to be ranked in point (-5,1). It is, known that the positions of the dancers remain on the x-axis. That means the y-axis is 0. The second answer from the second group showed that the position of the first dancer was at the point (0,-1), the position of the second dancer was at the point (0,-2), the position of the third dancer was at the point (0,-3), the position of the fourth dancer was at

the point (0,-4), and the position of the fifth dancer was at the point (0,-5). The second group's answer was incorrect because they determined the value between the x-axis and the y-axis.

To solve a problem, students must share ideas and learn from their mistakes. The quality of group discussions is a common problem for most elementery and junior high school students (Ross, 2008). Although teachers organize diverse groups of student (e.g. heterogeneous or homogeneous in tterm of ability or gender), they do not always structure these group interactions to foster effective collaboration (Baker & Clark, 2010). Students were greatly encourage when they could share ideas and strategies with group members. Students with more opportunities to help disadvantaged students.

In the third activity, the students also knew the end point as the point after their movement. The purpose of this activity is to encourage students to understand and identify the starting and ending points of a dancer's pose. Students classify the movements of the dancer (right, left, up, down). It started the students observing and knowing the pattern of the dancers' start points as straight line. The movement of the dancers then became a V pattern as the endpoint of the dancer's pose. The graph well through four translation activities are source allocation, initial coordination, targets constructing and equivalence determination (Bosse, 2011). Dancer's start point then became a V pattern as the endpoint of the dancer's pose can be seen in Figure 4.



Dancer of	The start Point	Movements			
		Right	Left	Up	Down
1					
2					
3					
4					
5					

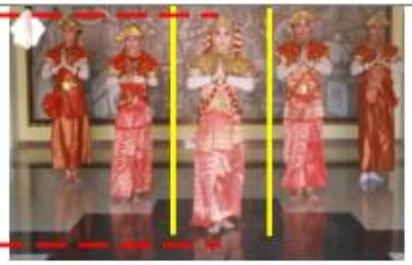
Figure 4. The Movement from straight line change to a V pattern activity

The conjecture in this activity include of activities, predictions of students' responses, and the responses that teacher should provide in reaction to the responses given by those students can be seen in Table 5.

Table 5. The conjecture of movement from straight line change to a V pattern activity

Activity	Predictions of student responses	Teacher's Responses
Students classify the movements of the dancers (right, left, up, down).	Students can classify those movements clearly in their own language. Students cannot classify those movement clearly in their own language.	The teacher offers a verbal appreciation to the student's task. The teacher explores students' difficulties which cause student to not able to translation.
Students can determine translation of the dancers that changes shape.	Students can understand and describe the translation of the dancers that changes shape. Students cannot understand and describe the translation of the dancers that changes shape.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.
Students can determine the translation of the dancers that changes size.	Students can understand and describe the translation of the dancers that changes size. Student cannot understand and describe the translation of the dancers that change size.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.
Student can determine the translation of the dancers that changes position.	Students can understand and describe the translation of the dancers that changes position. Student cannot understand and describe the translation of the dancers that changes position.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.

Table 5 show the aims for this activity to discover the students' knowledge about the relationship between the dancer's initial position, the number of movement, and the dancer's end position after being moved. Than they're know characteristic of movement. Students wrote the movement (translation) in formal form, including the universal translation of Gending Sriwijaya dance. This activity aims is to inspire students' understanding in writing or representing translations in a formal form. In this activity, students wrote the movement (translation) in formal form, consisting of the general translation of Gending Sriwijaya dance. The aim of this activity is to inspire students' understanding in writing or representing translations in a formal form, can be seen in Figure 5.

The "ngeset" movement	The standing worship movement
	
Figure 3. Dancer's shift entering the stage	**Figure 4.** The dancer's position entering the stage

The Characteristic	Yes/No
Dancers of translation to be shape changes	
Dancers of translation to be size changes	
Dancers of translation to be position changes	

Figure 5. The characteristic of translation activity

The conjecture in the last activity include activities, predictions of students' responses, and the responses of the teacher. The details can be seen in Table 6.

Tabel 6. The conjecture of characteristic of translation activity

Activity	Predictions of Students' Responses	Teacher's Responses
Students classify the movements of the dancers (right, left, up, down).	Student can classify the movements clearly in their own language. Student cannot classify the movements clearly in their own language.	The teacher offers a verbal appreciation to the student's task. The teacher explores students' difficulties which cause student to not able to translation
Students can determine geometric translation of the dancers that changes shape.	Students can understand and describe geometric translation of the dancers that changes shape. Students cannot understand and describe geometric translation of the dancers that changes shape.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.
Students can determine Geometric translation of the dancers that changes size.	Students can understand and describe geometric translation of the dancers that changes size. Students cannot understand and describe geometric translation of the dancers that changes size.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.
Student can	Student can understand describe dancers	The teacher offers a verbal

Activity	Predictions of Students' Responses	Teacher's Responses
determine geometric translation of the dancers that changes position.	of translation to be position changes Student cannot understand and describe geometric translation of the dancers that changes position.	appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.

In this activity, students wrote the movement (translation) in formal form, consisting of the general translation of Gending Sriwijaya dance. The aim of this activity is to inspire students'undertanding in writing or representing translations in a formal form can be seen in Figure 6.

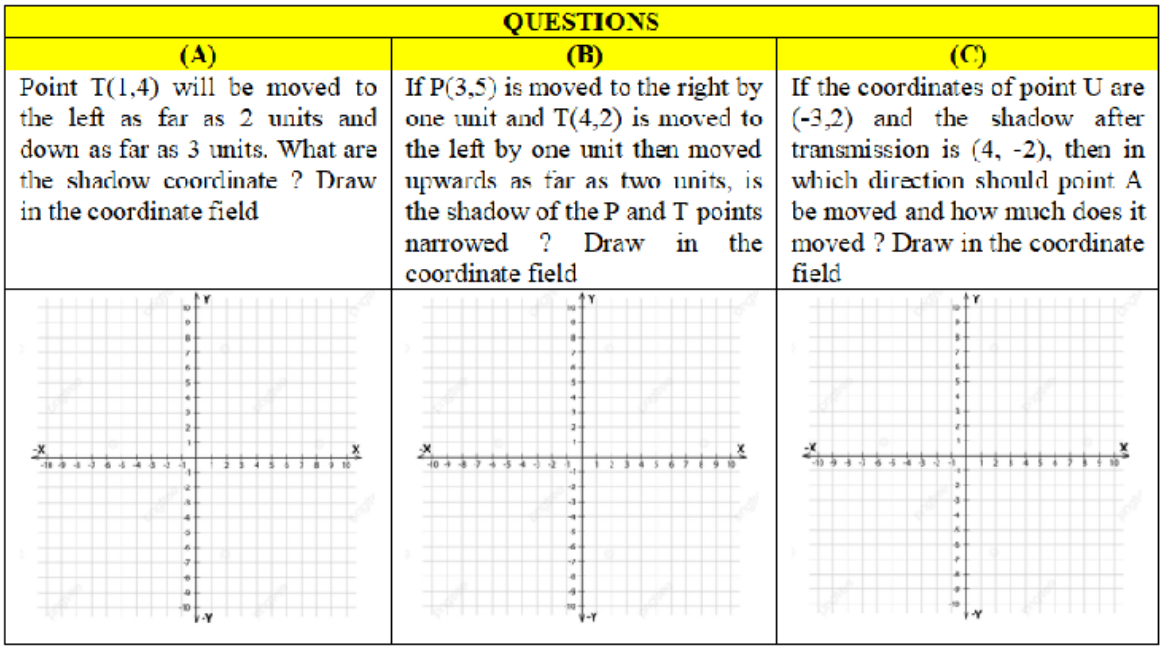


Figure 6. The translation in formal form activity

The conjecture in the last activity include activities, predictions of students' responses, and the responses of the teacher. The details can be seen in Table 7.

Table 7. The conjecture of translation in formal form activity

Activity	Predictions of student responses	Teacher's Responses
Students determine shadow of translation	Student can understand and determine shadow of translation. Student cannot understand and determine shadow of translation	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.
Student determine the coordinates of the end point position of the	Student can understand and determine the coordinates of the end point position of the object. Student cannot understand and determine the coordinates of the end	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.

Activity	Predictions of student responses	Teacher's Responses
object	point position of the object.	
Student determine translation with the start point and the end point being known	Student can understand and determine translation with the start point and the end point. Student cannot understand and determine translation with the start point and the end point.	The teacher offers a verbal appreciation to the student's task. The teacher recalls the creative thinking of students, to reflect on the activities which have been carried out formerly.

Culture is believed to be one of the aspects that can facilitate the growth of individual creativity. Creative culture as behavior, activity or way of life of a person or group of people embedded within it an element of novelty to life effective, communicative and refer to attitudes toward the social situation and the phenomenon of life (Susanto, 2017). One of the creation in culture is traditional dance. In the culture of traditional dance of South Sumatera, Gending Sriwijaya dance is one of dance arts from South Sumatera. Gending Sriwjaya Dance (TGS) broadly describes the fame, glory, and majesty of the Sriwijaya kingdom (Mareta et al., 2019).

The utility of traditional dance motions in learning mathematics is very useful for students who have issue in learning principles which are still abstract. Dance may be an engaging and appropriate medium to help students, especially students who are visual and kinesthetic learners (Iyengar, 2015). Students with visible and kinesthetic learning styles are predicted to recognize the learning principles which are conveyed more easily through those traditional dance motions. The result of this study and previous research on the exploration of Indonesian culture can be one of the transformative effort to bridge mathematics with the reality and belief of student in learning mathematics (Prahmana & D'Ambrosio, 2020).

The PMRI approach is also correctly used as an approach in this design, because PMRI has the features that use the real-world context as a starting point for learning (Prahmana & D'Ambrosio, 2020; Rawani et al., 2019). One of the principal through of HLT is to increase a geometric translation of learning activities based on a teacher's conjectures concerning students' current understanding of a centered mathematics idea, such as capacity limitations or demanding situation skilled by students (Lobato et al., 2017). Consistent with this concept, the result of this research shows how dance ought to support the improvement of students' conceptual knowing of geometric translation.

A reflective teacher is an effective teacher. The practice of reflective teaching is a thinking tool that provides space for teachers to critically examine each assumption regarding objectives and acceptable methods, problems and solutions. Teachers need to reflect on experiences for their own growth. Most of the students were interested in the fact that reflective teacher practiced situations to teach new knowledge and used interesting lessons by using one of the contexts of dancing as starting point of learning. So that it can help students absorb information more quickly and deepen their understanding. A study on teachers' reflection was conducted by (Kwon & Orrill, 2007) which

focused on the teaching capacity within the teacher's communication in class. Reflection can be used as a tool to investigate teaching practices in order to achieve meaningful educational reform (Cohen & Hill, 2000) and to help them in thinking about teachers' activity in the class (McNergney, R.F. & McNergney, 2004). It is also imperative to develop knowledge on how to teach effectively through analyzing the real situation in class (Zakaria & Binti Maat, 2010). Based on reflection, changes in teaching practices can be implemented provided that the teachers have broad knowledge in mathematics, pedagogy and on their students.

CONCLUSION

Teachers are the greatest asset of any education system. The complexity of teaching requires teachers to practice their professional development to enhance and improve student outcames. A reflective teacher is an effective teacher. Reflective teaching practice is a thinking tool that gives teachers the space to critically examine accepted goals and assumptions about methods, problems and solutions. A teacher must reflect on his experiences in order to grow. The design of HLT in every learning activity is an important part of designing student learning activities. The design of learning activities is inseparable from the learning trajectory, which includes a speculation plan for learning materials, where the learning trajectory is a concept trajectory that students will pass during the learning process. Also, the teacher may decide to do something special to achieve the best result. The first and fundamental basis for the advancement of an expert is certainly the teacher's own reflection on daily activities. Collaborative reflective teaching is a structured activity that allows teachers to engage in reflection, and collaboration can to change and improve their practice.

ACKNOWLEDGEMENTS

This article is part of a research project funded by a professional research grant from the Universitas Sriwijaya with the letter number of the Chancellor's letter number 0014/UN9/SK.LP2M.PT/2021 with the research contract number 0127/UN9/SB3.LP2M.PT/2021.

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