

Primary School Teachers' Identity in Mathematics: The Aspect of Specialist Teaching and Learning

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Received for publication 20 Jan. 2021. Accepted after review 19 Apr. 2021

Designated editor: Claudia Lisete Oliveira Groenwald

ABSTRACT

Background: Identity is closely related to the professional development of teachers in teaching and learning. Teachers of primary school do not have only one identity, because they work as class teachers. Mathematics is one of the school subjects taught, so that primary school teachers also have a mathematical identity in the teaching and learning that they do. **Objectives:** This study aims to explain the teaching and learning aspects of primary school teachers, as seen from their mathematical identity. **Design:** This type of research was qualitative by employing an explanatory approach. **Setting and Participants:** Forty-six teachers who concluded the Primary Teacher Education, who work as in-service teachers at a primary school in Tarakan city, grouped into three types: turning point, failing, and roller coaster. **Data collection and analysis:** The data collection used an open question questionnaire, and the data reduction process took into account the type of teacher and mathematical identity. In-depth interviews with six primary school teachers representing types were conducted as a triangulation process. **Results:** Based on the mathematics identity of the teacher, there are three findings in implementing teaching and learning, specifically: (a) hesitation in mathematics knowledge (b) teaching mathematics because it is fun versus it is part of the duty of primary school teachers, and (c) support for teaching mathematics. **Conclusions:** We suggest that a teacher professional development strategy based on mathematics learning is needed, such as group learning activities, especially mathematics. Further research is needed to see the identity of primary school teachers in classroom practices and their changes.

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Keywords: Mathematics; Identity; Teaching; Learning; Teacher.

Identidade do professor de escola primária em matemática: o aspecto do ensino e aprendizagem de especialistas

RESUMO

Contexto: A identidade está intimamente relacionada ao desenvolvimento profissional dos professores no ensino e na aprendizagem. Os professores da escola primária não têm apenas uma identidade, porque atuam como professores de classe. A matemática é uma das matérias ensinadas, de forma que os professores do ensino fundamental I também têm uma identidade matemática no ensino e na aprendizagem que fazem. **Objetivos:** Este estudo tem como objetivo explicar os aspectos de ensino e aprendizagem de professores do ensino fundamental I, a partir de sua identidade matemática. **Design:** Este tipo de pesquisa foi qualitativa com abordagem explicativa. **Cenário e participantes:** Quarenta e seis professores egressos do Curso de Pedagogia que trabalham como professores primários na cidade de Tarakan. São agrupados em três tipos de professores: ponto de inflexão, incapaz e montanha-russa. **Coleta e análise de dados:** A coleta de dados utilizou um questionário com questões abertas, e o processo de redução dos dados levou em consideração o tipo de professor e a identidade matemática. Entrevistas em profundidade com seis professores primários que representam tipos foram conduzidas em um processo de triangulação. **Resultados:** Com base na identidade matemática do professor, existem três descobertas na implementação do ensino e aprendizagem, especificamente: (a) hesitação no conhecimento da matemática (b) ensinar matemática porque é divertido versus é parte do dever dos professores do ensino fundamental, e (c) apoio ao ensino da matemática. **Conclusões:** Sugerimos que seja necessária uma estratégia de desenvolvimento profissional do professor baseada na aprendizagem da matemática, como atividades de aprendizagem em grupo, especialmente matemática. Mais pesquisas são necessárias para ver a identidade dos professores do ensino fundamental nas práticas de sala de aula e suas mudanças.

Palavras-chave: matemática; identidade; ensino; aprendizagem; professor.

INTRODUCTION

Multiple variables influence the mathematics learning difficulties of students, one of which is the teacher-related factor. In teaching and learning activities, the teacher is seen as a facilitator, including how teachers inspire students to learn mathematics (Acharya, 2017). Teachers' motivation is not only restricted to their teaching viewpoint, but requires a desire to learn and teach in a given way (Gresalfi & Cobb, 2011). The learning process carried out by the

teacher is strongly influenced by his/her own identity both as a teacher and as a learner (Drake et al., 2001).

We can understand identity as the process of looking at oneself, of how individuals see others, and how they see the expectations, which will continue to grow in line with group participation (Zoest & Bohl, 2005), shifting over time and becoming more complex (Rodgers & Scott, 2008). Identity is correlated with how someone characterises themselves and how they are perceived by others (Martin, 2000). A person's identity may include the knowledge and engagement of a person with others, whereas the relationship between a person and mathematics is expressed in mathematical identity building (Hima et al., 2019). Identity is also correlated with teaching knowledge, promoting the view that knowledge is permanent but social and needs to be transmitted to other individuals (Hodgen & Askew, 2007).

Mathematical identity is seen as an individual's relationship to both oneself and others with mathematics, which is reflected by awareness, interactions, and experiences that are often evolving in studying and teaching mathematics. Several elements are underlying the development of the mathematical identity of an individual. These elements are (a) the importance of mathematical knowledge for an individual, (b) motivation and persistence in mathematics learning, (c) opportunities in mathematics, (d) obstacles in mathematics learning, (e) strategies for participating in formal and informal mathematics contexts, and (f) the ability to perform in mathematics learning (Martin, 2000). This analysis will use these components to see the identity of the teachers who teach mathematics in primary schools.

In mathematics identity, there are two critical supporting roles, which include student identity and teacher identity. Few researchers and theoretical studies report that the main reason for researching teacher identity is its relevance to practice in teaching and learning (Clark et al., 2013; Pipere & Mičule, 2014; Watson, 2006). Discussions related to the concept of teacher identity are gaining popularity as a topic in educational research (Darragh, 2015) both for preservice teacher students, specialist mathematics teachers, and non-specialist teachers such as primary school teachers (Lutovac & Kaasila, 2018). Furthermore, because teachers in primary schools teach all the main subjects, they are referred to as non-specialist teachers in mathematics (Lutovac & Kaasila, 2014). A math teacher's identity is seen in teachers who specifically teach mathematics and in teachers who teach in primary schools and can be called teachers' identity related to mathematics (Lutovac & Kaasila, 2018).

Learning or developing a teacher's identity, both personal and professional, is inspired and driven by many aspects. In the professional development of teachers, the development of teacher identity plays an important role. Shulman (2019) defines the need to improve the pedagogical practice's understanding, necessary teacher skills, and professional knowledge development. Identity includes knowledge and experience (Wenger, 1998) and our perceptions of ourselves (Zoest & Bohl, 2005). Mathematical identity cannot be separated from teachers' identity in teaching and learning mathematics (Brown & Olwen, 2011; Hodgen & Askew, 2007; Jones et al., 2000). The teacher's identity as a mathematics teacher is reflected in three aspects: mathematics specialists, teaching-learning specialists, and caring (Putten et al., 2014). The research by Putten. et al. (2014) show that final-year preservice teachers' self-perceptions as teaching and learning specialists and fantastically caring are not well represented. Furthermore, other research reports that the identification of teachers as learners of mathematics is seen as something that needs to be recognised because it is closely connected to how teachers study and teach and who they are as teachers (Kaasila et al., 2008; McCulloch et al., 2013).

According to some of the theoretical explanations above, the teacher's identity can be constructed from knowledge, experience, and engagement with students inside and outside the classroom. Several researchers have conducted research related to the identity of both in-service and preservice primary school teachers in terms of social, emotional, experiential, or school culture that is associated with teaching practices (Beltman & Glass, 2015; Grootenboer & Edwards-Groves, 2019; Putten et al., 2014; Westaway, 2019), but no research has specifically examined the teaching and learning aspects of primary school teachers in terms of their mathematical identity. The study results state that primary school teachers have a more emotional struggle concerning mathematics (Hodgen & Askew, 2007). Hence, it is advisable to analyse the relationship between gaining understanding or knowledge and the identity that is constructed (Lutovac & Kaasila, 2018). Therefore, this study aims to reveal the teacher's identity in terms of the teaching and learning aspects of mathematics in primary schools by employing Martin's (2000) six components of mathematics identity.

METHODOLOGY

This research employed a qualitative method and used an explanatory approach. The researchers used an explanatory approach, since it allows us to

reveal aspects of teaching and learning mathematics, which are reflected in the teacher's identity by using the component of mathematics identity.

Participants

Forty-six students attending a Primary School Teacher Education, who work as in-service primary school teachers, filled out the questionnaire in this research. From this universe, only 21 teachers were used as participants in this study. The participants were selected according to three types of teachers: turning point, failing (foreclosed), and roller-coaster, as developed by Drake et al. (2001). Furthermore, six participants were selected to represent each type of teacher. The six participants received pseudonyms T1, T2, T3, T4, T5, and T6. We then identify more deeply related aspects of teaching and learning by looking at their mathematical identities. Table 1 shows the data demographics of participants.

Table 1

The participants' demographic

Aspect		Total
Gender	Male	5
	Female	16
Age	20-25	17
	26-31	4
Length of Teaching	1-3 years	18
	4-6 years	2
	7-9 years	1

Data Collection

The data in this study were collected through a questionnaire by using Google Forms and in-depth interviews. This research was conducted during the Covid-19 period; accordingly, it was not possible to perform direct observations during the learning process of mathematics carried out by the teacher in the classroom. Non-observational data can be collected by filling out biographical questionnaires and interviewing participants to investigate identities (Putten et al., 2014) and can be done without direct observation in classroom learning (Jong, 2016; Williams, 2011).

The data collection process in this study consisted of four stages. The first stage of data collection was compiling a questionnaire in the form of open questions by adapting six components of mathematical identity, according to Martin (2000). The components of mathematical identity seen from the aspects of learning and teaching referred to in this study can be seen in Table 2.

Table 2

Teacher’s mathematical identity in learning and teaching

Mathematical Identity	Description
The importance of mathematical knowledge	The teacher’s views regarding the meaning of mathematics in teaching and learning in children.
Motivation	The underlying aspect of teaching and learning mathematics by teachers.
Opportunity	Opportunity to upgrade teaching knowledge and skills
Obstacle	Faced during the process of obtaining understanding and delivery in teaching mathematics.
Strategies	The way the teacher uses in implementing teaching and learning
Ability	The teacher’s capacity to perform in mathematics

The second stage was to ask the teachers to fill out a questionnaire according to their learning and teaching experiences. In the third stage, we divided them into three types of teachers. In the four-stage, we confirmed and dug deeper into the explanation given regarding the teacher’s identity in terms of teaching and learning mathematics by using the mathematics identity component with six participants representing each type. The interview was conducted as a triangulation process. An interview is one of the recommended data collection methods for teacher identity-related research (Lutovac & Kaasila, 2019).

Data Analysis

Data analysis in this study used data reduction and data presentation to obtain the research conclusions (As'ari et al., 2019; Huberman & Miles, 2012). In the data reduction stage, we analysed the questionnaire results, paying attention to the components of the mathematical identity used in the study. We also reduced the questionnaire results by paying attention to the three types of teachers to obtain who met the research criteria. The descriptions of the three types of teachers were then compiled in the form of coding to make it easier to group the teachers' types, as shown in Table 3.

Table 3

The three types of teacher

Type of Teacher	Career Stage	Example Information
Turning Point	Middle career	Math is not a subject that I like so much at school. Early in my career, I am still looking for a suitable mathematics teaching pattern. I am a good and fun-loving teacher.
Failing (foreclosed)	Early-stage	I enjoy teaching mathematics I am less capable of learning mathematics since school. If possible, I would avoid teaching mathematics. I am not confident I doubt I can be a good math teacher.
Roller-coaster	Early-stage	I love learning maths, but there are times when I do not like it. I do not want to be a teacher who fails to teach math. I want to learn more to improve my math skills.

At the presentation stage, we introduced the three types of teachers obtained through questionnaire distribution and in-depth interviews in the explanatory form. The analysis is carried out in the last stage, by paying attention to the results and discussion to obtain the conclusion.

RESULTS

The research results presented below are data obtained based on questionnaire analysis and interviews. Table 4 shows the percentages related to the teacher identity's description in implementing teaching and learning in terms of mathematics identity.

Table 4

Identification of mathematical identity based on a questionnaire

Mathematical Identity	Questionnaire Answers (#)	TP (4)	F (7)	RC (10)
The importance of mathematical knowledge	Mathematics is very useful for students because it will be used in their daily lives	100%	14%	30 %
	Compulsory subjects in Primary school so they must be taught		14%	30%
	It would be fun and easy to teach if you already understand		29%	30%
	Mathematics is difficult for me to teach students		43%	10%
Motivation	I like and enjoy teaching mathematics	100%		
	I like mathematics			20%
	Because it is a duty and obligation as a classroom teacher		71%	80%
Opportunity	If possible I want to avoid teaching mathematics		29%	
	I am interested in participating in activities to improve insight into mathematics such as teacher training	100%	29%	80%
	Doubtful because other teachers are more appropriate to attend training		71%	20%
Obstacles	Some mathematics material is still difficult to me understand		57%	30%
	Students who do not like mathematics so it is difficult to provide an understanding		43%	30%

	Some students still cannot basic arithmetic operations, for example, multiplication, and division	75%		20%
Strategy	Limited learning facilities from school	25%		20%
	Arrange the material taught by paying attention to the curriculum	75%		20%
	Taking material directly from textbooks		86%	40%
Ability	Explaining simply and using concrete media	25 %	14%	40%
	I am confident and able to compete with other teachers in understanding mathematics	75%		
	Hesitant and lack of confidence to compete with other teachers		29%	60%
	I am unable because I do not understand some material		57%	10%
	Not to compete but complement each other with other teachers	25%	14%	30%

Teacher's Mathematical Identity with Turning Point Types

After obtaining the teachers' mathematical identity classification, four out of 21 primary school teachers were included in the turning point type. Based on their answers, we found that 100% of turning point type teachers saw mathematics as something very important to students because it could be used in their daily lives. This was further confirmed through the interview process with T1 and T2, who had worked as a mathematics teacher in a primary school for four years. T2 conveyed that mathematics plays an important role and must be taught to students because it has become a definite principle that mathematics will be related to students' real-life context.

T2: "Mathematics is essential in my life. For example, in trading, buying, and selling, the activities will be lame without mathematical operations. Therefore, I considered that teaching mathematics to children is essential and vital. I want to see their happy expression when learning maths instead of fear. Teaching is not only a skilful responsibility to which I must pay attention."

T1 and T2 as a turning point teachers acquired poor experience when studying mathematics. T1 stated that he did not like to study mathematics at first. During his primary education, he enjoyed studying mathematics. Nevertheless, he began to hate studying mathematics when he was in middle and high school. It went on during his university studies. However, T1 stated that he started to like mathematics when he took Mathematics Education for Primary School. He stated: ‘I considered that mathematics could be taught by using fun and understandable approaches to learning. I tried to apply what I thought when I started to become a teacher. Yet, I needed to struggle in my first year to deal with students who did not like mathematics.’ Furthermore, T2 stated: ‘I do not want my students to see mathematics as a terrible subject in school that they need to avoid as I did, I needed to make an extra effort to be passionate about mathematics when studying.’

Participants T1 and T2 succeeded in changing their view of the importance of mathematics and their motivation, experiences, activities in learning mathematics both in college and when they started teaching mathematics in primary schools. Based on the questionnaire results, it was seen that 100% turning point teachers stated that teaching mathematics in elementary schools was because of something fun. This was confirmed through interviews with T1 and T2 participants.

T1: “I consider myself an interesting and fun-loving mathematics teacher.”

T2: “Teaching mathematics is not just a duty as a teacher, and I believe that I can teach because I have already acquired proper mathematical knowledge and abilities. I think I am a creative and fun-loving teacher.”

T1 used the word fun-loving and creative to define that teaching mathematics should be fun learning along with an innovative learning approach. Not to mention, he was confident with the abilities that they had: ‘I think I enjoy and I am confident to become a teacher after I got involved in Teacher Working Group in school and attended several seminars and workshops/training related to mathematics teaching-learning approach.’ The statement above indicates that T1 has experienced a turning point in becoming a teacher after attending seminars and workshops to improve teaching ability. Meanwhile, the questionnaire results showed that 100% of turning point teachers were interested in participating in activities to develop mathematics learning, such as teacher training. T1 and T2 also consider that:

T1: "I am a classroom teacher, I need to learn another subject such as Natural Science, Social Sciences, etc."

T2: "I am a classroom teacher that handles several subjects other than mathematics in the classroom, but I am sure that my capacity to teach mathematics is relatively above-average when compared to other primary school teachers."

T1 and T2 refused to be called mathematics specialist teachers in primary school. T2 believes that although he is a teacher who teaches mathematics, he can carry out teaching and learning, too. In terms of mathematics lesson delivery strategies, the two turning-point teachers believed that to convey mathematics theory and lesson, and they could employ manipulative instructional media, for instance, when delivering concepts related to Geometry. Besides, T1 stated: 'I compile lesson content by correlating it to the students' real-life context.' Meanwhile, T2 stated: 'When compiling a lesson content, I refer to the applied curriculum, textbooks, and other learning resources.' This is in line with the results found that 75% of turning point type teachers develop teaching strategies by paying attention to the existing curriculum, and 25% explain mathematics material in a way that is easy for students to understand by using manipulation media.

As many as 75% of teacher turning points stated, some students still cannot do basic arithmetic operations, such as multiplication and division, and 25% are constrained by limited learning facilities in schools. T2 illustrated that if the teachers want their students to understand math material, they should become fun-loving teachers. Furthermore, T2 explains that a good teacher is a teacher who can understand the conditions and characteristics of students; who can apply appropriate learning strategies in the classroom.

Turning point teachers agree that they do not hesitate to ask when encountering other teachers' issues or problems. The two turning point teachers described the aspects of teaching and learning as identified from the teachers' mathematical identity, which is illustrated by the word 'fun-loving'. The teacher started to enjoy the process of teaching and understood how important the mathematics subject is for children. The experiences the teachers obtained and the willingness to keep learning through the Teacher Working Group, workshops, and pieces of training in school, and sharing with other teachers, led them to be good teachers, teachers who consider teaching mathematics an essential subject for students, going beyond their duty only as a classroom teacher.

Teacher's Mathematical Identity with the Failing Types (Foreclosed)

Based on the questionnaire results, we can observe that only 14% of the failing type teachers stated that mathematics is something essential and useful in students' daily lives. Meanwhile, 43% stated that mathematics is a difficult thing for them to teach. It affects the motivation they have in learning and teaching mathematics. 71% stated that they taught mathematics because of their duties as classroom teachers, and 29% stated that they wanted to avoid teaching mathematics in class if possible. Besides, 57% stated that some mathematics material is still difficult to understand. We have then explored more deeply through the interview process with two teachers classified as failing (foreclosed) types as two failings (foreclosed) teachers, T3 and T4, in the subsequent discussion. T3 has worked as a primary school teacher for a year. In comparison, T4 has worked as a primary school teacher for 18 months or one year, six months to be precise.

T3 stated that mathematics is an easy subject to teach to the students when it involves frequent practices in solving mathematics problems. Besides, she said: 'I am not interested in mathematics, and I think teaching mathematics to students in primary school is my prominent role and duty.' She considered that it might be necessary for students' real-life, such as multiplication and addition. Nevertheless, T3 considered that not all could be understood, so she considered her less capable in mathematics.

T3: "I am not sure whether I will become a good teacher since each student will acquire the lesson content I deliver differently, and my approach in delivering may be incompatible. Besides, I could not understand all topics. If I am pretty sure and understand specific topics, I think I could teach my students well."

T3 indicated she was hesitant, doubtful about mathematics understanding since she was aware that she could not master specific topics. She found that it had been difficult since school, and it continued to the university level: 'I feel awkward when people know that I teach mathematics, and I feel a huge burden when teaching.' T3 had a displeasing and irritating experience when learning mathematics during high school back then. She started the first teaching experience during Preservice Supervised Teaching, and it was challenging to find out what learning strategy was suitable for students to understand the topics. T3 further explained:

T3: "I do not intend to avoid teaching mathematics if I understand the topics well. However, I admit that some topics are difficult to be understood and even taught, for instance, the topic of angle. I could not understand the school's topic of angle because the topic is too abstract to grasp. Even when I was in university, I could not understand it well. When I teach my students, and they cannot understand what I explained, I feel burdened."

Not much different from T3, T4 also considered that mathematics is a common subject, but it is essential for the students. T4 frequently dealt with hardship when studying. She regarded it difficult to understand: 'I am less capable of mastering mathematics topics. I am frequently confused, and it is difficult to master'. T4 regarded that is a common demand for a primary school teacher. Her skills in mathematics is the primary reason for her hesitancy in teaching mathematics:

T4: "i am hesitant in teaching mathematics since I am less capable of mastering mathematics. I did not like math since I was in primary school. Even though I knew some of the topics, I think I am not that good. I could learn some topics, but it takes me longer. I am afraid that my explanation during the teaching process is not understandable by the students."

T4 used the word 'less capable' when describing how good she is at mathematics. She expressed an uncomfortable feeling when hearing the mathematics subject and used the words 'hesitant, afraid, and less capable'. It further indicates that T4 had limited acquisition in mathematics subjects. She is also afraid that the students could not understand the explanation. Furthermore, she stated: 'I frequently attempted to make my students feel relaxed and unburdened when studying.' Besides, T4 regarded that the condition of students is one of the obstacles:

T4: "However, I was not sure about some students since they pay less attention in the classroom, and they are lazy when dealing with calculation, particularly division."

T3: "There are other teachers who are more capable."

T4: "I want to but am hesitant because my math skills are not sufficient if a teacher is accompanying me maybe I can."

Two failing (foreclosed) teachers describe teaching and learning mathematics in the classroom by remembering experiences while learning mathematics. They regarded that teaching mathematics is the only duty of a primary school teacher. Knowledge about mathematics topics acquired by the teacher plays a significant role in the teacher's lesson delivery. When the teacher understands the topics well, they will be confident in teaching. On the other hand, when the teacher does not understand the topics, they will be hesitant in teaching.

Teacher's Mathematical Identity with Roller-Coaster Types

Ten primary school teachers belong to the roller-coaster type. Questionnaire results showed that 30% of roller-coaster type teachers stated that students use mathematics in their daily lives, 30% stated that mathematics is a compulsory subject taught in primary schools. Furthermore, 80% agreed that teaching mathematics is part of their duties as teachers, and 20% stated that they like mathematics. Meanwhile, 80% also expressed interest in participating in activities to develop teaching and learning skills, especially in mathematics. There are still 60% of roller-coaster type teachers who are hesitant and lack the confidence to compete with another teacher. We then explored more deeply through the interview process with two teachers classified as the fifth and sixth teachers. T5 and T6 had one year of teaching experience. They are both included in the roller-coaster types.

T5 expressed the importance of mathematics as a subject that will be beneficial for the student's future. At the same time, for them, some material is favourable for the activity in the classrooms: 'Students need it for numerous aspects in the future, and it helps me to design some instructional strategy, for example when explaining probability concept and number operation, I could use games to convey the concept.' Furthermore, he expressed that he liked studying math when he was still a student: "I was good at math at school, going to college was just normal." The researchers then identified deeper into the statement that hobbies and time mismanagement while in college decreased his mathematical ability:

T5: "During college, my math skills decreased because I could not manage the time between studying, being active in the organisation, and playing. Thus, the mathematics concepts that I had to teach when I was a teacher were also not optimal."

Based on the statement mentioned above, T5 was going through a

relatively positive experience in studying mathematics. He was aware that he had acquired insufficient mathematics ability during the study, since he had little motivation. It continues up to these days: ‘After becoming a teacher, I find it difficult to manage my time; between studying and playing games.’ Meanwhile, it is different from T6, who had a negative learning experience during high school:

T6: “During my primary school, I loved and frequently obtained a good score. Meanwhile, during my high school, the teacher did not teach us well. We were only asked to read the textbook and did the practices without explaining the topics beforehand. When I asked about the topics I did not understand, instead of giving me a proper explanation, my teacher pointed out at my face and called me stupid because I could not understand.”

T6 went through a negative experience, which made her hate mathematics in the past. She stated: ‘After becoming a teacher and starting my teaching career, I tried to learn very well; I do not want to be a bad teacher as I experienced before. I chose to explain multiple times to my students to make them understand, instead of asking them only to read the book.’ The negative experience obtained enhanced her motivation to be a good and friendly teacher to the students:

T6: “I still want to be a teacher who can teach my students mathematics. I try to teach mathematics in a simple way and language so that it is easy for students to understand. For example, I am trying to introduce numbers and simple operations (addition) using cubes outside the class.”

The statement above indicates that T6 was aware of how vital studying mathematics is for students since it is always related to the number that the students will find in real life. Besides, T6 understood that before explaining to the students, the teacher needs to understand the lesson content and use any object found by students in real life to make them accessible to comprehend the lesson content. Furthermore, both teachers stated that it is essential to attend workshops and formative courses, and they are willing to share with the senior teachers. T6 regarded that workshops, formative courses, and sharing sessions could improve his teaching abilities. T5 also stated he wants to attend workshops or training related to mathematics teaching to become a better teacher. Two roller-coaster teachers said that teaching mathematics in primary

school is compulsory. The teacher must master the lesson contents and other subjects.

T5 illustrated the ability to master mathematics lesson content by using the word 'relatively capable' since he considered that the skill needs to be improved further: 'If I took it seriously, I could understand better the lesson content.' Moreover, T5 explained that during the teaching process, he remains paying attention to the textbooks and frequently give the students problems to solve and activates students' involvement in the classroom to make them understand and get used to calculate mathematical operations.

The mathematics teaching identity of the two roller-coaster teachers reflects on the experience of being a learner and teaching mathematics in primary school. They understand the importance of mathematics to make it easier for students to do mathematical operations. The difference appears in the motivation. T5 is little motivated, because he feels he is not mature enough to determine priorities between playing and learning both as a preservice teacher and after becoming a teacher, but still believes that one day he can become a primary school teacher who teaches mathematics well based on the current teaching approaches. Meanwhile, T6 is very motivated to be a friendly teacher and make the students happy when studying mathematics. The same thing arises from the desire to teach appropriately through training or discussions with the senior teachers.

FINDINGS AND DISCUSSIONS

This research explains the mathematics teaching identity of primary school teachers from understanding mathematics concepts that were acquired in teaching and learning. The results of questionnaires from 21 teachers and interviews with six teachers who were classified as the turning point, failing, and roller-coaster resulted in findings in the form of identity as follows: (a) hesitation in mathematics knowledge, (b) teaching mathematics because it is fun versus teaching mathematics because it is part of the primary teachers' duty, and (c) support for teaching mathematics.

The finding shows that primary teachers' identity in learning and teaching is hesitation in mathematics knowledge. This is illustrated by the failing and roller coaster teachers. Most teachers feel unsure of their mathematical skills because they depend on their teaching experience, which is still in the categories early-stage and novice. Jong (2016) states that beginner teachers in primary schools often experience difficulties in applying their

mathematical knowledge and skills in classroom learning, and the desire to learn is a factor that affects their identity and teaching practices in the classroom. Prospective primary school teachers have various kinds of fear of mathematics, including knowledge, lack of confidence in teaching, and the inability to involve their students due to limited teaching methods (Bates et al., 2013).

The results of the research by Drake et al. (2001) reported that roller coaster teachers in teaching practice are committed to providing a better experience when learning mathematics by continuously improving mathematical knowledge, looking for teaching patterns, and then reflecting on getting the right teaching strategy. This condition is illustrated by T6, who remembers the bad experiences with an unprofessional math teacher; thus, T6 always tries to make students comfortable when learning. Every individual has control over the behaviour he/she wants, both positive and negative, while the condition of a person who thinks about whether he/she will behave in the same way as others is known as subjective norms as a factor of behaviour (Ajzen, 1985). Black, Choudry, Pickard-Smith, and Williams (2019) stated that the feelings experienced by a person could be reflected at a later date; thus, emotional experiences in learning mathematics must be well preserved from an early age. Meanwhile, Pillen, Den Brok, and Beijaard (2013) stated that in starting a mathematics identity, teachers would experience several conditions, which includes a change in the role of students to become teachers, a sense of care for their students, and a desire always to improve the knowledge of mathematics understanding. The tension between personal matters and teacher professionalism in shaping identity can impact good or bad changes in carrying out the learning role even for its development as a professional teacher (Beijaard, 2019).

The following finding is teaching mathematics because it is fun versus part of primary school teachers' duty. This finding is supported by the perception of turning points to teachers fond of teaching mathematics. In contrast, other types of teachers only consider teaching as part of the classroom teacher's obligations. In addition to teachers having to understand concepts, identities such as learning and teaching motivation need to be explored; thus, teachers can achieve a situation in which they enjoy teaching mathematics (Hodgen, 2011). According to Hannula et al. (2016), interest is the most significant determinant of mathematics achievement, being one of the motivational factors that give rise to reasons for being involved in any teaching, including creating opportunities for success in mathematics. The research by Drake et al. (2001) show that turning point teachers experience changes

successfully to understand and enjoy mathematics and realise that students need help to face their fear. Meanwhile, teachers who see teaching as a task because they think that mathematics is complicated are failing teachers, and they want to avoid teaching mathematics, and, when they do so, they experience self-doubt and bring up traditional or conventional teaching styles, such as the teacher-centred style which only relies on the textbook (Ling et al., 2019).

The identity of teaching mathematics can be seen from a person's desire to become a mathematics teacher, including the opportunity to develop a different and positive perception of mathematics. These primary school teachers identify themselves as teachers who teach mathematics, not as mathematics teachers (Hodgen & Askew, 2007), and the mathematics identity of the teacher is only one of the many identities of the subjects taught, in contrast to mathematics teachers who may only have one identity (Hobbs, 2013). The last finding shows that primary school teachers need support (support for teaching mathematics). Therefore, a strategy is needed to develop their professionalism. Giving attention and guidance to teachers who have just started a teaching career will mean that they are not left behind by other teachers and have others to share their concerns in terms of both mathematical knowledge and the teaching strategies used (Leijen et al., 2009; Pillen et al., 2013).

Furthermore, Lutovac and Kaasila (2014) suggested using narrative identity to see changes in a person through contextual activities, teaching reflection, and connecting with personal experiences. This is in line with the opinion that identity narrative can be seen in group learning activities by involving a reflective process that continues to change as the learning process progresses (Hima et al., 2019). Besides, the identity that is reflected in the motivation to change classroom teaching and a better change into high-quality teaching mathematics can be carried out through the teacher's community group (Gresalfi & Cobb, 2011), and by using unique training methods, it assists the preservice teachers to construct mathematics identity so that they are well-prepared to teach (Freitas, 2008).

In this study, three types of teachers expressed self-confidence, optimism, and even the desire to avoid teaching and learning mathematics. Alderton (2020) also states that self-confidence and material and pedagogical skills are part of the process of transforming the identity of primary school teachers. The teacher described in this study is a fun-loving teacher, fair enough (failing and roller coaster), and can even find the proper strategy to make students understand the lesson content (turning point and roller coaster).

However, the study results by Putten et al. (2014) show that there is an inconsistency between the perceptions of preservice teachers regarding their identity and what is shown in classroom teaching practices.

CONCLUSIONS

The teaching and learning roles of primary school teachers in teaching mathematics are reflected in three identities, specifically: (a) hesitation in mathematics knowledge, (b) teaching mathematics because it is fun versus teaching mathematics because it is part of the duty of primary school teachers, and (c) support for teaching mathematics. Primary school teachers' hesitancy is reflected in their understanding of the mathematics topics and has an impact on students' fear of not being able to understand the lesson content because their strategy could be wrong. Meanwhile, the reason for teaching mathematics cannot be separated from the long experience of teaching. Besides, primary school teachers have one identity for teaching mathematics, but there is another teaching identity; thus, they perceive it as part of their obligations. Only turning point teachers convey a comfortable feeling and enjoy teaching mathematics. With these two identity conditions, primary school teachers feel they need support to teach mathematics well. This support can be in the form of community teacher groups or workshops/pieces of training and can be used to see changes in the identity of primary school teachers in implementing aspects of teaching and learning mathematics.

The limitations of this study should be addressed in further research. The first limitation is the collection of data that only used interviews and questionnaires. Thus, it cannot confirm the consistency of the identity described by the teacher. Therefore, the results of this study are used as initial data for further research. The research in question is a narrative of changing identity in understanding mathematics that primary school teachers have in carrying out their role as teaching and learning specialists during classroom practice. The second limitation is that the research focuses only on one of the three aspects of the mathematics teacher: teaching and learning specialists. Therefore, further research is needed on two other aspects, such as mathematics specialists teaching and caring aspects.

AUTHORSHIP CONTRIBUTION STATEMENTS

A.W. I. N. and E. P. conceived the presented idea, developed the theory, built the questionnaire, collected the data, and analysed the data. **D. K.**, and **S. O.** reviewed and approved the final version of the work.

DATA AVAILABILITY STATEMENT

The data presented and supporting this research results are available at a reasonable request to the first author, A.W.I.N.

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