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Exploration of physics teacher identity through life experience: A case study of science teacher with excellent achievement

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Abstract: This research aims to explore the construction of teacher identity through life experiences. Data were collected from observation, interviews, and document analysis. The subject of this study was TN (a pseudonym), who is a science teacher with an excellent academic background. The results of this research indicate that, from the perspective of discourse identity, TN is a teacher who emphasizes contextual learning and student-centered learning. Based on the perspective of nature identity, kinesthetic learning and her fondness for mathematics have had a major influence on her interest in physics. Meanwhile, from the perspective of affinity identity, family and role models greatly influence TN's beliefs about learning and her decision to have a career as a teacher. From the perspective of institutional identity, formal institutions have a negative impact on the construction of TN's identities, while informal institutions such as organizations have a positive influence on TN's physics interests and rhetorical skills.
Keywords: teacher identity; physics education; life experience

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Introduction

A teacher is a central figure in education that can determine the success of learning. Each teacher brings unique characteristics based on personal and professional experiences (Buchanan, 2015; Leeferink et al., 2019). These experiences affect the learning that will be carried out by the teacher. Kaplan & Garner (2018) explain that pre-service teachers tend to view knowledge of classroom management as something complex. Most of them are not confident in the credibility of their classroom management and feel very confused about their knowledge in this field. In contrast, experienced teachers tend to view their knowledge of classroom management as complex and flexible but also certain. In addition, most of them feel satisfied with the certainty of their knowledge. This shows that life experiences can shape their identity.

In the last two decades, teacher identity has become an important focus of research, especially in the field of education. This is evidenced by the many instruments related to teacher identity that have been developed (Hanna et al., 2019). Teacher identity is an awareness and understanding of being a teacher (Beijaard & Meijer, 2017; Hanna et al., 2020), which plays an important role in influencing teacher teaching practice (Keiler, 2018) and is closely related to Pedagogical Content Knowledge (PCK) teacher (Chen & Mensah, 2018).

Teacher identity is built based on the interaction of several factors such as personal, professional, historical, and cultural factors (Hanna et al., 2019) and develops at every stage of the career to become a physics teacher (Purwaningsih, Suryadi, & Munfaridah, 2020). This causes each individual to have a different teacher identity and is shaped by different factors. Thus, studying teacher identity as a process

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can be a starting point for change in teacher professional development as well as a teacher preparation program (Avraamidou, 2014).

Research that focuses on teacher identity has been conducted in various countries such as America (El Nagdi, Leammukda, & Roehrig, 2018; Badia & Iglesias, 2019; Chung-Parsons & Bailey, 2019; Maddamsetti, 2019), Australia (Nguyen, 2017; Nguyen & Yang, 2018), Turkey (Erdem, 2020; Goktepe & Kunt, 2020), Switzerland (Berger & Van, 2018), the Netherlands (Leeferink et al., 2019), China (Teng, 2017; Deng et al., 2018; Ye & Zhao, 2018), Malaysia (Tangen et al., 2017; Ilfiandra, Setiadi & Sumarto, 2019), and Indonesia (Purwaningsih, Suryadi & Munfaridah, 2020). However, in Indonesia, there are still very few who conduct research on teacher identity, especially physics teachers. Most research on teacher identity in Indonesia is conducted on language teachers (Lomi & Mbato, 2020; Mahendra, 2020; Upa & Mbato, 2020; Analisti, 2021).

Therefore, this study was conducted to overcome the gaps that have been found in the literature. This exploration of the physics teachers' identities needs to be carried out because it is an important part of developing teacher professionalism, which will also affect the quality of physics learning. Knowledge of the identity of physics teachers is important for physics educators, professional development experts, and policymakers in determining and making appropriate policies in order to develop teacher professionalism, so that they can become professional and competent teachers in the future.

The teacher identity conceptualization framework presented by Gee (2000) is used in this study to explore how teachers conceptualize themselves as physics teachers. Furthermore, they conceptualize identity into four components, namely nature identity, institutional identity, discourse identity, and affinity identity. Nature identity refers to a person's innate characteristics, institution identity refers to the influence of institutions, discourse identity refers to an individual's character seen through interactions with other people, while affinity identity refers to an identity influenced by affinity groups. Specifically, the purpose of this study is to explore how TN (a pseudonym) forms teacher identity through her life experiences.

Method

This research is a qualitative case study with the aim of exploring the construction of physics teacher identity through individual life experiences. The subject of this study was TN (a pseudonym), a science teacher who was selected using a purposive sampling technique. TN is 25 years old, and she is a novice science teacher with less than five years of teaching experience. TN was chosen as a subject of this study because she has an excellent academic background as described in the following descriptions: (1) a young science teacher who showed a positive attitude towards science, especially physics, (2) she is actively writing and publishing scientific papers, and (3) she has many achievements in science, especially physics, such as winning many olympiads as a student and being chosen as an accomplished college student at her university. In addition, the selection of this subject is based on the possibility of the individual being able to provide the most information related to the research purpose.

The data collection methods used in this research were observation, interviews, and analysis of documents such as the teacher's lesson plan and syllabus. The interviews in this research were open-ended and semi-structured based on the interview guidelines that had been prepared. Meanwhile, observation and analysis of documents such as lesson plans and syllabuses were carried out to enrich the data and cross-check teacher identity, which was found from the interview results.

The data obtained from the interviews were transcribed and grouped to obtain four themes or teacher identity perspectives as proposed by Gee (2000), namely (1) nature identity, (2) institution identity, (3) discourse identity, and (4) affinity identity. Statements on each of the same themes are compared again to find similarities and variations in these statements so that core categories are obtained that are independent of one another. Then the results of this analysis are interpreted to report the meaning of the case. Flow chart of the research design as shown in Figure 1.

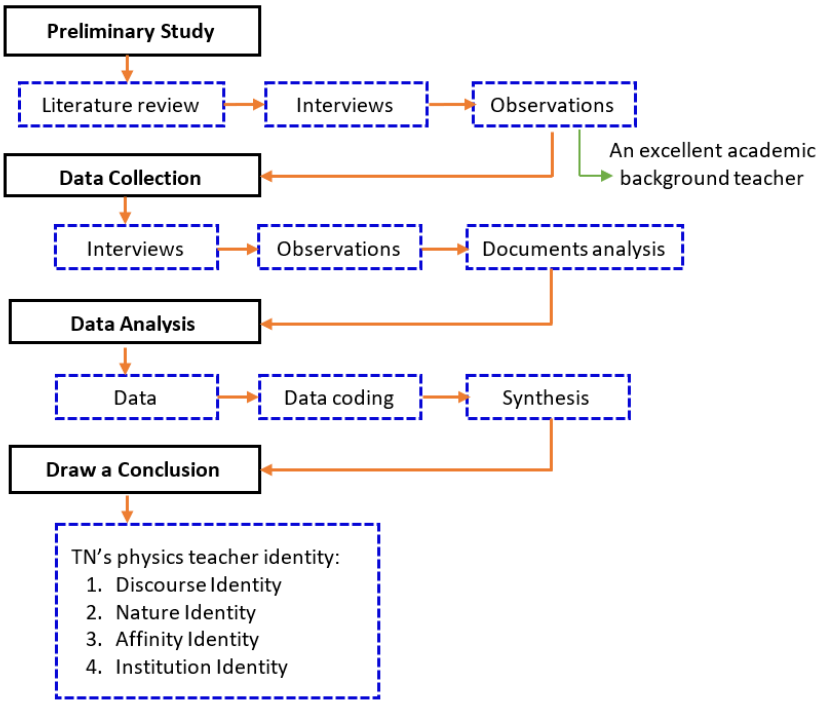

Figure 1. Research Design

Results and Discussion

Discourse Identity: Emphasizes Contextual Learning and Student Activeness

The discourse identity perspective shows TN's belief in physics and its learning, TN's teaching orientation, and TN's teaching practices. TN interprets physics as knowledge that must be learned not only mathematically but also the concepts that underlie it. TN emphasized that in physics, it is much more important to know how a formulation is obtained and becomes a formula. This TN belief also underlies TN's way of teaching physics. Until today, she taught physics by applying contextual learning, in which learning the topic of physics starts with the physical meaning or phenomenon, as she reveals in the following interview.

> *"But in terms of physics content, physics cannot be taught by simply showing the formula. Even now I'm still learning how to teach physics, starting from the physical meaning or starting from phenomena. So, we explain to the students what kind of phenomenon is happening, what the concept is like, and then derive it in the form of a formula."*

Contextual learning, like what TN is trying to implement, is very relevant to 21st century teaching to create meaningful learning (Asrizal, Desnita, & Darvina, 2020). When students only memorize mathematical equations without understanding the physical meaning underlying them, they will find it difficult to imagine the actual events that are working on an object. Therefore, by applying contextual learning, the teacher can associate the material being taught with real-world situations and encourage students to make connections between the knowledge they have and its application in their daily lives as members of the family and society (Dewi & Primayana, 2019; Desnita *et al.*, 2021). Thus, students' conceptual understanding will increase through contextual learning (Ariani & Yolanda, 2019; Hendawati *et al.*, 2019; Juniwati, Yusrizal & Khaldun, 2020).

TN's beliefs about learning are very much dominated by constructivism learning. She stated that learning must involve students actively. Based on the lesson plan analysis and interview results, the discussion method, especially the jigsaw learning model, seems to dominate the learning conducted by TN. TN believes the discussion method can make the learning atmosphere more fun and interactions between students more active. She also added that the jigsaw model can develop various aspects of student skills, such as working in groups, making projects, and presenting them to other friends. In general, the learning process carried out by TN is as follows: (1) Students observe videos or pictures

about Motion and Force displayed by the teacher and are given the opportunity to identify questions; (2) students are formed into several groups to discuss, gather information, and make projects regarding Motion and Force; (3) students present the results of group work and express their opinions; and (4) draw conclusions.

TN's statement is in line with the findings of Zuler *et al.* (2021), stating that the use of jigsaws affects aspects of students' knowledge, attitudes, and skills. This is because by applying the Jigsaw, students are given the opportunity to explore the physics concepts they are learning through sharing ideas between students, and besides that, they are also required to be tutors to their group mates (Kade, Degeng & Ali, 2019; Zuler *et al.*, 2021). However, the observation results show that TN still tends to dominate learning and has not been successful in making her students fully active. TN still provides many direct explanations during the lesson. This finding is in line with research conducted by Mansour (2013), which found that teachers with constructivist beliefs tend to be inconsistent in practice.

Another important finding reveals that TN actually agrees to apply inquiry learning in physics. According to TN, inquiry learning can help students build their own understanding. She added that learning is more meaningful when students are directly involved in the experience rather than being given information directly from the teacher. However, the application of inquiry learning in her class was hindered by the existing facilities and infrastructure at school. Thus, TN more often performs demonstration methods by utilizing existing tools as teaching aids. The following is TN's response when asked to explain further about his usual demonstration method.

However, this inquiry-based learning cannot be carried out in class due to the limited facilities and infrastructure in schools. Thus, TN often conducts demonstrations using the tools around them. TN's response when asked to explain further regarding the demonstration method she was using was as follows:

> *"...I use existing tools. For example, at that time, I once brought my students glasses and tubs from the kitchen to teach fluids. I made a bottle, and then I made a hole in that bottle to explain to them about hydrostatic pressure."*

Physics learning in class is consistent with TN's statement. He tried to do a simple demonstration when explaining the concept of Newton's Laws. Excerpts from field notes are as follows:

> *The teacher prepares a bottle that is placed on the paper and then asks two students to come forward. The first student is asked to pull the paper quickly and show that the bottle is still in its initial position. Meanwhile, the second student was asked to pull the paper slowly and show that the bottle was moving along with the paper. After all the students in the class have observed the demonstration, the teacher asks them to do the same at their desks.*

Such demonstrations are important for TN, especially in explaining concepts that are difficult to explain when we don't explain the context or the application in everyday life. So that by doing such demonstrations, it will be easier for students to imagine or visualize what will be explained afterwards. TN's statement is in accordance with what was stated by Kestin *et al.* (2020), that demonstrations can help students develop their conceptual understanding because they can illustrate physics principles that seem abstract and unrelated to the real world. It is important to create a picture of an event that will help students gain physical knowledge successfully through demonstration (Farmonov, 2020). Triayomi's (2019) research proved that students could provide an explanation of a concept well after seeing a demonstration of the concept. Furthermore, Kestin *et al.,* (2020) added that a successful demonstration could highlight and resolve students' misconceptions about physics.

As explained above, TN's beliefs affect the teaching practices she uses in class. This is in line with the results of previous studies, which show that teachers' beliefs are one of the factors that significantly influence teachers' actions and learning practices in the classroom (Gil-Flores, Rodríguez-Santero & Torres-Gordillo, 2017; Burke et al., 2018; Santos & Miguel, 2019; Willis et al., 2019).

Nature Identity: Kinesthetic Learning Style and Love of Mathematics

Nature's identity describes the character brought by TN. Based on the results of the interviews, it can be seen that TN enjoys learning physics through hands-on practice. This is proven when she is

asked about the most memorable and enjoyable learning experiences during school. TN's answers always lead to learning through hands-on practice. Here are some of TN's explanations about this:

> "The topic was sound; I still remember it very well. At home, I was taught the piano by my father's friend. Then at school, at that time, it was my father who taught science. At that time, he demonstrated various sounds, one of which was the sound of the piano. Then, at that time, I had already memorized one song, and then I was asked to come forward to play the piano in front of the class." Interview regarding the most memorable learning experience in elementary school.
>
> "So in the end, we were given a practicum module with tools such as statives, pendulums, and springs. Inside the module was written the mass used, the length of the spring before and after being given mass, and the change in spring length. After that, I was asked to make a graph, and it turned out that my graph at that time was really great." Interview regarding the most memorable learning experiences in junior high school.
>
> *"… at that time we were invited to do an equilibrium experiment. Since tools at my school were limited, there were no kits like that. So, at that time, the tools were made from long wood, and they were given string and masses. That really impressed me."* (Interview regarding the most memorable learning experiences in high school).

Her interest in learning through hands-on practice has made her a kinesthetic learner. She always tries to ask her students to do hands-on experience and practice during learning through simple demonstrations. This proves that TN's learning style influences the way she teaches physics material. She enjoys studying physics and feels that she can understand physics concepts better when learning through hands-on practice; therefore, she tends to apply and introduce the same learning method to her students in the hope that they can understand the material better. This result is in line with the findings of Chetty et al. (2019), which revealed that teachers create a learning environment depending on their own learning style. They added that there is a close relationship between teacher learning styles, student learning styles, and student achievement, in which student achievement will increase when the learning that is carried out matches their learning style. On the other hand, this learning experience also made TN realize the importance of knowing the learning styles of her students. So that she can adjust her teaching style based on student characteristics and learning styles in the hope that learning will be more meaningful to them through those activities. Thus, a good teacher must be able to develop a variety of ways to present the content they will teach and also treat each student as a unique individual without putting them into unfounded categories (Cuevas, 2015).

Another factor that forms TN's identity is her love for exact subjects, especially mathematics. TN has taken abacus lessons since elementary school, and she is often included in several math competitions. TN's explanation regarding her interest in mathematics is as follows:

> *"… I am interested in exact topics like mathematical calculations and so on, and in elementary school I was really interested in that. At that time, in grade 2, I was already taking arithmetic and abacus lessons, so even now I still apply what was taught at that time. From there, it kind of made me like math."*

Mathematics and science have a good correlation. So TN's love for mathematics also greatly influenced her interest in physics, which began to grow when she entered high school. When she was in elementary school, she wasn't really interested in science. But once she was in high school, she became interested in science, especially physics. She even attended extra science tutoring, and she also took part in various science and physics competitions. At that time, her interest in physics even made TN close to one of her teachers, as she stated in the following interview.

> "... Well, because I really like physics, if there was a topic that I didn't understand, I went to the physics teacher's room to ask her directly about it."

The explanation above shows that TN's love for mathematics paved the way for him to pursue physics. Research results by Archer, Moote, & MacLeod (2020) support this finding; they revealed that students who are in excellent physics classes tend to show a stronger interest in mathematics. This is one of the reasons that TN's love for mathematics makes it easier for him to learn physics. She is used to solving math problems, so she can easily solve physics problems too, especially those that require calculations. She just needs to learn more about the physical meaning and concepts of physics. This is because mathematics is closely related to physics. This is in line with the results of the research from

Palmgren & Rasa (2022), which showed that mathematics has an important and even inseparable role in physics and also in physics education. They add an explanation that mathematics is closely related to the formation of physics knowledge and that the role of mathematics cannot be separated from learning physics.

Affinity Identity: Family Roles and Role Models

Affinity Identity shows the relationship between TN and family and role models during school and how both affect TN's identity. Physics education is not TN's dream major. When she was still in high school, TN aspired to enter the medical department. But after trying many times and still failing, she finally decided to take the second option, majoring in education. TN stated that if she couldn't get into the medical department, then she would like to get into the education department. This was influenced by TN's family, of whom most were educators, thus motivating TN to become an educator as well. Excerpts from interviews related to this are as follows:

> *"... the majority of my family are teachers, so I was carried away. I liked it when I saw my uncle, aunt, and father as teachers. My brother is also a teacher. I think it's good to have students; someone greets you on the street like that …"*

Based on the explanation above, it can be concluded that the family has a major influence on TN's interest in becoming a teacher. Seeing the majority of her family work as teachers makes TN feel that teaching and having students are fun. This made TN want to experience the same thing. So, when she failed in her first choice of majors, she immediately made a choice in the education department. This finding is supported by Ralph & MacPhail (2015), who state that most teachers make their family a role model and even influence them in making the decision to become teachers.

In addition, TN's parents always gave her full freedom and support in choosing the career she wanted. Excerpts from interviews related to this are as follows:

> *"My parents gave me the freedom to choose any major as long as I was capable of it and it was good for me. They believed that I could do it because I always liked math. Their belief makes me confident."*

This made TN's confidence greater in making the decision to pursue a career as a physics teacher. This finding is consistent with Jemini-Gashi, Duraku, & Kelmendi (2021) research results, which show that individuals who receive more support from their parents show better career development and greater confidence in the decisions they make, whereas individuals who receive less support from their parents tend to show doubt in the career decisions they make.

The application of learning in the classroom also affects the relationship between teachers and students. TN's relationship with the teacher at her secondary school forms her teacher identity. TN stated that most of his middle school teachers taught using the teacher-centered method, but there was one teacher who he considered very helpful in her learning process. The teacher always writes down the important points of the topic being discussed; besides that, he also always teaches how to solve physics problems in a coherent way. This has influenced the way TN learns and teaches to this day.

> *"... It's like, for example, there is a problem solving that requires formulas. So that's the way to solve it: by writing down the quantities that are known first and then what is asked, which is very coherent. So until now, I have answered questions like that too. I learned all of that from middle school."*

TN's learning experience at the university also influenced the formation of her teacher identity. Since physics education was not her first choice, TN felt 'lost' when she was a first-year student. Even so, there were several lecturers who inspired TN and made her more enthusiastic about learning. One of them was a new lecturer who taught the course of "English for Physics". TN revealed that the lecturer introduced the jigsaw learning method, which she thought was very fun. TN was very inspired and even adopted the method used by the lecturer in her learning.

> *“... In the past, when I entered the new class, in 2014 there was a new lecturer named Mrs. X. The new lecturer usually used new methods. At that time I was new to the jigsaw model. Well, I think that was really impressive…”*

TN mentioned another lecturer whom she greatly admired when she attended his lessons. The lecturer did not explain mathematical formulas in physics, but instead emphasized contextual learning that related to phenomena in everyday life or even by giving examples right away. TN was impressed with the patients of the lecturer and how he always visualized the topics slowly.

> *"... I want to be like Mr. Y. His learning was really contextual and he could visualize slowly. I wanted to be like that when teaching physics."*

The previous explanation shows that role models greatly influence the way TN teaches. According to Purwaningsih, Suryadi, & Munfaridah (2020) the teacher as a role model contributes greatly to identity construction. Role models provide examples and are important motivators for teacher competency development (Howard *et al.*, 2021), as prospective teachers tend to adopt the teaching styles and practices they observe (Ellis, Alonzo, & Nguyen, 2020). When TN feels that the learning she experienced while at school and university was effective and helped her understand the subject matter, then she tends to adopt the same learning strategy in her own teaching in the future. This is in accordance with Taimalu & Luik (2019) which states that if teachers do not experience effective and meaningful learning, especially in the use of technology while at school, they will not see the relevance of this learning, especially regarding the use of technology in their own teaching in the future. That's why TN's admiration for her past teachers especially Mr. Y's learning has shaped TN's identity. Mr. Y tends to teach using contextual learning and this makes TN believe that a good way to teach physics should start from the physical meaning or phenomenon first, we can't teach physics by directly explaining the mathematical equation only. Therefore, TN always tries to implement contextual learning in her class. This is in line with research Moreau & Brownhill (2017) which stated that a person's teaching orientation is formed from his interactions with teachers and lecturers who taught him in the past.

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Institution Identity: The Role of Organizations and Schools

Institution identity describes how institutional authority influences the formation of TN's identity. In this section, TN's identity is influenced by the context of the organizations and the school where TN joined. The organization that TN joined while she was a student was very influential in the formation of her identity. Previously, it was explained that physics was not her first choice of major. When she was a first-year student, TN felt that she had not yet "felt" physics. Then, in the third semester, TN joined the Al-Qur'an Study Club (ASC) student organization. Through ASC, TN could deepen her knowledge of physics. She learned to write a lot here, so in the end she was motivated to write about physics. She even took part in scientific writing competitions several times.

> *"... the scientific writing competition actually brought me closer to physics. So I thought, oh yes, it turns out that studying physics doesn't only have to be about learning the formulas or being good at theory, but we can write about physics, which is also something that can lead us to get to know more about physics."*

Even though at that time TN was still felt 'lost' regarding her major, she always tried to get to know and get closer to her major. One of her efforts is to join the Physics Department Student (HMJ) organization. Being active in HMJ for two years made TN used to coordinating friends to make certain programs. TN learned a lot about how to interact with other people, communicate in front of many people, and coordinate with various people who have different characteristics. Thus, through HMJ, TN's rhetorical abilities also developed. In the end, this also influences the way TN teaches in class, especially how she deals with students who have different characteristics.

> *"... at HMJ, I met with lecturers, communicated with lecturers, met friends from the same major, or, for example, at ASC, I met lots of people. It has a lot of influence … learning how to interact with people, communicate, and coordinate, so it influences a lot when learning in class."*

Such informal learning experiences can contribute to the development of an individual's identity (Close, Conn, & Close, 2016; Wulff *et al.*, 2018). Suleiman, Hanafi, & Muhajir (2019) revealed that being active in organizations helps individuals develop self-discipline, creativity, and responsibility. When they hold an activity, they will work together and do it responsibly according to the task given. This is because organizational activities can provide opportunities to build positive relationships with peers and adults (Haghighat & Knifsend, 2019). As previously explained, TN felt closer to physics by writing in ASC while she gained many rhetorical skills that she did not get in college classes through HMJ. This is in line with the results of Purwaningsih, Suryadi, & Munfaridah's study (2020) which found that individual involvement in student organizations makes them more confident to speak in front of many people, which is very much needed for a teacher. Therefore, policy makers need to consider the involvement of formal and informal activities in preparing prospective physics teachers.

The last factor that plays a role in construction of TN's identity is the school where she works. Previously, it was explained that TN enjoys doing contextual learning and involving students in direct experience. However, she could not carry out learning optimally because the school did not provide sufficient experimental equipment.

> *"... due to limited tools, we don't have laboratory equipment at all and to access tools outside of that is difficult because school doesn't allow students to freely bring their own tools. So considering the limitations of the tools and facilities at this time I have never implemented inquiry in class. I have only ever asked students to look at the phenomena around them and correlate them with the topics to be discussed."*

This is in accordance with the results of research by Rafindadi (2016), which found that inadequate school infrastructure affects the learning process carried out by teachers. Even though the existence of a school laboratory has an important role in supporting the learning process, especially for science learning (Riswanto *et al.*, 2019). Furthermore, Siswanto & Hidayati (2020) found that the facilities and infrastructure provided and managed properly by schools can increase students' interest in learning and teacher enthusiasm in teaching in class. Adequate infrastructure makes learning more effective and efficient.

Structurally, TN has the position of homeroom teacher as well as laboratory manager in school. Being the homeroom teacher makes TN get to know her students more personally. She specifically revealed that she enjoyed being a homeroom teacher because she could really feel being an educator, not just a teacher. TN feels closer to her students, so she can understand the characteristics of each student and their way of learning better. Her position as homeroom teacher also forms TN's belief about teaching physics. TN believes that teaching must be done by paying attention to the characteristics of students.

> *"At least the teacher must know how the student's character is, so if we know their character, we can know how they learn, and we can adjust into it."*

So in practice, TN always tries to adjust her teaching strategies into the characteristics of her students. This is because, by becoming a homeroom teacher, she realizes that each student has different cognitive abilities. She understands that she cannot make all students to get excellent study results. On the contrary, by knowing each student's cognitive ability, she can pay more attention and help students with below average cognitive abilities. The teachers' understanding of their role in the learning process like this supports the development of their teacher identity (Andreasen, Bjørndal, & Kovač, 2019).

Conclusion

Based on the results of the research and discussion, it can be concluded that teacher identity is complex. From the perspective of discourse identity, TN is a teacher who emphasizes contextual learning as the best method for learning physics. She also believes that physics learning must involve students actively, even though in practice she still often dominates learning. Based on the perspective of nature identity, it can be seen that her kinesthetic learning style and interest in mathematics have a major influence on her interest in and learning of physics. Meanwhile, from the perspective of affinity identity, the people around TN are very influential in the formation of her identity. TN's family, most of whom work as educators, certainly provided considerable motivation for TN's decision to pursue a career as a teacher. Apart from that, the teaching style of the teachers and lecturers that she made role models also influenced TN's beliefs about learning physics as well as the learning strategies and methods that she has used until now. From the perspective of institutional identity, it can be seen that formal institutions have a negative impact on the formation of TN's identity. The school where she teaches has a negative impact by not providing adequate laboratory facilities. Meanwhile, informal institutions such as the ASC and HMJ organizations had a positive effect on TN's interest in physics and her rhetorical skills.

References

Analisti, D. (2021). Professional Identity Construction of an Indonesian English Teacher: A Narrative Inquiry. *Language-Edu*, 10(2).

Andreasen, J. K., Bjørndal, C. R., & Kovač, V. B. (2019). Being a Teacher and Teacher Educator: The Antecedents of Teacher Educator Identity Among Mentor Teachers. *Teaching and Teacher Education*, 85, 281-291.

Archer, L., Moote, J., & MacLeod, E. (2020). Learning that Physics is 'Not for Me': Pedagogic Work and the Cultivation of Habitus Among Advanced Level Physics Students. *Journal of the Learning Sciences*, 29(3), 347-384.

Ariani, T., & Yolanda, Y. (2019). Effectiveness of Physics Teaching Material Based on Contextual Static Fluid Material. *Kasuari: Physics Education Journal (KPEJ)*, 2(2), 70-81.

Asrizal, Desnita, & Darvina, Y. (2020) Need Analysis to Develop Electronic Enrichment Book of Physics Based on Contextual Teaching and Environmental Potential. In *Journal of Physics: Conference Series* (Vol.181, No. 1, p. 012123). IOP Publishing.

Avraamidou, L. (2014). Tracing a Beginning Elementary Teacher's Development of Identity for Science Teaching. *Journal of Teacher Education*, 65(3), 223-240.

Badia, A., & Iglesias, S. (2019). The Science Teacher Identity and the Use of Technology in The Classroom. *Journal of Science Education and Technology*, 28, 532-541.

Beijaard, D., & Meijer, P. C. (2017). Teacher identity development: On the role of the personal and professional in becoming a teacher. *Handbook of Research on Teacher Education. London, Washington DC: Sage Publishing.*

Berger, J. L., & Lê Van, K. (2019). Teacher professional identity as multidimensional: mapping its components and examining their associations with general pedagogical beliefs. *Educational Studies*, 45(2), 163-181.

Buchanan, R. (2015). Teacher identity and agency in an era of accountability. *Teachers and teaching,* 21(6), 700-719.

Burke, P. F., Schuck, S., Aubusson, P., Kearney, M., & Frischknecht, B. (2018). Exploring teacher pedagogy, stages of concern and accessibility as determinants of technology adoption. *Technology, Pedagogy and Education*, 27(2), 149-163.

Chen, J. L., & Mensah, F. M. (2018). Teaching contexts that influence elementary preservice teachers' teacher and science teacher identity development. *Journal of Science Teacher Education*, 29(5), 420-439.

Chetty, N. D. S., Handayani, L., Sahabudin, N. A., Ali, Z., Hamzah, N., Rahman, N. S. A., & Kasim, S. (2019). Learning Styles and Teaching Styles Determine Students' Academic Performances. *International Journal of Evaluation and Research in Education*, 8(4), 610-615.

Chung-Parsons, R., & Bailey, J. M. (2019). The hierarchical (not fluid) nature of preservice secondary science teachers' perceptions of their science teacher identity. *Teaching and Teacher Education*, 78, 39-48.

Close, E. W., Conn, J., & Close, H. G. (2016). Becoming physics people: Development of integrated physics identity through the Learning Assistant experience. *Physical Review Physics Education Research*, 12(1), 010109.

Cuevas, J. (2015). Is learning styles-based instruction effective? A comprehensive analysis of recent research on learning styles. *Theory and Research in Education*, *13*(3), 308-333.

Deng, L., Zhu, G., Li, G., Xu, Z., Rutter, A., & Rivera, H. (2018). Student teachers' emotions, dilemmas, and professional identity formation amid the teaching practicums. *The Asia-Pacific Education Researcher*, 27, 441-453.

Desnita, D., Putra, A., Hamida, S., Marsa, P. B., & Novisya, D. (2021). Quality Test of Student Worksheets Based on Contextual Teaching And Learning for Class XI High School Physics. *Jurnal Penelitian Pendidikan IPA*, 7(1), 92-101.

Dewi, P. Y., & Primayana, K. H. (2019). Effect of learning module with setting contextual teaching and learning to increase the understanding of concepts. *International Journal of Education and Learning*, 1(1), 19-26.

Ellis, N. J., Alonzo, D., & Nguyen, H. T. M. (2020). Elements of a quality pre-service teacher mentor: A literature review. *Teaching and Teacher Education*, 92, 103072.

Erdem, C. (2020, October). Exploring the relationships between possible selves and early teacher identity of Turkish pre-service teachers. In FIRE: *Forum for International Research in Education* (Vol. 6, No. 3, pp. 94-115).

Farmonov, U. (2020). Teaching of physics for students of natural direction with innovation technologies. *Journal of Physics and technology education*, (1).

Gee, J. P. (2000). Chapter 3: Identity as an analytic lens for research in education. *Review of research in education*, 25(1), 99-125.

Gil-Flores, J., Rodríguez-Santero, J., & Torres-Gordillo, J. J. (2017). Factors that explain the use of ICT in secondary-education classrooms: The role of teacher characteristics and school infrastructure. *Computers in Human Behavior*, 68, 441-449.

Goktepe, F. T., & Kunt, N. (2021). "I'll do it in my own class": novice language teacher identity construction in Turkey. *Asia Pacific Journal of Education*, 41(3), 472-487.

Haghighat, M. D., & Knifsend, C. A. (2019). The longitudinal influence of 10th grade extracurricular activity involvement: Implications for 12th grade academic practices and future educational attainment. *Journal of youth and adolescence*, 48, 609-619.

Hanna, F., Oostdam, R., Severiens, S. E., & Zijlstra, B. J. (2019). Domains of teacher identity: A review of quantitative measurement instruments. *Educational Research Review*, 27, 15-27.

Hanna, F., Oostdam, R., Severiens, S. E., & Zijlstra, B. J. (2020). Assessing the professional identity of primary student teachers: Design and validation of the Teacher Identity Measurement Scale. *Studies in Educational Evaluation*, 64, 100822.

Hendawati, Y., Pratomo, S., Suhaedah, S., Lestari, N. A., Ridwan, T., & Majid, N. W. A. (2019, October). Contextual teaching and learning of physics at elementary school. In *Journal of Physics: Conference Series* (Vol. 1318, No. 1, p. 012130). IOP Publishing.

Howard, S. K., Tondeur, J., Ma, J., & Yang, J. (2021). What to teach? Strategies for developing digital competency in preservice teacher training. *Computers & Education*, 165, 104149.

Ilfiandra, I., Setiadi, R., & Sumarto, S. (2019, July). The Comparison of professional identity of prospective teachers between UPI Indonesia and UPSI Malaysia. In *2nd International Conference on Educational Sciences (ICES 2018)* (pp. 83-89). Atlantis Press.

Jemini-Gashi, L., Duraku, Z. H., & Kelmendi, K. (2021). Associations between social support, career self-efficacy, and career indecision among youth. *Current Psychology*, 40, 4691-4697.

Juniwati, Yusrizal, & Khaldun, I. (2020, February). Influence of the contextual teaching and learning model against student learning outcome. In *Journal of Physics: Conference Series* (Vol. 1460, No. 1, p. 012128). IOP Publishing.

Kade, A., Degeng, I., & Ali, M. (2019). Effect of jigsaw strategy and learning style to conceptual understanding on senior high school students. *International Journal of Emerging Technologies in Learning (iJET)*, 14(19), 4-15.

Kaplan, A. and Garner, J. K. (2018) *Teacher Identity and Motivation: The Dynamic Systems Model of Role Identity*, *Springer International Publishing AG*.

Keiler, L. S. (2018). Teachers' roles and identities in student-centered classrooms. *International journal of STEM education*, 5, 1-20.

Kestin, G., Miller, K., McCarty, L. S., Callaghan, K., & Deslauriers, L. (2020). Comparing the effectiveness of online versus live lecture demonstrations. *Physical Review Physics Education Research, 16*(1), 013101.

Leeferink, H., Koopman, M., Beijaard, D., & Schellings, G. L. (2019). Overarching professional identity themes in student teacher workplace learning. *Teachers and Teaching, 25*(1), 69-89.

Lomi, A. N. K., & Mbato, C. L. (2020). Struggles and strategies in constructing professional identity: The first-year teaching experiences of Indonesian EFL novice teachers. *Journal of English Education and Teaching, 4*(1), 1-19.

Maddamsetti, J. (2020). Where all the good teachers are cape verdean Americans: A white teacher's identity positionings in an urban elementary school. *The Urban Review, 52*(1), 100-126.

Mahendra, A. W. (2020). Constructing Identity: Experiences of Indonesian ESP Teachers in a Language Institute. *English Language Teaching Educational Journal, 3*(3), 229-240.

Mansour, N. (2013). Consistencies and inconsistencies between science teachers' beliefs and practices. *International journal of science education, 35*(7), 1230-1275.

Moreau, M. P., & Brownhill, S. (2017). Teachers and educational policies: Negotiating discourses of male role modelling. *Teaching and Teacher Education, 67*, 370-377.

El Nagdi, M., Leammukda, F., & Roehrig, G. (2018). Developing identities of STEM teachers at emerging STEM schools. *International journal of STEM education, 5*, 1-13.

Nguyen, H. T. M., & Yang, H. (2018). Learning to become a teacher in Australia: A study of pre-service teachers' identity development. *The Australian Educational Researcher, 45*, 625-645.

Nguyen, M. H. (2017). Negotiating contradictions in developing teacher identity during the EAL practicum in Australia. *Asia-Pacific Journal of Teacher Education, 45*(4), 399-415.

Palmgren, E., & Rasa, T. (2022). Modelling Roles of Mathematics in Physics: Perspectives for Physics Education. *Science & Education*, 1-18.

Purwaningsih, E., Suryadi, A., & Munfaridah, N. (2020). " I Am a Rhetoric Physics Student-Teacher": Identity Construction of an Indonesian Physics Student-Teacher. *Eurasia Journal of Mathematics, Science and Technology Education, 16*(12).

Rafindadi, S. M. (2016). The Impact of Infrastructure on the Quality of Primary Education in Katsina Zone Katsina State, Nigeria. *International Journal of Research Development*, 10(1), 2141-1409.

Ralph, A. M., & MacPhail, A. (2015). Pre-service teachers' entry onto a physical education teacher education programme, and associated interests and dispositions. *European Physical Education Review, 21*(1), 51-65.

Riswanto, Suseno, N., Partono, Harjati, P., & Dedy, H. A. (2019). School Laboratory Management Information System. *Journal of Physics: Conference Series*, *1361*(1).

Santos, D., & Miguel, L. (2019). The Relationship between Teachers' Beliefs, Teachers' Behaviors, and Teachers' Professional Development: A Literature Review. *International Journal of Education and Practice, 7*(1), 10-18.

Siswanto, E., & Hidayati, D. (2020). Management indicators of good infrastructure facilities to improve school quality. *International Journal of Educational Management and Innovation, 1*(1), 69-81.

Suleiman, Y., Hanafi, Z., & Muhajir, T. (2019). Influence of Extracurricular Services on Students' Academic Achievement in Secondary Schools in Kwara State: A Qualitative Approach. *Indonesian Journal on Learning and Advanced Education (IJOLAE), 1*(2), 1-19.

Taimalu, M., & Luik, P. (2019). The impact of beliefs and knowledge on the integration of technology among teacher educators: A path analysis. *Teaching and teacher Education, 79*, 101-110.

Tangen, D., Henderson, D., Alford, J., Hepple, E., Alwi, A., Abu Hassan Shaari, Z., & Alwi, A. (2017). Shaping global teacher identity in a short-term mobility programme. *Asia-Pacific Journal of Teacher Education, 45*(1), 23-38.

Teng, F. (2017). Emotional development and construction of teacher identity: Narrative interactions about the pre-service teachers' practicum experiences. *Australian Journal of Teacher Education, 42*(11), 117-134.

Triayomi, R. (2019). The effect of interactive demonstration method on heat energy learning. *Journal of Physics: Conference Series*, *1282*(1).

Upa, Y., & Mbato, C. L. (2020). English Teacher Identity Construction: Indonesian Teachers' Motivation and Strategies in Teaching English for Special Needs Students. *PROJECT (Professional Journal of English Education), 3*(2), 311.

Willis, R. L., Lynch, D., Fradale, P., & Yeigh, T. (2019). Influences on Purposeful Implementation of ICT into the Classroom: An Exploratory Study of K-12 Teachers. *Education and Information Technologies, 24*, 63-77.

Wulff, P., Hazari, Z., Petersen, S., & Neumann, K. (2018). Engaging Young Women in Physics: An Intervention to Support Young Women's Physics Identity Development. *Physical Review Physics Education Research, 14*(2), 020113.

Ye, J., & Zhao, D. (2019). Developing Different Identity Trajectories: Lessons from the Chinese Teachers. *Teachers and Teaching, 25*(1), 34-53.

Zuler, A. D. M., & Darvina, Y. (2021). Meta-Analysis of the Effect of the Use Of Jigsaw Type Cooperative Model on Student Learning Outcomes in Learning Natural Science in Junior High School and Physics in Senior High School. *Pillar of Physics Education, 14*(2), 146-152.