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# Shaping Pre Service Teacher's Mental Model through Constructing Teaching Preparation and Practicing Performance

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***Abstract***
*Since this research aims to search on how the students' mental model are shaped before joining the real teaching practice field through constructing teaching tool preparation and doing teaching practice performance, so this research uses the result of lecturers' evaluation from both of them. The result of lecturers' evaluation is the main instrument that is analyzed as documentation. Moreover, the methods used in this research are quantitative and qualitative. The subject of this research is from Faculty of Pedagogy and psychology, PGRI Wiranegara University. The total numbers of students are 113 from 5 Education study programs in seventh semester. Based on the result analysis found that quantitatively and qualitatively the seventh semester students are success and ready to join the real teaching field. It can be seen from the result of analysis in constructing teaching tool preparation stated very bright in civic 95% and 5% very good, (economic) very bright 71% and 20% students are bright, and the rest are very good and almost good and very good, (English) very bright 51% and 49% are bright, (Indonesian) very bright 64% and 36% students are bright, (mathematics) very bright 92% and the rest is bright. It can be deduced that the process of shaping students' mental model are successful and students are ready to join the real teaching field in school.*

***Keywords: Perspective, Teacher's adaptation, Mental Model***

## INTRODUCTION

Students as human being have their uniqueness in grasping new knowledge. Each student has their own ways and styles which differ from one another. Moreover, lecturers in teaching and learning activities have to implement appropriate strategy, method and technique. They have to be taken since students have their difference characteristics in adopting knowledge. Thus, the result of teaching and learning are influenced by the internal uniqueness of students' learning styles that make the teaching activities stated effective or not. However, the individual self-concept, role of experience, readiness of students to learning and learning purposes lead to the achievement of itself-identity (Firmansyah et al., 2020; Rayanto, 2022; Wahyuddin, 2016). Conducting teaching and learning activities are uneasy since the preparation of it should be all set up well. This perspective suggests that teacher preparation program must provide numerous experiences to engage the pre-service teacher in investigating, thinking, planning, practicing, and reflecting. Numerous studies have yielded consistent findings on differences in the thoughts and instructional practices of expert and novice teachers (Borko & Livingston, 1989; Leinhardt, 1989; Livingston & Borko, 1990; Niess, 2005; Westerman, 1991). From a constructivist perspective, as novices, pre-service teachers' actions largely stem from an understanding based on having been taught in particular ways; with teacher preparation program experiences and instructional practice, their beliefs, knowledge, and thinking must mature.

Teachers' adaptation of instructional practices is a process of assimilation and accommodation that results in changes in their thinking (Schreiter & Ammon, 1989). The instructional practices preparations themselves are not only constructing the lesson plan, material of teaching, and media but also mental model. It has to be constructed well since mental model is a cognitive psychological aspect which is embodied internally from the individual itself. It is not provided from the outside of individual. Moreover, if individual creates mental model, it means creating something real. The creation itself as the reflection of individual knowledge as the prior knowledge obtained. As the representation of knowledge, mental model is formed in order to be able to convey new information easily, understandable or useful and reveal prediction (Ifenthaler, n.d.; Seel, 1991, 2004; Rayanto & Nurhayati, 2022). Thus, mental model as idiosyncrasy, and accommodative that mediate beyond of the world and subjectivity of knowledge. Mental model is the core pillar which must be attached to all lecturers or teachers before conducting teaching and learning activity. Mental model has strong impact to make the teaching activity success. Learning occurs actively on how to construct or form the meaningful mental representation from what to be conveyed and received as coherence mental model that presents and communicate subjective experience, ideas, thoughts, and intuitions. Besides that, each individual constructs mental model that explain the knowledge, enlarge, and reconstructing new knowledge. Moreover, the shaping of students' mental model can be stated as the main foundation that the students have to be obtained in order to be able to create meaningful teaching (Mayer et al., 1999; Seel, 1991; Seel et al., 1992).

Faculty pedagogy and psychology at PGRI Wiranegara University must create and graduate teachers' candidate. Afterward, before graduating the teachers' candidate, the students must follow 2 agenda they are; constructing teaching tool preparation and doing practice performance before joining the real teaching practice field in school. Constructing teaching tool preparation here, the students must be ready and expert in constructing and designing syllabus, lesson plan, material of teaching, media, evaluation determination and determining the proper strategy and technique. They have to be systematically designed and constructed well since they are used to show on how and what to be delivered and evaluated. (Rayanto &Nurhayati, 2022; Susanto, 2008). Meanwhile in doing practice performance, students must do teaching practice in front of their friends and lecturer. In this case, students must perform their skill in teaching practice, especially in implementing media, model, strategy, and technique. In other name, the students must implement all the things that they already set up well. Both, the readiness of constructing teaching tool preparation and doing practice teaching performance are the mental model shaped by the students themselves. Therefore, this research formulates research problem on how the students shape their mental model in constructing teaching tool preparation and doing teaching practice performance.

## RESEARCH METHODS

This research was conducted in Faculty of Pedagogy and Psychology at PGRI Wiranegara University, Pasuruan, East Java. The subject of this research was taken from each study program, whereas in English Education Study Program consisted of 27 students, Economic Education Study Program consisted of 32 students, Indonesian Education Study Program consisted of 25 students, Mathematic Education Study Program consisted of 28 students, and Civic Education Study Program consisted of 21 students. The total numbers of the student were 113. They were all from the seventh semester.

This research used a quantitative and qualitative research. In quantitative, this research counted all scores obtained when all students had already accomplished and submitted teaching tool preparation and doing teaching practice performance. Below was the rubric and formula of counting the score gained from learning analysis evaluation from teaching tool preparation and teaching practice performance, adopted from Guidance book of teaching practice PGRI Wiranegara University (2022);

**Table 1** Learning analysis of teaching preparation

| No. | Evaluation Aspects | Score | | | |
|---|---|---|---|---|---|
| | | **4** | **3** | **2** | **1** |
| 1 | Analysis on Lesson Plan | | | | |
| 2 | Analysis on Learning Material | | | | |
| 3 | Analysis on Learning Media | | | | |
| 4 | Analysis on Strategy used | | | | |
| 5 | Analysis on Evaluation items | | | | |
| | **Total score** | | | | |
| | **Average score =** $\frac{\textbf{total score}}{\textbf{x 100}}$ | | | | |

**Table 2** Teaching Practice Performance

| No. | Aspects of evaluation | Score | | | |
|---|---|---|---|---|---|
| **I** | **Opening Session** | **4** | **3** | **2** | **1** |
| 1. | Greeting, praying, and checking student's attendance | | | | |
| 2. | How to motivate students | | | | |
| 3. | Doing apperception | | | | |
| 4. | Delivering the objective of learning | | | | |
| 5. | Delivering the material that will be learned | | | | |
| **II** | **Core activity** | | | | |
| 1. | Delivering the material of learning clearly, and the concept properly, systematically and link the material with other relevant knowledge: | | | | |
| 2. | Connecting the material of learning to the real life | | | | |
| 3. | The model, strategy, and model are used to get involved of students in learning activity | | | | |
| 4. | Using proper and polite language in learning activity | | | | |
| 5. | Doing evaluation process and learning result | | | | |

| | | |
|---|---|---|
| **III** | **Closing Activity** | |
| 1. | Summing up the learning material and also giving feedback | |
| 2. | Doing reflection and continuity | |
| | **Total Score** | |

$$\textbf{average score} = \frac{\textbf{Total Score}}{\textbf{48}} \textbf{ x 100}$$

Meanwhile, in qualitative, this research described and explained the phenomenon occurred during teaching practice performance done by students. The instrument used in this research was documentation. Here, the researcher documented and calculated the score gained by students from the evaluators (lecturers), and did an interpretation based on the score given by evaluators (lecturers). Below was score scale adopted from guidance book of teaching practice in PGRI Wiranegara University (2022):

**Table 3** Score scale

| No. | Score scale 100 | Letter score | Amount | Criteria |
|---|---|---|---|---|
| 1 | 91 – 100 | A | 4,00 | Very Bright |
| 2 | 84 – 90 | A– | 3,70 | Bright |
| 3 | 77 – 83 | B+ | 3,30 | Very Good |
| 4 | 71 – 76 | B | 3,00 | Good |
| 5 | 66 – 70 | B– | 2,70 | Almost Good |
| 6 | 61 – 65 | C+ | 2,30 | More than enough |
| 7 | 55 – 60 | C | 2,00 | Enough |
| 8 | 41 – 54 | D | 1,00 | Less |
| 9 | 0 – 40 | E | 0 | Fail |

## RESULT AND DISCUSSION

This research finding is divided into two parts, they are; teaching preparation and teaching practice performance. As it has been mentioned earlier that teaching preparation means that the students must prepare their teaching tool preparation, they are; lesson plan, material, media, strategy, and evaluation items. These preparations must be constructed and submitted, and lecturers give score based on the scoring scale. Based on the final result of counting from the evaluators, the researchers make some interpretations. Here, researchers divide the final result of calculation based on the study program;

### Score Teaching Tools Preparation

**Table 4** Civic Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | |
| 91 | 91 | 91 | 92 | 92 | 92 | 94 | 93 | 92 | 94 | 83 | 95 | 94 | 93 | 94 | 94 | 95 | 94 | 94 | 91 | 94 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | |
| A | A | A | A | A | A | A | A | A | A | B+ | A | A | A | A | A | A | A | A | A | A |

**Table 5** Economic Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95 | 75 | 100 | 90 | 70 | 90 | 90 | 100 | 95 | 90 | 95 | 90 | 100 | 97 | 90 | 90 | 91 | 91 | 91 | 91 | 91 | 98 | 91 | 91 | 91 | 96 | 91 | 91 | 91 | 91 | 91 | 91 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B+ | A | A- | B- | A- | A- | A | A | A- | A | A- | A | A | A- | A- | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |

**Table 6** English Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | 90 | 92 | 92 | 92 | 89 | 94 | 90 | 94 | 94 | 86 | 88 | 92 | 84 | 88 | 86 | 84 | 91 | 84 | 88 | 84 | 92 | 92 | 91 | 94 | 85 | 92 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | A- | A | A | A | A- | A | A- | A | A | A- | A- | A | A- | A- | A- | A- | A | A- | A- | A- | A | A | A | A | A- | A |

**Table 7** Indonesian Education Language Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | 93 | 94 | 93 | 93 | 86 | 91 | 91 | 92 | 91 | 93 | 92 | 93 | 88 | 92 | 92 | 88 | 94 | 88 | 86 | 90 | 84 | 95 | 86 | 86 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | |
| A | A | A | A | A | A- | A | A | A | A | A | A | A | A- | A | A | A- | A | A- | A- | A- | A- | A | A- | A- |

**Table 8** Mathematics Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | 90 | 93 | 93 | 92 | 91 | 92 | 91 | 92 | 91 | 87 | 90 | 91 | 91 | 91 | 88 | 91 | 93 | 93 | 92 | 93 | 92 | 91 | 92 | 92 | 91 | 87 | 91 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | A- | A | A | A | A | A | A | A | A | A- | A- | A | A | A | A- | A | A | A | A | A | A | A | A | A | A | A- | A |

Based on the counting result of lecturers from what students did in teaching tools preparation, it is found that 95% of civic education study program can be stated very bright. There is only 1 student gets very good, that is student's number 11. In economic education study program found that 71% students are very bright, 20% students are bright, and the rest are very good and almost good. In English Education Study Program found that 51% students are very bright, and 49% are bright. In Indonesian Education Study Program found that 64% students are very bright, and 36% students are bright, and meanwhile in Mathematics Education Study program found that 92% students are very bright and the rest is bright. Clearly, below is the graphic of students' mental model in preparing teaching tools preparation before conducting teaching practice performance:

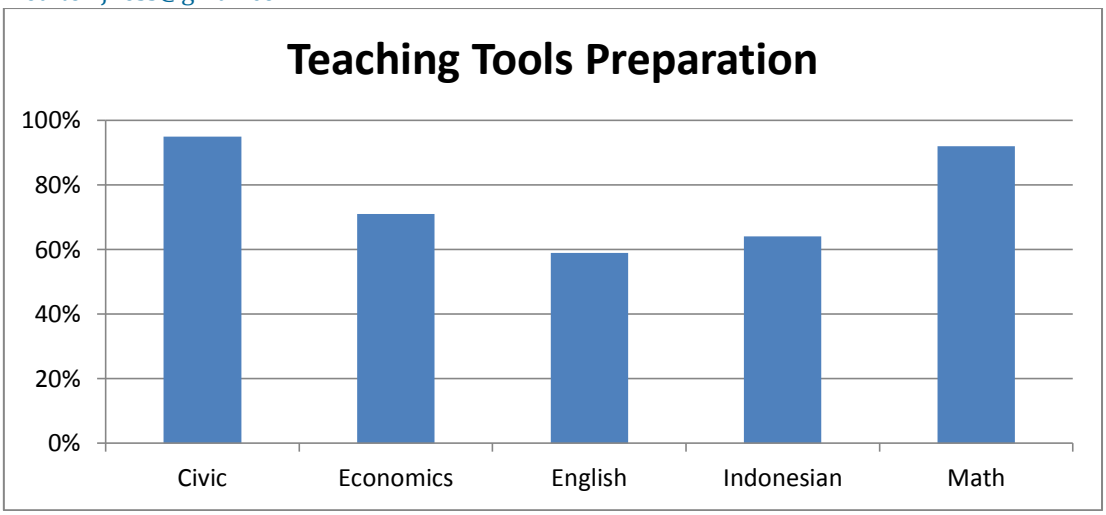


**Figure 1** Teaching Tool Preparation

## Score Teaching Practice Performance

**Table 9** Civic Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | |
| 91 | 90 | 92 | 92 | 92 | 92 | 92 | 92 | 91 | 92 | 83 | 95 | 94 | 95 | 94 | 95 | 94 | 95 | 95 | 92 | 95 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | |
| A | A | A | A | A | A | A | A | A | A | B+ | A | A | A | A | A | A | A | A | A | A |

**Table 10** Economic Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 80 | 100 | 100 | 90 | 90 | 90 | 95 | 90 | 90 | 90 | 88 | 100 | 96 | 95 | 90 | 90 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 | 91 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | B+ | A | A | A- | A- | A- | A | A- | A- | A- | A- | A | A | A | A- | A- | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |

**Table 11** English Education Study Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 82 | 85 | 85 | 85 | 78 | 92 | 90 | 92 | 92 | 82 | 82 | 88 | 82 | 82 | 80 | 78 | 91 | 86 | 89 | 84 | 91 | 95 | 95 | 92 | 94 | 86 | |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A- | B+ | A- | A- | A- | B+ | A | A- | A | A | B+ | A- | A- | B+ | B+ | B+ | B+ | A | A- | A- | A- | A | A | A | A | A | A- | |

**Table 12** Indonesian Language Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93 | 92 | 93 | 92 | 93 | 88 | 91 | 93 | 92 | 92 | 93 | 86 | 93 | 85 | 90 | 94 | 88 | 94 | 86 | 84 | 90 | 84 | 95 | 84 | 89 | |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | A | A | A | A | A- | A | A | A | A | A | A- | A | A- | A- | A | A- | A | A- | A- | A- | A- | A | A- | A- | |

**Table 13** Mathematics Program

| STUDENTS' NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| FINAL SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93 | 91 | 92 | 93 | 91 | 91 | 91 | 93 | 91 | 84 | 92 | 91 | 91 | 91 | 91 | 90 | 91 | 92 | 93 | 92 | 92 | 92 | 93 | 91 | 92 | 92 | 90 | 92 |
| LETTER SCORE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | A | A | A | A | A | A | A | A | A- | A | A | A | A | A | A- | A | A | A | A | A | A | A | A | A | A | A- | A |

Based on the table of students' score from teaching practice performance given by lecturers found that each study program have difference percentage score, they are; in civic education study program found that 95% students are very bright, and the rest is very good. Still, student's number 11 gets very good. In Economic Education study program, there is 68% students get very bright, 27% students get bright, and 5% gets very good. In English Education study program found that 33% students get very bright (9 students), 43% students are bright (11 students), and 24% students are very good (7 students). In Indonesian Education Study Program found that 56% student get very bright (14 students) and the rest get bright, that is 44% (11 students), and the last mathematics education study program found that 89% students get very bright and the rest (3 students) get 11% stated as bright. Obviously, it can be seen through the graphic below;

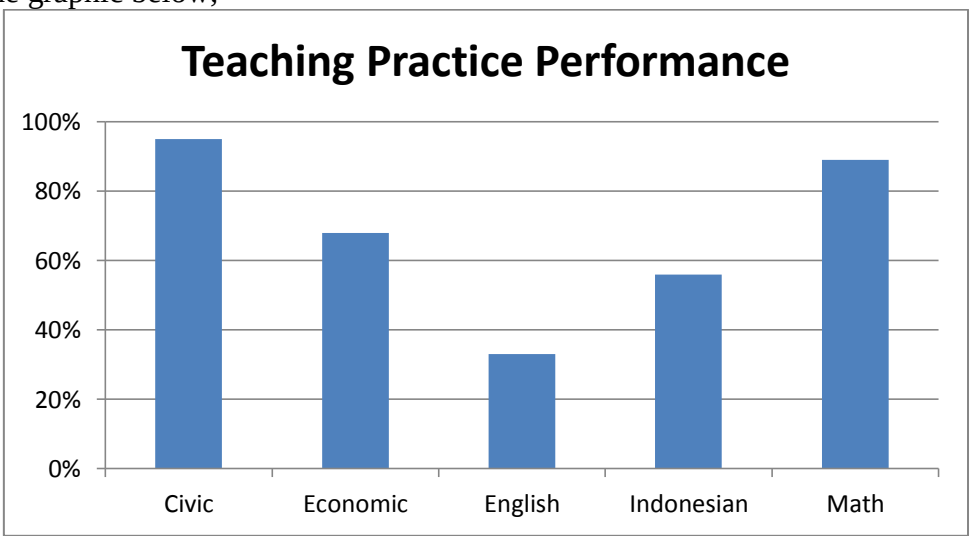


Figure 2 **Teaching Practice Performances**

**Interpretation result**

Both between the result of constructing teaching tool preparation and doing teaching practice performance through the result of an analysis found that there are similarities and different results. The similarity result is found in civic education study program in constructing teaching tool preparation and doing teaching practice performance is 95% very bright. Meanwhile different results are found in other study programs, they are; very bright in economic 71% are in constructing, and 68% in doing teaching practice, in English 51% are in constructing, and 33% in doing practice performance, in Indonesian education 64% in constructing, and 56% in doing teaching practice performance, and the last in Mathematics 92% in constructing, and 89% in doing teaching practice performance. From the result analysis found that first, there is consistence percentage found in civic education between constructing and doing teaching practice, second, there is descent percentage in doing practice teaching performance after students construct teaching tool preparation.

**Discussion**

Shaping students' mental model both in constructing teaching tools preparation and doing teaching practice performance must be prepared well not only by students themselves but

also the lecturers. The reflection of students' result in preparing both of them can be said as the result on how the lecturers (educators) convey their educating and teaching. Somehow, teaching is a complicated practice that requires an interweaving of many kinds of specialized knowledge. In this way, teaching is an example of an ill-structured discipline, requiring teachers to apply complex knowledge structures across different cases and contexts (Cox & Graham, 2009; Koehler et al., 2017; Spiro, 2012). Teachers practice their craft in highly complex, dynamic classroom contexts (Leinhardt & Greeno, 1986) that require them to constantly shift and evolve their understanding. Thus, effective teaching depends on flexible access to rich, well-organized, and integrated knowledge from different domains (Glaser, 1984; Putnam & Borko, 2000; Shulman, 1986, 1987), including knowledge of student thinking and learning; knowledge of subject matter; and increasingly, knowledge of technology. However, the uniqueness and different students' mental model in receiving and delivering instructional material should be realized well. Moreover, shaping students' mental model is not at glance, it needs much time to polish it well.

## CONCLUSION

Shaping students' mental does not come in a short time. It needs much time and special treatments since the students have their individual mental model and differ from one another. Based on the finding, the process of shaping students' mental in constructing teaching tool preparation and doing teaching practice performance by students and lecturers can be concluded very good and successful although there are different percentage results between the result of shaping in teaching tool preparation and doing practice performance and also the students are already ready to join the real field of teaching in school.

## REFERENCES

Arikunto, S. (2010). Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta: Rineka Cipta.

Borko, H., & Livingston, C. (1989). Cognition and improvisation: Differences in mathematics instruction by expert and novice teachers. *American Educational Research Journal*, *26*(4), 473–498.

Cox, S., & Graham, C. (2009). Using an elaborated model of the TPACK framework to amalyze and depict teacher knowledge. *TechTrends*, *53*(5), 60–69.

Firmansyah, M. B., Siswanto, W., & Priyatni, E. T. (2020). Multimodal Smartphone: Millennial Student Learning Style. *Test Engineering & Management*, *82*, 9535–9545.

Glaser, R. (1984). Education and thinking: The role of knowledge. *American Psychologist*, *39*(2), 93.

Ifenthaler, D. (n.d.). Pirnary-Dummer., Spector, JM (2008). Understanding Models for Learning and Instruction. *Blumschein, Patrick; Model Centered Learning and Instructional Design, Albert-Ludwigs-University, Freiburg, Germany*.

Koehler, M. J., Mishra, P., & Cain, W. (2017). What is Technological Pedagogical Content Knowledge (TPACK)? *Journal of Education*, *193*(3), 13–19. https://doi.org/10.1177/002205741319300303

Leinhardt, G. (1989). Math lessons: A contrast of novice and expert competence. *Journal for Research in Mathematics Education*, *20*(1), 52–75.

Leinhardt, G., & Greeno, J. G. (1986). The cognitive skill of teaching. *Journal of Educational Psychology*, *78*(2), 75.

Livingston, C., & Borko, H. (1990). High school mathematics review lessons: Expert-novice distinctions. *Journal for Research in Mathematics Education*, *21*(5), 372–387.

Mayer, R. E., Moreno, R., Boire, M., & Vagge, S. (1999). Maximizing constructivist learning from multimedia communications by minimizing cognitive load. *Journal of Educational Psychology*, *91*(4), 638.

Niess, M. L. (2005). Preparing teachers to teach science and mathematics with technology: Developing a technology pedagogical content knowledge. *Teaching and Teacher Education*, *21*(5), 509–523. https://doi.org/10.1016/j.tate.2005.03.006

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, *29*(1), 4–15.

Rayanto, Y. H. (2022). Investigating Student's Learning Style in Learning Activity during Blended Learning Class. *International Journal Of Humanities Education and Social Sciences (IJHESS)*, *2*(2).

Rayanto, Y.H.,& Nurhayati, Dies.(2021). Epistemologi Pembelajaran; CV Jejak, Jawa Barat

Schreiter, B., & Ammon, P. (1989). *Teachers' Thinking and Their Use of Reading Contracts.*

Seel, N. M. (1991). *Mentale modelle und weltwissen*. Göttingen: Hogrefe.

Seel, N. M. (2004). Model-centered learning environments: Theory, instructional design, and effects. In *Curriculum, plans, and processes in instructional design* (pp. 63–88). Routledge.

Seel, N. M., Dörr, G., & Dinter, F. R. (1992). Lernen im Medienverbund-Eine Untersuchung zum Erwerb neuen Wissens. *Unterrichtswissenschaft*, *20*(3), 275–288.

Shulman, L. S. (1986). Those Who Understand: Knowledge Growth in Teaching. *Educational Researcher*, *15*(2), 4–14. http://links.jstor.org/sici?sici=0013-189X%28198602%2915%3A2%3C4%3ATWUKGI%3E2.0.CO%3B2-X

Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the New Reform. In *Harvard Educational Review* (Vol. 57, Issue 01, pp. 4–14). https://doi.org/0017-8055/87/0200-0001s01.25/0

Spiro, R. J. (2012). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In *Cognition, education, and multimedia* (pp. 177–220). Routledge.

Susanto. (2008). *Assessing and teaching beginning readers*. Toronto: Toronto University Press.

Wahyuddin, W. (2016). GAYA BELAJAR MAHASISWA: Studi Lapangan di Program Pascasarjana IAIN SMH Banten. *Al Qalam*, *33*(1), 105–120.

Westerman, D. A. (1991). Expert and novice teacher decision making. *Journal of Teacher Education*, *42*(4), 292–305.