Domination Analysis of Influence between Educational and Professional Competency on the Performance of Prospective Mathematics Teachers in the School Field Introduction Program

Nyoman Sridana [1]**, Harry Soeprianto** [1]**, Amrullah** [1]**, Muhammad Turmuzi** [1]

[1] *University of Mataram*
Jl. Majapahit No 62 Mataram, Nusa Tenggara Barat, Indonesia

Abstract. This study aims to determine the dominance of the influence between educational and professional competencies on the performance of prospective teachers in the school field introduction program for students majoring in Mathematics, Faculty of Teacher Training and Education, University of Mataram. This type of research is associative research by taking quantitative data from the average value of student courses containing pedagogic competence, professional competence and the school field introduction program (PLP) value. The population in this study were students majoring in Mathematics, at the University of Mataram, with a purposeful sampling technique, namely student teacher candidates who had taken the School Field Introduction Program in the period 2019-2022 with a total of 15 students. Process and testing using Software Statistical Product and Service Solution (SPSS) version 25. The analysis tool uses multiple linear regression. The results showed that the absence of independent variables that had a dominating influence on the results of the performance scores of prospective teachers in the School Field Introduction Program (PPL) was marked by the results of the significance level of each independent variable being more than 5 %.

Keywords: pedagogic competence; professional competence; teacher candidate performance.

INTRODUCTION

The role of an educator in learning activities is intended to assist and facilitate students to obtain quality learning [1, 2]. This certainly shows that the learning process is the core of the activities in the school [3, 4]. The interaction between teachers and students in delivering each lesson is to take place optimally and can achieve learning objectives.

The learning objectives can be achieved optimally and are greatly influenced by a teacher's ability to create teaching and learning situations [5]. For this reason, every teacher must have high professional competence in carrying out their duties [6, 7, 8]. Teachers must have academic qualifications, competence, physical and mental health, and the ability to implement national education. Competence is a combination of knowledge, skills, values and attitudes reflected in the habits of thinking and acting [9, 10]. The competence of teachers as learning agents in primary and secondary education and early childhood education includes pedagogic competence, personality competence, social competence, and professional competence obtained through professional education.

Pedagogic competence (by the Law of the Republic of Indonesia No 14 of 2005 and Government Regulation No 19 of 2005) is the ability related to student understanding and managing educational and dialogical learning. Permendiknas No 16 of 2007, concerning Academic Qualification Standards and Teacher Competencies, explains that pedagogic competence includes several indicators:

1) mastering student characteristics from physical, moral, spiritual, social, cultural, emotional, and intellectual aspects;

2) mastering learning theory and teaching principles of learning;

3) develop a curriculum related to the subjects taught;

4) organize educational learning;

5) utilizing information and communication technology for learning purposes;

6) facilitating the development of students' potential to actualize their various potentials;

7) communicate effectively, empathically, and politely with students;

8) conducting assessments and evaluations of learning processes and outcomes;

9) utilize the results of the assessment and evaluation for the benefit of learning;

10) take reflective action to improve the quality of learning.

These ten indicators are translated into a grid which will then be described as statements or questions.

In addition to educational competence, mastery of teacher professional competence is thought to influence teacher quality in learning management [11].

Teacher professional competencies are related to expertise in education and teacher training [12]. Professional competence is a teacher's essential ability in learning and human behaviour, the field of study he guides, the right attitude about the teaching and learning environment, and special skills in teaching [13]. In the National Education Standards, the explanation of Article 28, paragraph 3 point c states that what is meant by professional competence is the ability to master learning materials broadly and sincerely, which allows guiding students to meet the competency standards set out in the National Education Standards. Permendiknas No 16 of 2007, concerning Academic Qualification Standards and Teacher Competencies, explains that professional competence includes indicators:

1) mastering the material, structure, concept, and scientific mindset that supports the subjects taught;

2) mastering competency standards and essential competencies of the subjects taught;

3) developing creatively guided learning materials;

4) sustainably develop professionalism by taking reflective actions;

5) utilizing information technology.

Various problems related to the condition of teachers include the following:

1) there is a diversity of teacher abilities in the learning process and mastery of knowledge;

2) there is no accurate measuring tool to determine the ability of teachers;

3) the guidance carried out does not reflect the needs;

4) inadequate teacher welfare.

If this is not addressed immediately, it will have an impact on the low quality of education, including:

1) the ability of students to absorb subjects is not optimal;

2) the character formation is less than perfect, reflected in each student's attitudes and life skills.

Because of these problems, it is necessary to have extensive preparation, especially preparing prospective teachers since the lecture period. Future teachers must be more creative and innovative in learning. Prospective teachers must also be trained in developing subjects from the competencies students must achieve when participating in the School Field Introduction Program. Also, prospective teachers must be prepared to integrate various skills (soft and hard skills) in each lesson. The competencies possessed by each future teacher will show their quality in teaching. All prospective teachers must keep these competencies, in this case, students who study majoring in education.

METHODS

This type of research is associative research by taking quantitative data from the average value of student learning courses containing pedagogic competence, professional competence and the value of the school field introduction program (PLP). The respondents in this study were students majoring in Mathematics at the University of Mataram, with a purpose-sampling sampling technique, namely prospective teacher students who have taken the School Field Introduction Program in the 2019-2022 period are 15 students. The data analysis technique used in this study is the multiple regression technique using the SPSS 21 application.

This study analyses the dominance of the influence between educational and professional competencies on the performance of prospective teachers in PLP in partner schools. The data analyzed came from the value of student courses containing Pedagogic Competence and Professional Competence, and PLP Assessment data consisting of the importance of PPL 1 (Microteaching on campus) courses and PPL 2 courses as the value of field experience practice in partner schools involving 15 prospective teachers as the research sample.

RESULTS AND DISCUSSION

The following tables summarizes the cumulative mean of the data for each variable to be analysed.

Table 1 − Average Cumulative Value of Pedagogic Competence (X1), Professional Competence (X2) and PLP Teacher Candidate Performance (Y)

NIM	Cumulative Mean X1	Category	Cumulative Mean X2	Category	Cumulative Mean Y	Category
E1R117021	2.69	Well	2.28	Pretty good	3.67	Very good
E1R018039	3.72	Very good	3.07	Well	4.00	Very good
E1R118027	3.04	Well	2.18	Pretty good	3.83	Very good
E1R018014	3.43	Very good	2.96	Well	3.83	Very good
E1R018029	3.35	Very good	2.69	Well	3.83	Very good
E1R018071	3.69	Very good	3.26	Very good	4.00	Very good
E1R018007	3.44	Very good	3.41	Very good	3.83	Very good
E1R018016	3.52	Very good	2.99	Well	4.00	Very good
E1R018043	3.80	Very good	3.54	Very good	3.67	Very good
E1R018053	3.67	Very good	3.46	Very good	4.00	Very good
E1R118010	3.22	Very good	1.93	Pretty good	3.83	Very good
E1R118014	3.37	Very good	2.25	Pretty good	3.83	Very good
E1R018012	3.76	Very good	3.75	Very good	4.00	Very good
E1R018058	3.59	Very good	3.38	Very good	3.67	Very good
E1R018059	3.22	Very good	2.27	Well	3.83	Very good
Average Value	3.43	Very good	2.89	Well	3.85	Very good

Notes: Category Likert Scale Student Cumulative Score: 0.8 < Cumulative Value < 1.6 − Not good; 1.6 < Cumulative Value < 2.4 − Pretty good; 2.4 < Cumulative Value < 3.2 − Well; 3.2 < Cumulative Value < 4 − Very good

The following are the results of the classical assumption test. The data consists of a normality test whose information is usually distributed. The multicollinearity test is in which the results of each variable do not mean any correlation between independent variables. The heteroscedasticity test shows that the independent variables of Pedagogic Competence and Professional Competence are not statistically significant, affecting the dependent variable.

Table 2 − Data on Normality Test Results of Student Values (One-Sample Kolmogorov-Smirnov Test)

		Unstandardized Residual
N		15
Normal Parameters, b	Mean	0.0000000
	Std. Deviation	0.10739164
Most Extreme Differences	Absolute	0.207
	Positive	0.119
	Negative	-0.207
Test Statistics		0.207
Asymp. Sig. (2-tailed)		0.084

Table 3 − Data of Multicollinearity Test Results of Student Values

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	β
Constant	2,353	2,528	
Pedagogic	1,735	1.056	0.708
Professional	0.407	0.546	0.321

Table 4 − Data on Student Scores of Heteroscedasticity Test Results

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	β
Constant	2,353	2,528	
Pedagogic	1,735	1.056	0.708
Professional	0.407	0.546	0.321

Multiple linear regression analysis was used to test the hypothesis of the effect of the independent variables (academic competence, professional competence) on the dependent variable (teacher candidate performance).

Table 5 – Multiple Regression Result Data

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	β
Constant	2,353	2,528	
Pedagogic	1,735	1.056	0.708
Professional	0.407	0.546	0.321

Based on Table 5, the resulting multiple linear regression equation for the model can be made the following equation (1):

*PLP= 2,353 + 1,735 Pedagogic Competence +
+0.407 Professional Competence + e* (1)

The meaning of the constant of 2.353 can explain the regression equation above. This means that if all independent variables (Pedagogic and Professional Competence) are worth 0, then the dependent variable (PLP) value is 2,353. The regression coefficient figure of 1.735 means that if Pedagogic Competence increases by 1 unit, then the PLP increases by 1.735 units assuming other independent variables are constant. The regression coefficient figure of 0.407 means that if Professional Competence increases by 1 unit, the PLP increases by 1.735 units assuming other independent variables are constant.

Table 6 – Simultaneous Test (f-test)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.051	2	0.025	1,884	0.194
	Residual	0.161	12	0.013		
	Total	0.212	14			

Based on Table 6 shows that the f-count is greater than the f-table (1.884 < 3.81) or a significance level of 0.194 is more significant than 0.05. It can be concluded that pedagogic and professional competences have no effect simultaneously on the performance of prospective teachers, which is proxies by the PLP.

The coefficient of determination test (R^2) is used to measure how far the model's competence is to explain the variation of the dependent variable. The greater the coefficient of determination, the greater the interpretation of the independent variable in defining the dependent variable. The

results of testing the coefficient of the decision can be seen in Table 6.

Table 7 – Coefficient of Determination Test Results

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.489	0.239	0.112	0.11600

Based on Table 7, it can be seen that the value of the coefficient of determination in the Adjusted R^2 column is 0.239, meaning that 23.9% of the performance of prospective teachers as proxied by the PLP is explained by the independent variable. The remaining 76.1% is explained by other variables not included in the regression model. The t-test aims to test Pedagogic Competence and Professional Competence partially affects teacher candidate performance which is reflected in the PLP Program Value or not.

Table 8 – t-test results

Model	Unstandardized Coefficients		Stand. Coef.	T	Sig.
	B	Std. Error	β		
Constant	2,353	2,528		0.931	0.370
Pedagogic	1,735	1.056	0.708	1,643	0.126
Professional	0.407	0.546	0.321	0.745	0.471

The partial test results in table 8 regarding Pedagogic Competence are obtained from t-count 1,643 with β of 1.735 and a significance level of 0.126.

The value of the t-count is smaller than the t-table, 1.643<2.179, and the significance value is more significant than 0.05. So pedagogic competence does not partially affect the formation of teacher candidate performance assessments proxied by the PLP.

In Professional Competence, obtained t-count 0.745 with β of 0.407 and a significance level of 0.471.

The value of the t-count is smaller than the t-table, which is 0.745 < 2.179, and the significance value is more significant than 0.05. So professional competence does not partially affect the formation of teacher candidate performance scores proxied by the value of the School Environment Introduction Program (PLP) student.

This study aimed to determine which variables were the most dominant between academic competence and professional competence in shaping the performance value of prospective teachers in the School Field Introduction (PLP) program. As is known, the most dominant variable is the most influencing variable in a model. Finding the results of the most dominant variables in this study can be seen by looking at the β-value in the regression model and from the most considerable t-count value by considering the significance level. The magnitude of the influence of the independent variable on the dependent variable is denoted by β and can be positive or negative. In addition, significant or insignificant also affects the choice of which variable is the most dominant.

Based on the results of the descriptive analysis in Table 1, the value of academic competence with an average value of 3.43 is in the excellent category, which is greater than the average value of professional competence, which is 2.89 (the suitable type). It is identified that academic competence with an average of the excellent category influences the performance results of prospective teachers in the value of the School Field Introduction Program (PLP). Their scores are included in the average type of very good. Likewise, Professional Competence with an average value of "a good" category where the value is lower than pedagogic competence. But is identified as likely to affect the performance assessment of prospective teachers in the school field introduction program (PLP).

PLP= 2,353 + 1,735 Pedagogic Competence
+ 0.407 Professional Competence + e   (2)

In this equation (2), the β of Pedagogic Competence is 1.735, which is greater than the β of Professional Competence, which is 0.407. However, the table also shows that the two variables have a significance level of P-value>5%, where pedagogic competence has a significance value of 0.708 and professional competence has a significance value of 0.321. It indicates that neither of the two variables can be said to be more dominant in influencing the performance of prospective teachers in the program. Introduction to the school

field (PLP), likewise, in the t-test in table 7. It can be seen that the variables of academic competence and professional competence cannot be said to be more dominant in influencing the performance of prospective teachers due to the significance level of p-value> 5%, even though the t-count value of the pedagogical competence variable is 1.643, which is greater than the t-count of professional competence of 0.745. Likewise, the data analysis found the results of the model's feasibility test of the coefficient of determination (R^2) of 23.9%. This shows that the contribution of the variables in this study is relatively small and insignificant in forming the value of the School Field Introduction Program (PLP) and indicates that there are contributions from other factors that affect the performance assessment of prospective teachers outside the variables tested.

CONCLUSIONS

Based on the results of testing and analysis in this study, several conclusions can be drawn, including.

1. The absence of a more dominant variable between the variables of academic competence and professional competence affects the results of the performance scores of prospective teachers in the School Field Introduction Program (PPL), marked by the results of the significance level of each independent variable being more than 5%.

2. It was found that the coefficient of determination (R^2) of 23.9%. This shows that the contribution of the variables in this study is relatively small in consideration of the formation of the performance value of prospective teachers in the field introduction program (PPL) and shows that there are contributions from other factors that affect the performance assessment of future teachers outside the variables tested.

3. The value of the influence of the independent variables (pedagogic competence and professional competence) does not significantly affect the performance assessment of prospective teachers in the School Field Introduction Program (PLP). This could be due to the School Field Introduction Program (PLP) evaluation during the COVID-19 pandemic.

REFERENCES

1. Gifari, A. (2019). *Optimalisasi hasil belajar peserta didik dengan menggunakan metode pembelajaran kooperatif Numbered Heads Together (NHT) pada mata pelajaran ipa di mi baeturridlwan Bandung* [Optimizing student learning outcomes using the numbered heads together (NHT) cooperative learning method in science subjects at Mi Baeturridlwan Bandung]. doi: 10.13140/RG.2.2.3493711369 (in Indonesian).

2. Suhirman, S. (2018). Pengelolaan sumber belajar dalam meningkatkan pemahaman peserta didik [Learning resource management in improving learners' understanding]. *Al Fitrah: Journal Of Early Childhood Islamic Education, 2*(1), 159. doi: 10.29300/alfitrah.v2i1.1513 (in Indonesian).

3. Hadi, H. (2020). Peranan Ingatan Serta Implikasinya Dalam Proses Pembelajaran [The Role of Memory and Its Implication in the Learning Process]. *Journal of Education Informatic Technology and Science, 2*(3), 45–54. doi: 10.37859/jeits.v2i3.1687 (in Indonesian).

4. Supriadi, S. (2017). Pemanfaatan sumber belajar dalam proses pembelajaran [Utilisation of learning resources in the learning process]. *Lantanida Journal, 3*(2), 127. doi: 10.22373/lj.v3i2.1654 (in Indonesian).

5. Effendi, V. K. (2020). *Upaya meningkatkan Kemampuan Guru dalam Proses Kegiatan Belajar Mengajar di SMAN 3 Batam Melalui Supervisi Akademik Tahun Pelajaran 2017/2018* [Efforts to Improve Teachers' Ability in the Process of Teaching and Learning Activities at SMAN 3 Batam through Academic Supervision in the 2017/2018 Academic Year]. Retrieved from https://independent.academia.edu/ViviEffendi (in Indonesian).

6. Anif, S. (2018). *Pengembangan Kompetensi Profesional Guru Mapel Biologi* [Professional Competency Development of Biology Subject Teachers]. Surakarta: Muhammadiyah University Pres (in Indonesian).

7. Nurhaidah, & Musa, M. I. (2016). Pengembangan kompetensi guru terhadap pelaksanaan tugas dalam mewujudkan tenaga guru yang profesional [Development of Teacher Competence on the Implementation of Tasks in Realizing Professional Teachers]. *Jurnal Pesona Dasar, 2*(4), 8–27 (in Indonesian).

8. Sulfemi, W. B. (2019). *Kompetensi Profesionalisme Guru Indonesia Dalam Menghadapi Mea* [Professionalism Competence of Indonesian Teachers in Facing Mea]. doi: 10.31227/osf.io/czxus (in Indonesian).

9. Al Fathoni, Abd. A. M. (2021). Model Fasilitasi Peningkatan Kompetensi Guru (Sebuah Gagasan Penelitian & Pengembangan Diri) [Teacher Competency Improvement Facilitation Model (A Research & Self-Development Idea)]. *Jurnal Literasiologi, 5*(1). doi: 10.47783/literasiologi.v5i1.172 (in Indonesian).

10. Matori, H. (2016). *Kontribusi Kompetensi Profesional, Kepuasan Kerja, Dan Motivasi Terhadap Kinerja Guru* [Contribution of Professional Competence, Job Satisfaction, and Motivation to Teacher Performance]. Retrieve from https://journal.walisongo.ac.id/index.php/wahana/article/download/354/323 (in Indonesian).

11. Helmi, J. (2015). Kompetensi profesionalisme guru [Teacher Professionalism Competence]. *Al-Islah, 7*(2), 319–336 (in Indonesian).

12. Jumiatun. (2018). Pengaruh Supervisi Akademik Pengawas Pai Dan Kegiatan Kelompok Kerja Guru (KKG) Terhadap Kompetensi Profesional Guru Pai Sd Di Wilayah I Kabupaten Rejang Lebong [The Effect of Academic Supervision of Islamic Education Supervisors and Teacher Working Group Activities (KKG) on the Professional Competence of Elementary Islamic Education Teachers in Region I]. *An-Nizom*, 119–127 (in Indonesian).

13. Idawati, K. (2019). Peningkatan Kinerja Guru Melalui Kompetensi Profesional Dan Kelompok Kerja Guru (KKG) Sekolah Dasar Negeri Gugus III Kecamatan Gunung Agung Tulang Bawang Barat [Improving Teacher Performance Through Professional Competence and Teacher Working Group (KKG) at State Elementary School Gugus III Gunung Agung Sub-district, West Tulang Bawang]. *Jurnal Lentera Pendidikan Pusat Penelitian LPPM UM METRO, 4*(2), 46–57 (in Indonesian).