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Professional teachers: Study of ICT capabilities and research competencies in urban and rural?

Syahrial Syahrial [*a], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/0000-0002-0919-146X

Dwi Agus Kurniawan [b], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/0000-0002-0130-2436

Asrial Asrial [c], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/0000-0003-3401-8092

Husni Sabil [d], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/0000-0002-8063-6687

Shella Maryani [e], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/0000-0002-5043-4830

Endah Febri Setiya Rini [f], Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia, https://orcid.org/ 0000-0002-4984-8577

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Abstract

This study aims to examine ICT competencies, research competencies, and teacher professionalism. The research method used is a mixed method.This study was conducted on urban and rural residents. The instruments used are teacher competency questionnaires, research competency questionnaires, questionnaires that measure teacher professionalism and interview instruments. Based on the results of data analysis, it is known that there is a relationship between teacher professionalism, ICT competence and research competence. This finding is that there is a relationship between ICT competence and research competence simultaneously on teacher professionalism.

Keywords: Profesional Teacher , ICT, Research Competencies, Urban, Rural

[*] ADDRESS OF CORRESPONDENCE: Syahrial Syahrial, Universitas Jambi, Faculty of Teacher Training and Education, Jambi, Indonesia

Email address: porigih@gmail.com

1. Introduction

1.1 Conceptual and Theoretical Framework

Education is an important aspect in the era of globalization which continues to develop according to the times. Education is currently called the era of education 4.0 which can encourage increased education in areas of interest as well as, learning media that are aligned with technology (Bonfield et al. 2020; Feldman 2018). This is followed by the industrial revolution 4.0 that uses artificial intelligence, robotics, the internet, energy storage, materials science and quantum computing (Anaelka 2018; Diwan 2017). In education 4.0 in their daily lives, humans and technology are aligned to create the latest innovations (Anaelka 2018). The existence of the linkage of technology in education shows that technology has an important role in education.

Education has an important relationship with technology. The rapid changes in education in the field of information and communication technology development have become the forerunner to the emergence of various interactive learning innovations (Billman et al., 2018; Nofaizzi et al., 2020). Advances in technology provide many advantages in accessing various information and being connected without limits, without being limited by space and time (Dabbagh, 2002; Du, X. et al., 2019; Farida et al., 2019; Chaeruman, 2020).To support interesting learning, teachers are required to adapt to the internet and future technology as a tool for delivering material (Ally, 2019; Nurdyansyah and Riananda, 2016). Teachers use technology to find solutions to meet the tools and skills they need in learning (Kola, 2017;Niiranen, 2021). Therefore, teachers are required to master ICT.

Information and Communication Technologies (ICT) is a terminology foundation for processing and conveying digital-based information which is very important to be applied in an education. Since the 1990s education and research has been directed towards the integration of ICT as a supporting tool in learning (van der Westhuizen, 2005; Jimoyiannis & Komis, 2007). For example, ICT in competency education for teachers described by national standards from KLH is an important contextual information and primary need as a good learning support tool (Brakels et al., 2002; Muhammad et al., 2011; Lim et al., 2015). Because we live in a digital era, information and communication technology (ICT) penetrates more and more areas of life with a an established technology infrastructure is useful for teachers in learning activities (Shah et al., 2020; Fraillon et al., 2019; Becker, 2021). However, in reality, not all teachers can apply ICT in learning. The causes of this delay include technical factors such as lack of technology and software in schools and limited skills of teachers regarding the use of ICT to other factors such as teacher knowledge about how to integrate ICT into teaching (Hsu & Sharma, 2008; Jedeskog, 2005; Nivala, 2009; Player-Koro, 2012). Therefore, the use of ICT is important to support the implementation of good learning which is a teacher competency that must be mastered.

As an educator, you need a skill to do work more effectively, which is called teacher competence. Teacher competence is a factor in determining the quality of education (Aishath and Omar 2021; Austin, Rickard, and Reilly 2017). Of course, this will have a positive influence on the development of students in understanding the subject matter and can make students think, behave and be creative when teachers can achieve their competencies (Herlina, Ahmad, and Wahidy 2020; Ruslan, Lian, and Fitria 2020). However, it will also have a negative value when the teacher does not have the knowledge or research competence (Udompong, Traiwichitkhun, and Wongwanich 2014). The learning environment will be more effective for students at school if the teacher has confidence (Devine, Fahie, and McGillicuddy 2013). Good learning ability by linking Research competence and ICT

ability can encourage professionalism by having teaching competence, collaborating and facilitating practice.

The dynamic and complex process of carrying out a role within the limits of the ability and value of educators is the professionalism of teachers (Sardabi, Biria, and Golestan 2018). Quality of students and the effectiveness of teachers will have an impact on the educational experience of students (Ismail et al. 2018; Zugelder et al. 2018). The process of learning activities, expert presenters of knowledge and skills that consider instructional objectives, student characteristics, class conditions, and methodological aspects are carried out with the professionalism of educators (de Paor 2019; Renani, Afghari, and Hadian 2019). It is systematically sustainable with the impact of student growth by ensuring every policy (Munyengabe et al. 2017; Yaakob et al. 2020; Zugelder et al. 2018). The professionalism teacher can be seen from the teacher's competence in carrying out learning activities by linking ICT competence and the ability of Research teachers.

1.2 Related Research

There is research that is relevant to the research to be carried out by the researcher. Among them is the research conducted by Willegems et al., (2016) on the role of teacher educators in developing teacher collaborative research teams. Similar research was also conducted by Alvunger & Wahlström (2018), the research includes research on teacher education based on the potential of teacher education in Sweden. Ibieta et al., (2017), conducted another study on the ability of teachers to learn the Internet in the practice of the teaching profession. Furthermore, research Mukhamadovna et al (2020) examines the urgency of forming the professionalism of primary school teachers for the future. And research Suhartini et al., (2021) examines the effect of professional competence and teacher competence in improving the quality of education in Langsa City.

Other research has also been linked by Unwin (2007), with the focus of research on Teacher Professionalism related to the ICT ability of teachers in universities, the findings state that teacher skills in ICT are needed in the implementation of teacher professionalism to support a good education system. Research Amirova et al., (2020), examines creative competencies and research competencies as professional factors for prospective teachers in the perspective of learning technology. Of these several studies, many examine ICT competencies, research competencies and professionalism. However, no one has discussed the three in one study, so the novelty of this study is to analyze teacher research abilities related to ICT skills and teacher professionalism in learning and how the three competencies differ when viewed from rural and urban schools.

1.3 Aims and research questions of the study

From the description above, several objectives of this study emerged, namely to determine the influence and differences between ICT competence, teacher research competence, and teacher professionalism in urban and rural areas. The questions posed in this study are as follows.

Is there an influence between ICT competence, teacher research competence, and teacher professionalism?

Is there a difference between ICT competence, teacher research competence, and teacher professionalism in rural schools and urban schools?

2. Method and Material

2.1. Research design

The method in this research is a mix-method using explanatory sequential which combines quantitative and qualitative research where in the first stage the research is carried out using quantitative methods and in the second stage is carried out using qualitative methods (Groleau et al., 2007; Kamid et al., 2021; Putri et al., 2021; McCrudden & McTigue, 2019; Maryani, Astalini, and Kurniawan 2022). In this study, it will be more focused on the results of quantitative data analysis, while qualitative data as supporting data in this study. Quantitative methods were used to obtain data on teacher research competencies, teachers' ICT abilities and teacher professionalism for teachers in rural and urban areas through the provision of questionnaires.

2.2. Participants

The population in this study were all elementary school teachers in urban and rural areas of Jambi City and Batanghari Regency. The sample in this study were elementary school teachers in urban areas who were elementary school teachers in the city of Jambi totaling 120 people, while the sample of elementary school teachers in rural areas was teachers in Batanghari amounting to 120 people who were taken using purposive sampling technique. In addition, the informants in this study were 6 informants consisting of 3 elementary school teachers in urban areas and 3 elementary school teachers in rural areas. Purposive sampling technique is a sampling technique based on the criteria and considerations of the researcher (Fitriani, Putri, et al., 2021; Setiya Rini et al., 2022). The reason for using the purposive sampling technique is that this technique is appropriate because the sample selection in this study is based on several criteria from the researcher.

2.3. Data collection tools

The instruments used a teacher competency questionnaire, a teacher ICT ability questionnaire and a questionnaire that measured teacher professionalism and was strengthened by interviews. The teacher professionalism questionnaire instrument consists of 23 statements with 4 Likert scales including never, sometimes, often and always. The teacher professionalism questionnaire instrument was valid at 0.807 and reliable with a reliability value of Cronbach's Alpha 0.811. The grid of teacher professionalism questionnaires is shown in the table below.

Table 1. The grid of teacher professionalism questionnaires

Indicator teacher professionalism questionnaire	**Number item**
The ability to master the material	1,2,3,4,5,6
Research ability and preparation of scientific papers	7,8,9,10,11
Professional development skills	12,13,14,15,16,17,18
Understanding of insight and educational foundation	19,20,21,22,23

The ICT questionnaire instrument consists of 26 statements with 4 Likert scales. The ICT questionnaire instrument was valid at 0.815 and reliable with a reliability value of Cronbach's Alpha

0.823. The grid of the ICT questionnaire in the form of computer technology, multimedia technology and telecommunications technology. The research questionnaire instrument consists of 26 statements with 4 Likert scales. The research questionnaire instrument was valid at 0.781 and reliable with a reliability value of Cronbach's Alpha 0.793. Furthermore, the instrument of teacher research competence, teacher ICT capabilities and teacher professionalism were distributed to teachers in Jambi City and teacher in Batanghari. The interview instrument was used to support the results of quantitative research that had been obtained by asking 5 questions as shown in table 8.

2.4. Data collection process

The procedure of this research starts from the selection of the population and research sample, namely teachers in Jambi Province which consists of 2 regions, namely Jambi and Batanghari cities.The sampling technique was done by purposive sampling. Purposive sampling technique is used to identify phenomena that occur in the city of Jambi and Batanghari (Darmaji et al., 2022; Palinkas, 2014; Setiya Rini et al., 2022). After the sample is obtained, then the data is collected through quantitative data and qualitative data. This quantitative data was obtained from the instrument of teacher research competency, teacher ICT ability and teacher professionalism. After the data is collected, then proceed with collecting qualitative interviews. This interview is important to do to strengthen the quantitative results in order to get more accurate results in this study.

2.5. Data Analysis

The data quantitatively analyzed using descriptive statistical testing and hypothesis testing in the form of Two Way Anova and Multiple Correlation tests. Descriptive statistical tests in the form of frequency, percentage, mode, mean, minimum value and maximum value which is equipped with a narrative explanation (Fitriani et al. 2021; Setiya Rini et al. 2021; Simamora et al. 2020). Furthermore, before testing the hypothesis, the data must be tested for assumptions, which are normality test, homogeneity test and linearity test (Darmaji et al. 2022; Kholilah et al. 2020; Setiya Rini 2020; Yolvianysah et al. 2021). Meanwhile, to test the hypothesis, correlation test was used to see the relationship between variebles in urban and rural areas. A Two Way ANOVA test was also carried out which was used to see the differences in the instrument of teacher competence Research, teacher ICT skills and teacher professionalism in the cities of Jambi and Batanghari (Matondang et al., 2021;Zhu et al, 2019; Masni, Ralmugiz, & RukMale, 2020). Acceptance of decision making to test the hypothesis if the significance value is below 0.05. Furthermore, qualitative data derived from interviews were analyzed using the Miles and Huberman method in the form of data reduction, data presentation and drawing conclusions (Miles and Huberman 1994; Setiya Rini, Darmaji, and Kurniawan 2022).

3. Result

Descriptive statistical results of teacher professionalism competence show in table 2.

Table 2. The Result of descriptive statistical teacher professionalism

Category	F	%	Mean	Mode	Min	Max	Teacher in School Area
Very Not Good	10	2%	70.5	62	65	76	Rural
Not Good	30	35.7%					
Good	68	52.3%					
Very Good	12	4%					
Very Not Good	5	1.4%					Urban
Not Good	10	3.6%					

Good	88	87%	81	87	70	92
Very Good	17	8%				

Table 2 shows that the professional competence of teachers living in rural areas is categorized as good with a percentage of 52.3% with an average of 70.5, then the second highest percentage is in the bad category of 35.7%. Furthermore, the professional competence of teachers living in urban areas is included in the good category with a percentage of 87% with an average of 81. The second highest percentage is categorized as very good at 8%. Then, descriptive statistical results of ICT Capabilities show in table 3.

Table 3. The Result of descriptive statistical teacher ICT Capabilities

Category	F	%	Mean	Mode	Min	Max	Teacher in School Area
Very Not Good	30	24%					
Not Good	35	25,6%					
Good	50	49%	60.5	60	53	68	Rural
Very Good	5	1,4%					
Very Not Good	2	1%					
Not Good	11	4%					
Good	92	90.2%	85	88	74	96	Urban
Very Good	15	4.8%					

Table 3 shows that the ICT Capabilities of teacher living in rural areas is categorized as good with a percentage of 49% with an average of 60.5, then the second highest percentage is in the bad category of 25.6%. Furthermore, the ICT Capabilities of teacher living in urban areas is included in the good category with an average of 85. The second highest percentage is categorized as very good at 4.8%. Then, descriptive statistical results of research competencies teachers show in table 4.

Table 4. The Result of descriptive statistical research competencies teachers

Category	F	%	Mean	Mode	Min	Max	Teacher in School Area
Very Not Good	20	15%					
Not Good	32	23%					
Good	58	59%	72	62	62	82	Rural
Very Good	10	3%					
Very Not Good	4	2.5%					
Not Good	15	6%					
Good	89	87%	82	84	70	94	Urban
Very Good	12	4.5 %					

Table 4 shows that the research competencies teachers living in rural areas is categorized as good with a percentage of 59% with an average of 72, then the second highest percentage is in the bad category of 23%. Furthermore, the research competencies teachers living in urban areas is included in the good category with an average of 82. The second highest percentage is categorized as not good at 6%.

Before testing the hypothesis, namely the ANOVA test and the correlation test, it is necessary to test the assumptions in normally, linearity, and homogeneous test. The data in the study have been confirmed to meet the assumption requirements so that the researchers continue to test the hypothesis, namely the Two Way ANOVA test. The differences in teacher competencies in Jambi City and Batanghari Regency are as follows.

Table 5. The Result of Two Way ANOVA Urban and Rural School

Urban			
Source	**Mean Square**	**F**	**Sig.**
Corrected Model	57,729	1,820	0.015
Intercept	367023,495	11571,944	0.000
Research	63,024	1,987	0.023
Ict	82,846	2,612	0.047
Research*Ict	48,485	1,529	0.023
A. R Squared = 0.952 (Adjusted R Squared = 0.429)			
Rural			
Source	**Mean Square**	**F**	**Sig.**
Corrected Model	42,315	3.017	0.41
Intercept	495566,241	35337,491	0.00
Research	32,312	2,304	0.049
Ict	66.855	4,767	0.035
Research*Ict	50.824	0.502	0.027
A. R Squared =0.897 (Adjusted R Squared = 0.753)			

Based on table 5, it explains the differences in ICT competencies, research competencies, and professionalism in urban and rural areas. When viewed in urban areas, the research significance is 0.023, meaning 0.023 < 0.05, so it can be concluded that there are differences in teacher professionalism based on teacher research competencies. Furthermore, the ICT significance value was 0.047, meaning 0.047 < 0.05, so it was concluded that there were differences in teacher professionalism based on teacher ICT competencies. Furthermore, a significance value of 0.023 was obtained, meaning 0.023 < 0.05, so it was concluded that there was an interaction between research competence and ICT competence in determining teacher professionalism. When viewed in rural areas, the significance of the research is 0.049. 0.049 < 0.05, so it can be concluded that there are differences in teacher professionalism based on teacher research competencies. Then obtained ICT significance of 0.035, which means 0.035 < 0. 05 so it can be concluded that there are differences in teacher professionalism based on teacher ICT competencies. Then, obtained a p-value of 0.027, which means 0.027 < 0.05 so it can be concluded that there is an interaction between teacher research and teacher ICT competence in determining teacher professionalism.

After conducting the Two Way Anova test, the researcher continued to conduct multiple correlation tests on urban school data to find out whether there was a relationship between the

variables of ICT competence, teacher research competence and teacher professionalism. The test results are obtained.

Table 6. The Result of Multiple Correlation Competency Teacher in Urban School

Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.995	0.991	0.991	0.714	0.991	6427,640	2	117	0.000
a. (Constant), professionalism, research									

Table 6 shows the results of the dual correlation of teacher competencies in urban schools where when viewed from the simultaneous contribution of the ICT competence variable and research competence to teacher professionalism, it is 0.991 x 100% = 99.1% and the remaining 100% - 99.1% = 0.9 % influenced by other variables outside the variables tested.

Next, the researcher continued to examine the multiple correlations regarding ICT competence, research competence and professional teachers in rural schools. The result is as follows.

Table 7. The Result of Multiple Correlation Teacher in Rural School

Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Change Statistics				
					R Square Change	F Change	Df1	Df2	Sig. F Change
1	0.985	0.970	0.970	1.326	0.970	1897,188	2	117	0.000
a. (Constant), professionalism, research									

Table 7 shows the results of the double correlation of teacher competencies in urban schools where when viewed from the R square value obtained a value of 0.970, which means that there is a relationship between ICT competence and research competence simultaneously on teacher professionalism. To examine more deeply the interviews were conducted, as for the results of the interviews as follows:

Table 8. Interview result

Question	Answer	
	Urban	**Rural**
"In your view, what is the general picture of the performance of educators and education staff at this school? So far, has the role of educators and education staff in supporting educational activities in schools been fulfilled?"	80% has been fulfilled, from the level of education that is in accordance with the profession, then the available infrastructure, as well as learning activities that are going well indicate that the school supports educational activities during the teaching and learning activities. The performance of educators and education staff has carried out a fairly good performance. During the learning process, the teacher has carried out	Not yet fully, such as in infrastructure that requires a good signal or computer network or the ability to use electronics is still difficult to do. However, for learning activities such as direct learning activities with nature or learning activities that should have been carried out well. But there are some constraints such as time and infrastructure that support activities to export materials more widely

	learning that is in accordance with the teacher's competence.	
Have you ever done learning by using a variety of learning media? If so, what kind of learning media are there?	Yes, as long as I teach. I always do learning media. Both print and electronic media. Usually by using an image attached to a cardboard or blackboard, then using a book, and sometimes I also use Infocus to show power-points, videos or other learning resources	Yes, every material I teach to children must use learning media. These learning media are of various kinds, either just pictures that are pasted in front of the class using a blackboard or poster, or directly exploring from nature. Sometimes I also teach with electronic teaching materials such as power points or videos
Have you ever reflected on the learning that has been carried out in the form of a questionnaire or questionnaire to students? If not why? If so, what are the results of the questionnaire used for?	There are some teachers who have done reflection and some have never done reflection using questionnaires or questionnaires. Some teachers who do not carry out reflection with a questionnaire/questionnaire because they usually reflect on learning to students based on their learning outcomes after evaluation. For teachers who have done reflection using questionnaires and interviews, the data is used to make an evaluation or make an article	Never, teachers do reflection on student learning outcomes. And see whether during the learning takes place students can listen well or not. Meanwhile, to see the responses from students, I usually just use a short interview.
So far, have you carried out research activities on students or research that covers the teaching environment?	Most of the teachers have conducted research on students related to school-related research on students, where this research helps the learning process to be more interesting and increase students' enthusiasm for learning.	Actually, this research activity is diverse, yes, research can be done through observation in class during learning or not. Of course, research activities have been carried out by each teacher indirectly. Some teachers have done it but only about one or two times, while in the near future no research activities have been carried out
In your opinion, is there a relationship between learning activities using teachers' ICT competence, teacher research abilities and teacher professionalism?	Yes, teacher competence can support teacher professionalism. With the competence that exists in the teacher, the professional level of the teacher becomes good. This is also closely related to the implementation of learning activities that can make students develop as well.	Yes, professional teachers certainly have broad ICT knowledge competencies and also have extensive research capabilities. Of course, all teacher competencies are also related to the implementation of learning activities. However, it does not mean that teachers who are old-fashioned to technology are not

	professional in generating learning activities that are able to make students understand the subject

4. Discussion

The focus of this research is to examine more deeply the differences in the competencies of teachers which include ICT competence, Research competence, and professionalism. Then, the researcher saw whether there was a relationship between the three variables. This research is supported Suhartini et al., (2021) shows that professionalism and competence have a positive effect on the quality of education. Further research Amirova et al., (2020), examines creative competencies and research competencies as professional factors of teacher candidates based on the perspective of learning technology. This shows that research on teacher competence is very important to study.

In the first step, researchers conducted descriptive statistical tests on teacher professionalism competence, teacher ICT skills and teacher research competence, both in rural and urban schools. Table 2 shows that the professional competence of teachers living in urban areas is better than rural areas is categorized as good with a percentage of 87% with an average of 81. Then, descriptive statistical results of ICT Capabilities in table 3 shows that the ICT Capabilities of teacher living in rural areas and urban areas is categorized as good with a percentage of 49% in rural areas and 90.2% in urban areas. Next, descriptive statistical results of research competencies of teachers shows that the research competencies of teachers living in rural areas are lower than research competencies of teachers living in urban areas but categorized as good with a percentage of 59%

The data in this study have been confirmed to be normal and homogeneous. So the researcher continued to do the ANOVA test between the three variables. Based on table 5, it explains the differences in ICT competencies, research competencies, and professionalism in urban and rural areas. When viewed in urban areas, it can be concluded that there are differences in teacher professionalism based on teacher research competencies. Furthermore, the ICT significance value is 0.047, it means that there are differences in teacher professionalism based on the teacher's ICT competence. Furthermore, the obtained significance value of 0.023 means that there is an interaction of research competence with ICT competence in determining teacher professionalism. When viewed in rural areas, The research significance obtained is 0.049, which means that there are differences in teacher professionalism based on teacher research competencies. Then obtained an ICT significance of 0.035, which means 0.035 there is a difference in teacher professionalism based on the teacher's ICT competence. Then obtained a p-value of 0.027, meaning that there is an interaction of teacher research competence with ICT competence of teachers in determining teacher professionalism.

After the researcher conducted the ANOVA test, the next researcher conducted a multiple correlation test to see if there was a relationship between the three teacher competency variables. Based on Table 6 shows the results of the multiple correlation of teacher competencies in urban schools where when viewed the R value obtained is 0.995, which means that there is a relationship between ICT competence and research competence simultaneously on teacher professionalism with a correlation coefficient of 0.991. While the simultaneous contribution of the ICT competence variable and research competence to teacher professionalism is 0.991 x 100% = 99.1% and the remaining 100% - 99.1% = 0.9% is influenced by other variables outside of the variables that are tested. Multiple correlation testing was also carried out in rural schools where table 7 shows the results of the double correlation of teacher competencies in urban schools where the R square obtained is 0.970, which

means that there is a simultaneous contribution of ICT competence and research competence on teacher professionalism with a coefficient of determination of 0.970 x 100 % = 97%.

The results of the interviews concluded that not all teachers have the same research abilities and ICT competencies, as well as the professionalism of teachers. However, in an interview with one of the teachers mentioned that “Teacher competence certainly has a close relationship with teacher professionalism in learning activities. However, it does not mean that teachers who are conservative on technology are not professional in generating learning activities that are able to make students understand the subject.Another opinion states that "professional teachers certainly have broad ICT knowledge competencies and also have extensive research capabilities. Of course, all teacher competencies are useful in learning activities. From the results of interviews with 6 samples consisting of 3 samples in rural areas and 3 samples in urban areas, it was stated that the ICT competence of teachers and the insight of teachers' research abilities had an effect on teacher professionalism.

Based on quantitative and qualitative research, it shows that teacher competence is the spearhead of students' understanding and implementation of teaching in schools. The main objective of the IT School initiative is to provide services and training to enable teachers to use ICT in teaching (Kristiawan 2019). Utilization of ICT is very important in supporting learning. In addition, teachers need to have research competence because lack of research competence can be the cause of the current decline in the authority of teachers (Ghavifekr and Rosdy 2015). Research competence is a very important aspect to develop the quality of teaching and learning. In addition, various competencies possessed by teachers can increase teacher professionalism and have a significant impact on student growth (Astutik and Roesminingsih 2021; Pahrudin, Martono, and Murtini 2016).

Research by Alvunger & Wahlström (2018), this study discusses the potential of teacher education in Sweden. Ibieta et al., (2017), conducted another study that touched on the ability of teachers to learn the Internet by teachers inside and outside the classroom. Furthermore, research by Mukhamadovna et al (2020) examines the urgency of forming teacher professionalism for the future. Research by Suhartini et al., (2021) examines the effect of professional competence and teacher competence. Research by Amirova et al., (2020), examines creative competence and research competence as teacher professional factors.

Of these several studies, many examine ICT competencies, research competencies and professionalism. However, no one has discussed the three in one study, so the novelty of this study is to analyze relationship teacher research abilities related to ICT skills and teacher professionalism in learning and how the three competencies differ when viewed from rural and urban schools.

5. Conclusion

The results of hypothesis testing show that there is a relationship between research competencies, ICT skills and teacher professionalism with a coefficient of determination of 99.1% in urban areas and 97% in rural areas. Furthermore, there are differences in ICT competencies, research competencies and teacher professionalism in urban and rural schools. These results are supported by the results of interviews with several teachers, namely teacher research competencies, ICT abilities and professionalism of each teacher which is certainly different, so that professional teachers certainly have good and broad ICT knowledge and research competencies.

6. Recommendation

This research is limited to a sample of low-grade elementary schools, so suggestions for further research are to research with the same topic, namely teacher research competencies, ICT skills

and teacher professionalism competencies at various levels of education. In addition, the researcher also recommends that future researchers examine innovations that can improve research competence, ICT capabilities and teacher professionalism in encouraging the teaching process in the classroom.

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