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Using the service quality instrument to assess the quality of the professional certification programme

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Abstract

The professional teacher certification programme is a programme that has been implemented online for both in-service teachers and pre-service teachers since 2019. The change in the pattern of implementing the professional teacher programme from offline to online will provide a different programme experience for teachers, participants and tutors. The aim of this research is to measure the quality of service provided to the professional teacher certification programme participants using the SERVQUAL instrument. The instrument used was developed and analysed using confirmatory factor analysis (CFA). Subjects involved were 354 teacher respondents. Data analysis was carried out by SmartPLS version 3. The CFA results show that the model has met the fit index. Convergent and discriminant validity meet the criteria. The CR ranges between 0.948 and 0.989 and CA ranges between 0.917 and 0.985. Finally, the level of service quality provided to the professional teacher certification programme participants at Universitas Negeri Yogyakarta is in the very high level category.

Keywords: Confirmatory factor analysis, service quality, professional teacher certification programme.

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1. Introduction

Professional programme is a professional certificate programme for educators and prospective educators organised by the Kementerian Pendidikan dan Kebudayaan Indonesia to improve the quality of education (Saptono et al., 2021). The goal is that educators and prospective educators have four competencies in terms of teaching in the 21st century: personality, pedagogic, social competence and professional competence (Meilia & Murdiana, 2019). Personality competence reflects the attitude of a teacher in acting mature, wise and authoritative and having morals, so that he is able to become a good figure for students (Kistoro et al., 2021). Pedagogic competence is the ability of teachers to understand the characteristics of students that affect the process of planning and implementing learning, developing student abilities and evaluating learning outcomes in actualising the potential that exists in children (Lumbantobing, 2020). Social competence shows the ability of a teacher to socialise in the community so that he becomes a role model for students (Taufan & Basalamah, 2021). Meanwhile, professional teachers are teachers who have the competence to understand learning material externally and deeply in schools. These four competencies are instilled in educators and prospective educators through the teacher PPG for two semesters.

PPG in Indonesia has been going on since 2005 until now. In the past, teacher professional education had to be taken for 1–2 years after prospective PPG participants graduated from undergraduate or non-graduate education programmes. Over time, teacher professional education aimed at two things: teachers who are included in in-service programmes and prospective teachers who are included in pre-service programmes. Participants who take part of the in-services PPG programme only need to undergo training for approximately 3 months. This is assessed because the participants already have experience as teachers in the field. However, for participants who are still fresh graduates, the implementation of the PPG programme still must be taken for 1 year. In addition to being able to master the four competencies that have been described earlier, the PPG programme is also expected to produce professional teachers by achieving three teacher education standards: teaching standards, research standards and community service standards (Singh et al., 2019).

During the COVID-19 pandemic, the implementation of PPG in-services and pre-services teachers was carried out through an online LMS. In the implementation of online-based PPG, the LMS system is divided into several implementation stages that must be completed by participants (Muntari et al., 2021): 1) introduction containing the orientation of PPG implementation to participants; 2) deepening of material which contains analysis of teaching materials in the field of study, preparation of teaching materials, analysis of pedagogic teaching materials and review of teaching materials; 3) lesson planning; 4) comprehensive exam; and 5) learning practice. The professional teacher certification programme implementation is carried out synchronously and asynchronously. The synchronous implementation aims to provide a deepening of the material and an explanation of the tasks that must be completed by the participants by involving the field supervisor and the civil servant teacher. Meanwhile, asynchronous implementation is carried out to fulfil tasks that must be completed by participants independently, including learning evaluation.

The implementation of the professional teacher certification programme for in-service teachers has led to many criticisms. Moreover, the average professional teacher certification programme participants are already quite old and find it difficult to operate the technological devices used.

According to previous research studies, there are three inhibiting factors in the implementation of the professional teacher certification programme (Lailatussaadah et al., 2020); the first factor is the inability to master information and technology; the second is the Internet network; and the third is the implementation time and the commitment built between participants, supervisors and tutors. It takes hard work for educational institutions and education personnel who are the organisers of professional teacher certification programme to continue to provide the best service amidst the limited ability of PPG participants in online positions.

Universitas Negeri Yogyakarta (also known as UNY) is one of the educational institutions and education personnel in Indonesia trusted by the government to implement the PPG online. For the last 2 years, UNY has received an award as the best PPG organiser in Indonesia. Based on this, the researchers here are trying to explore how much satisfaction the professional teacher certification programme participants in positions provide to the services provided by administrators, supervisors and tutors during its implementation. Researchers used the SERVQUAL instrument which for decades was believed to be the right instrument in measuring participant satisfaction with the services provided by the programme.

The SERVQUAL instrument has gone through many processes of refinement since it was developed for more than 30 years. The instrument has been considered by several previous researchers to be able to effectively measure customer satisfaction and increase one's intentions in an industry or other field (Cuthbert, 1996), including education and culinary (Olorunniwo et al., 2006). The SERVQUAL instrument consists of four dimensions using a Likert scale of 1–5, namely 1) tangibility, which includes several things regarding a person's satisfaction with resources, financing and infrastructure that support the programme; 2) reliability, which reflects one's satisfaction with the promises offered by the programme organisers appropriately and accurately; 3) responsiveness, which means a person's satisfaction with the services provided by the programme organisers is quickly related to the problems faced; 4) assurance, which means someone's trust in the services provided by the programme organiser so as to ensure that users have chosen the best organisers; and 5) empathy, which means a person's satisfaction with the attention given personally to service users when facing problems while participating in service programmes.

SERVQUAL has been used to measure student satisfaction with educational services provided by educational institutions by Stodnick and Roger (2008). A total of three of the five dimensions used (reliability, responsiveness and empathy) resulted in significant values (Stodnick & Rogers, 2008). This shows that the SERVQUAL instrument can be used as a form of evaluation of the educational services provided by the school, be it teacher services to students, academic staff services to students or school principals to students. In this study, the instrument developed by Stodnick and Roger (2008) was used to measure the satisfaction of participants in the online teacher professionalism programme at Yogyakarta State University. Research questions that arise regarding service satisfaction provided by the organisers of the professional teacher certification programme include the following:

1. Can the SERVQUAL instrument be used to measure the service quality of the teacher professional certification programme at Yogyakarta State University?
2. What are the main constructs of the factors that are formed in measuring the service quality of the online teacher professional certification programme at Yogyakarta State University?

3. How is the level of satisfaction of participants with the implementation of the teacher professional certification programme as a whole?

2. Method

2.1. Instrument construction

The SERVQUAL instrument was developed using existing principles by modifying several things related to the online teacher professional certification programme so that the results are more comprehensive. In this study, researchers replaced the 'tangibility' dimension with 'LMS content' to be able to describe the implementation of the programme carried out online using a website-based application (Cao et al., 2005; Santos, 2003). The model formed can be seen in Figure 1. The dimensions involved and the resulting variables from each dimension are presented in Table 2. An example of the dimensions of this research is 'satisfaction'; in this case, the measured variable is 'I feel that the implementation of the teacher certification programme professional event organised by Yogyakarta State University online which has ended is very meaningful to me'.

Table 1. Research hypothesis

Hypothesis	Number of items	Dimensions
H1–H4	17	Responsiveness, assurance, empathy and reliability
H5	8	LMS content
H6	7	Quality learning and satisfaction

If seen in Table 1, four of the five dimensions of SERVQUAL are used (Stodnick & Rogers, 2008) to produce several research hypotheses as follows:

H1. The assurance dimension has a significant influence on the quality of the online teacher certification programme implementation.

H2. The empathy dimension has a significant influence on the quality of the online teacher certification programme implementation.

H3. The responsiveness dimension has a significant influence on the quality of the online teacher certification programme implementation.

H4. The reliability dimension has a significant influence on the quality of the online teacher certification programme implementation.

Meanwhile, the dimension of 'LMS content' is defined as a form of presentation and layout of information on the material provided in the online programme implementation, for example, student attendance and material on teacher competence. Based on previous research, 'LMS content' is able to influence the quality of the implementation of online teacher certification programmes (Udo &

Marquis, 2002). The indicators in measuring the quality of 'LMS content' include 1) the quality of information system; 2) the suitability of the material presented and the media displayed (video or audio); 3) the link for presenting learning outcomes; 4) the size and type of images; and 5) the overall attractiveness of the LMS.

Several studies have shown that image, sound, video and graphics can be used to add material appeal and influence the quality of LMS content (Koernig, 2003; Liu & Arnett, 2000; Montoya-Weiss et al., 2003; Nitse et al., 2004). Sun et al. (2008) identified six dimensions of LMS service quality, with four of them being content based: (1) website substance; (2) content accuracy; (3) aesthetics, which includes site attractiveness; and (4) pictures and graphs (Sun et al., 2008). Based on the results of the research by Koernig (2003), it is stated that the attractive 'LMS content' dimension can increase participants' satisfaction with the online services they participate in, thereby increasing the understanding of the material presented. Based on this research, the following hypothesis is formed:

H5. The LMS content dimension has a significant influence on the quality of the online teacher certification programme implementation.

Rust and Oliver (1994) define satisfaction as a customer's fulfilment response, which is an evaluation as well as an emotion-based response to a service. This is an indication of the customer's trust in the potential of the service leading to positive feelings (Rust & Oliver, 1993). Cronin Jr et al. (2000) assessed service satisfaction using items that included interest, enjoyment, surprise, anger, wise choice and doing the right thing. Based on this, this study uses (with some modifications) the four emotion-based items developed by Olorunniwo et al. (2006). The sample questions include 'I am satisfied with my decision to choose UNY as my LPTK organiser' and 'I am satisfied with the services provided by lecturers, tutors and admin'. Our hypothesis regarding participant satisfaction are:

H6. Participants' perceptions regarding the implementation of professional certification online have a significant effect on satisfaction with the organisers.

2.2. Data collection

Participants of the teacher professional certification programme conducted online in classes available at Yogyakarta State University were asked to fill out the survey provided. There were 391 participants involved in the teacher professional certification programme. They all enrolled in PPG online classes to participate in the 3-month PPG programme, answering surveys, with 354 complete surveys available for analysis.

2.3. Procedure

SmartPLS is an application developed as a structural equation model analysis tool based on partial least squares (PLS) and is widely used in information system-based research (Gefen et al., 2000). This application can also be used to perform exploratory and confirmatory factor analysis on the validity and reliability of the instrument based on the constructs made. The use of SmartPLS is also able to minimise the form of measurement error due to the limitations of the measurement scale, the number of samples used and the distribution of residuals formed compared to using a covariance-based SEM application. SmartPLS is also used to create component-based path analysis/regression models. PLS has the advantage of being able to model several dependent and independent variables when dealing with multicollinearity between independent variables. The application can also handle

missing data and cross-product bases involving response variables, resulting in more robust predictions (Chin & Marcoulides, 1998).

2.4. Instrument material

The questions compiled were validated and tested for construct reliability before being used. The complete list of questions used after validation is presented in a table using a 5-point Likert scale except for the demographic information of online teacher certification participants. Table 2 shows the items that modified the factors based on previous theoretical studies.

1) Assurance, empathy, reliability and responsiveness

The use of the SERVQUAL instrument to assess the quality of implementation and satisfaction of online teacher professional certification programme participants is by adopting 14 of the 22 questions regarding assurance, responsiveness, reliability and empathy with adjustments to the characteristics of online learning programmes. Tangibility is considered suitable for use if the implementation of the teacher professional certification programme is carried out offline.

2) LMS content

This study also adopted eight questions regarding 'LMS content', developed by Cao et al. (2005), in measuring the satisfaction of the website quality of business customers using 71 online users. The eight questions that are considered suitable for use in measuring the appearance of the LMS used by online teacher certification programme participants that are used by participants daily for 3 months starting from the display, image arrangement, menu functions, learning videos, teaching materials and assessments are part of the evaluation of the quality of programme implementation.

3) Professional teacher certification programme quality

The measurement of the quality of this teacher professional certification programme uses four items from research developed by previous research. The four items consist of questions that reflect the overall quality of learning, updated information needed by teachers, the function of website features in supporting learning and clarity of instructions (Udo et al., 2011).

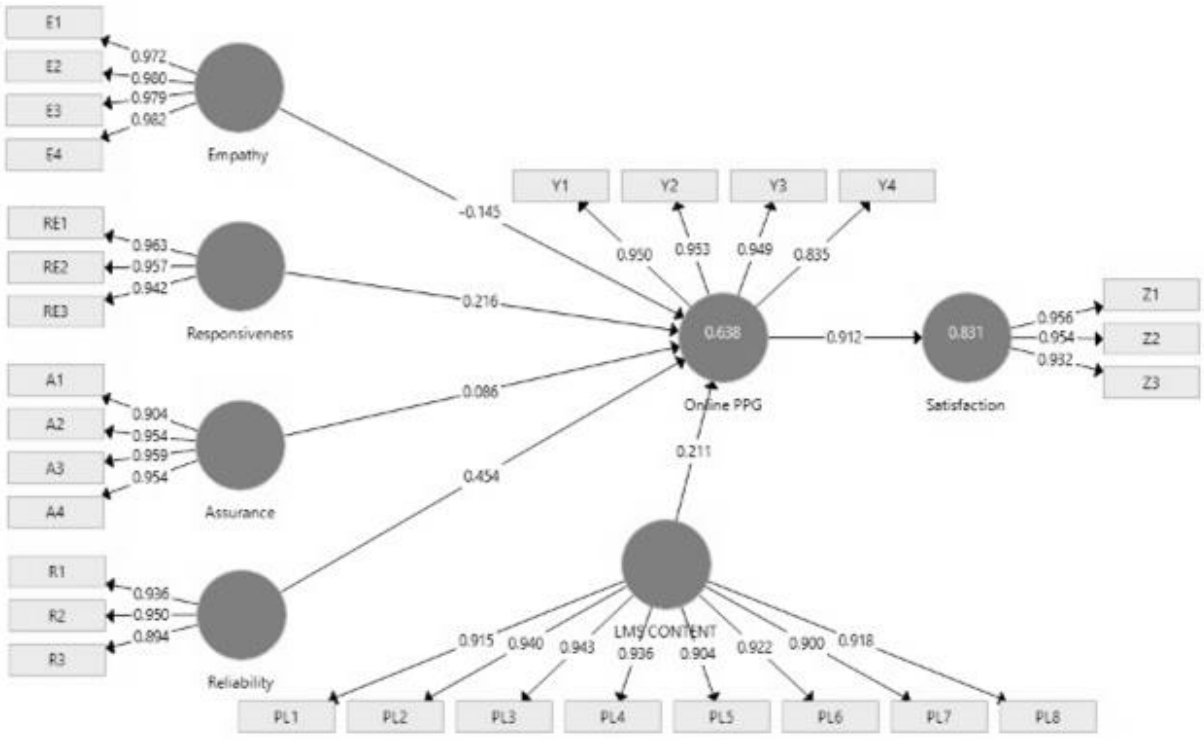
4) Satisfaction (SAT)

Overall participant satisfaction was also assessed using three questions adopted from previous studies (Zhang & Prybutok, 2005). The things that indicate the satisfaction of the online teacher professional certification programme participants are the results obtained, the experience gained and the recommendations given to prospective participants in the future.

3. Results

The construct validity uses the linear structural equation covariance analysis procedure in SmartPLS. In testing the reliability of the resulting model, EFA was performed. As shown in Table 2, the composite reliability value for each dimension shows a score between 0.948 and 0.090 which means that the instrument used is tested for reliability because it meets the criteria at an acceptable level (Cronbach's alpha > 0.70). This shows that it is no longer necessary to repeat the EFA/CFA analysis to refine the instrument used because there are no items to be discarded.

A more rigid procedure was carried out to assess the dimensions of satisfaction measure of the teacher professional certification programme participants. The measurement model (Figure 1) has identified five factors and shows the relationship between the indicator variables and their associated factor dimensions. A statistical examination of the fit carried out obtained information that the proposed model is an acceptable measurement model. Empirically, construct validity was confirmed by tests for convergent (similar constructs) and discriminant validity (distinct constructs). Convergent validity was assessed by reviewing the *t*-test for factor loading. In parameter estimation (factor loading), the loading items for each factor are set exactly as suggested by the model. Metrics for each scale were established by setting the coefficient for one indicator to 1,000 for each of the five factors (i.e., assurance, empathy, responsivity, reliability and LMS content). In addition, to the fixed load, each item was shown to have a highly significant *t*-statistic ($p < 0.000$), which indicates that all indicator variables provide a good measure of their respective constructs. These results generally support the convergent validity of the indicators. Anderson and Gerbing (1988) also generally assume that a construct displays convergent validity if the mean extract variance (AVE) is at least 0.500, or the square root off the AVE is at least 0.700 (i.e., when the variance explained by the construct is greater than the measurement error). The construct AVE values (shown in bold as diagonal elements of Table 3) varied from 0.922 to 0.979.



such variable. In this method, the constructs are considered different if the AVE is greater than the joint variances. The square roots of the AVE for a given construct must be greater than the absolute value of the standard correlation of the given construct with other constructs in the analysis.

According to Wold (1985), the quality criteria used in determining the structural fit of the model are (a) path coefficient, (b) composite reliability, (c) Cronbach's alpha and (d) R^2. In this study,

Cronbach's alpha criteria were 0.800 (very good), composite reliability was 0.700 (good) and <0.700 was poor. The results obtained indicate the value of CA in the very good category (Chin & Marcoulides, 1998). While R^2 values of 0.670, 0.330 and 0.190, respectively, can be assessed as string, moderate and weak relationships (Chin & Marcoulides, 1998). In this study, the R^2 value shows the variation of the relationship obtained is the reliability dimension.

Table 2. Factor loading

Dimensions	Standard loading	CR	CA
Empathy		0.989	0.985
E1. Lecturers, admin and tutors are genuinely concerned about the PPG participants	0.972		
E2. Lecturers, admin and tutors understand the individual needs of students.	0.980		
E3. Lecturers, admin and tutors have the PPG participants' best long-term interest in mind.	0.979		
E4. Lecturers, admin and tutors encourage and motivate the students to do their best.	0.982		
Responsiveness		0.968	0.951
RE1. Lecturers, admin and tutors quickly and efficiently respond to PPG participants' needs.	0.963		
RE2. Lecturers, admin and tutors are willing to go out of their way to help PPG participants.	0.957		
RE3. Lecturers, admin and tutors always welcome PPG participants' questions and comments.	0.942		
Assurance		0.970	0.958
A1. Lecturers, admin and tutors are knowledgeable in their field.	0.904		
A2. Lecturers and tutors are fair and impartial in grading.	0.954		
A3. Lecturers and tutors answer all the questions thoroughly.	0.959		
A4. I am confident the lecturers and tutors have an expert understanding of the	0.954		

Dimensions	Standard loading	CR	CA
material.			
Reliability		0.948	0.917
R1. The lecturers and tutors consistently provide a good explanation.	0.936		
R2. The lecturers and tutors are dependable.	0.950		
R3. The lecturers and tutors reliably correct information when PPG participants are needed.	0.894		
LMS Content		0.979	0.975
PL1 LMS uses audio elements properly.	0.915		
PL2 LMS uses video elements properly.	0.940		
PL3 LMS uses animations/graphics properly.	0.943		
PL4 LMS uses multimedia features properly.	0.936		
PL5 LMS provides helpful information.	0.904		
PL6 LMS provides accurate information.	0.922		
PL7 LMS provides high-quality information.	0.900		
PL8 The information on the LMS is relevant to PPG participants.	0.918		
Professional Teacher Certification Programme Quality		0.958	0.941
Y1 The instructional professional teacher certification programme seems to be up to date	0.950		
Y2 The instructional professional teacher certification programme works well	0.953		
Y3 The instructional professional teacher certification programme has clear instruction	0.949		
Y4 Your perception of the overall quality of the instruction you get from professional teacher certification programme	0.835		
Satisfaction		0.963	0.943

Dimensions	Standard loading	CR	CA
Z1. I feel that my experience with PPG online learning has been enjoyable.	0.956		
Z2. I am satisfied with my decision to choose UNY as my LPTK organiser.	0.954		
Z3. I am satisfied with the services provided by lecturers, tutors and admin	0.932		

In this research model, composite reliability ranges between 0.948 and 0.989 (see Table 2), while Cronbach's alpha ranges between 0.917 and 0.985. Based on Chin's (1998) three quality criteria, our model is considered substantial.

Table 3. Correlation matrix (diagonal represents square root of AVE values)

	A	*E*	PL	*Y*	*R*	RE	*S*
A	**0.943**						
E	0.938	**0.979**					
PL	0.939	0.938	**0.922**				
Y	0.762	0.758	0.769	**0.923**			
R	0.919	0.929	0.915	0.785	**0.927**		
RE	0.909	0.938	0.917	0.760	0.900	**0.954**	
S	0.739	0.734	0.752	0.912	0.771	0.737	**0.947**

4. Discussion

The research model with path coefficients and significance levels is shown in Figure 1. Strong validity and reliability, and the resulting fit measure, provide strong support for this research hypothesis. Table 3 summarises the results and shows that H1–H5 are supported, which relates to the factors that predict the quality of teacher professional certification programme. Thus, the proposed model argues that 'assurance', 'empathy', 'responsiveness', 'reliability' and 'LMS content' affect PPG online. The findings show that four of these five factors determine how participants perceive the quality of PPG online. It should be noted that 'reliability', one of the main contributions of this study, had the strongest effect (coefficient = 0.454) on the perceived quality of PPG online. The overall R^2 of the model is 0.831, while the variable 'empathy' has a negative influence on the quality of professional teacher certification programme.

The significant test was seen from *t*-value > 1.96. *t*-value analysis shows that the variable that has the most significant relationship is 'satisfaction'. To measure how well the observed value is

generated by using predictive relevance, the blindfolding test was carried out and resulted in a value of 0.538, which means the observation value is in the good category. The NFI value shows the number 0.911, which means the model fits (91.1%).

The aims of this research are (1) to assess the quality of services provided to PPG online participants at Universitas Negeri Yogyakarta; and (2) to develop and test the instruments used to measure the quality of PPG Online services. When the PPG programme undergoes significant changes, understanding the quality impact of PPG online becomes very important.

This research was motivated by Stodnick and Rogers (2008), who used SERVQUAL to measure the quality of the classroom experience in a traditional setting. The researchers have incorporated a new dimension, LMS content and thus have increased the predictive power of the model. The researchers' approach supports DeLone and McLean's (2003) IS success model, which states that system quality and information quality have a positive relationship with user satisfaction.

The application of this concept to online learning is one of the main contributions of this research. This finding implies that PPG online organisers must pay attention to the content, design and layout of both learning materials and the learning system, the LMS itself. Stodnick and Rogers (2008) found that assurance and empathy significantly influence the perceived quality of online learning. However, Stodnick and Rogers (2008) also found that responsiveness had no significant impact on learning quality and reliability was partially significant, while the researchers found reliability significant and empathy a negative effect. The possibility that occurs is the lack of interaction that is built between tutors, LMS admins and supervisors during the certification process, which still affects participants' perceptions of the implementation teacher professional programme.

A possible explanation for the significant effect of 'reliability' is that PPG participants saw LPTK's efforts to ensure 'reliability', including quality programmes, reliable lecturers and tutors, and reliable feedback from lecturers and tutors. The quality of PPG participants must pay attention to the factors that affect the perception of the quality of PPG online implementation.

5. Conclusion and recommendations

SERVQUAL which has been modified based on the type of programme offered can be an instrument that can be used to measure service quality and satisfaction with professional teacher certification programme implementation for teacher participants in services. Quality programmes, reliable lecturers and tutors, and reliable feedback from lecturers and tutors are key factors in implementing PPG online. In terms of satisfaction level, the professional teacher certification programme organised by Universitas Negeri Yogyakarta are in the very high level and satisfied categories. The recommendation from this research is the need for a website-based application that can monitor the professional teacher certification programme participant satisfaction so that it can be used as evaluation material if in the future there is a decrease in the level of participant satisfaction.

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