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# Indonesian Teachers Beliefs On The Gap Between Educational Research And Practice

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*Abstract: Teachers' beliefs towards educational research has become one significant factor in explaining the gap between research and practice. The present study aimed at reviewing the scale to measure teachers' beliefs about the causes and problems related to research-based practices, describing beliefs that teachers appear to hold, and examining its relation to their demographic characteristics. The study involved 466 in-service teachers in Jakarta Province. The study employed the 24-item scale developed by Broekkamp and van Hout-Wolters (2007). The study indicated that 20 out of 24 items of the scale were valid and reliable to measure the teachers' beliefs. The scale consisted of two factors, namely, causes pertaining to research and causes pertaining to the use of research. The study also showed that most of participants tend to hold negative beliefs, especially pertaining to the use of research. There was significant difference in beliefs related to teaching experience.*

## Introduction

The development in educational research should influence and direct teachers to improve their practices in the classroom. However, in most cases teaching practices are not in line with research (Broekkamp & van Hout-Wolters, 2007; De Corte, 2003; Kaur et al., 2020). In other words, there is a gap between findings from educational research and practices in the classroom. According to Broekkamp and van Hout-Wolters (2007), there are four possible explanations in respect to this gap. The first two are related to problems in the production of research, to wit, its methodology and practical use. Meanwhile, the latter two are related to teachers' aspects, to wit, their negative beliefs about educational research and reluctance to implement it in daily practice.

In Ismail et al. (2019), Hargreaves states that teaching is a professional activity that should consider new research findings and take into account students' skills and competencies required in a fast-changing world. Therefore, open-mindedness is an essential

attitude for teachers to integrate developing knowledge and their teaching practice in classroom. Teachers who hold beliefs that educational research is an important source for improving their practices tend to make effort in implementing it in the classroom. It has been clarified by several researchers (Pajares, 1992; Purnomo, Suryadi, & Darwis, 2016; Thompson, 1992) that belief has a role in directing a person to make decisions and to behave. Belief is defined as a person's subjective knowledge gained from experience and expressed through propositional attitudes or perceptions or views on a certain truth value (Purnomo, 2017a, 2017b; Purnomo et al., 2016). Therefore, assessing teachers' beliefs about educational research is cornerstone to understanding problems related to it and subsequently designing a program to change their beliefs (perceptions; mind-set; conception) so that they will become more open-minded towards findings from educational research, and will eventually make effort to implement it in daily practices.

In literature, several previous studies have investigated teachers' beliefs. For example, Purnomo and his Colleagues (Purnomo, 2017a; Purnomo et al., 2016) explored pre-service primary school teachers' beliefs and its relationship with practices in their classroom. However, these studies did not specifically examine their beliefs about educational research. In addition, Groth and Bergner (2007) have conducted research on understanding teachers' perspectives on the positive impact of mathematics education research reports on their practices in the classroom and their criticism against these reports. However, this research was limited to a small sample and did not have a formal measurement to measure teachers' beliefs about research reports. Morales et al. (2016) have also examined teachers' beliefs about educational research, particularly classroom action research. The findings of this study indicated that teachers viewed that action research helped them to improve students' learning in science and mathematics, and promote lifelong learning. However, this research only focused on teachers' responses to classroom action research and no detailed information about the validity and reliability of the instrument. Lack of exploration of validity and reliability could also be found in research conducted by Broekkamp and van Hout-Wolters (2007). They designed questionnaires about teachers' beliefs regarding causes and problems that caused a gap between research and its practices in the field. Not only that, but this research's limitation was also its small sample size.

The importance of reviewing an instrument's validity and reliability has become a requirement in research, because it is related to the credibility of the research itself. However, based on literatures and the aforementioned studies, studies that focus on developing a valid scale for measuring teachers' beliefs about educational research, especially related to problems and causes of the gap between research and practices is still rare. Because of that, the present study focused on reviewing the validity and reliability of the instrument to measure the beliefs. Moreover, the present study also explored the profile of teachers' beliefs generally and with respect to their characteristics. Next are the questions that guided the present study.

1. How is the validity and reliability of the scale to measure teachers' beliefs about the causes and problems related to research-based practices?
2. How is the profile of teachers' beliefs about the causes and problems related to research-based practices?
3. Is there a significant difference between the beliefs held by the teachers with respect to their gender, teaching experience, age, school status, and certification that they have?

## Theoretical Underpinning

Research-based practice refers to the condition in which teachers, as the designers of learning, consider and use results of research conducted by researchers in the learning process. Because teachers' activities and choices are based on their beliefs (Lui & Bonner, 2016; Stipek et al., 2001), then the teachers' awareness of using research results originated from their beliefs towards educational research.

Belief, according to Schoenfeld (1992), is included in the affective domain and is described as an understanding and feeling of a person that determines how that person sees the world and engage themselves in mathematical activities. Meanwhile, Torner (2002) categorized beliefs in the cognitive domain and describes it as a reflection of a person's subjective knowledge about mathematics. However, other researchers (e.g. Leder & Forgasz, 2002; Purnomo et al., 2016) explained that beliefs are a component of both. In addition, Pajares (1992) stated that beliefs could not be seen directly, but can be identified through a person's words, actions, and intentions. Several researchers proposed their arguments with respect to definition of beliefs, to wit: an individual's subjective knowledge that guides their decision to behave (Purnomo et al., 2016). Purnomo (in Purnomo, 2017a, 2017b; Purnomo et al., 2016) claimed that this subjective knowledge was obtained from experiences and expressed it through propositional attitude. Even though enacted behaviour could be attributed to their initial espoused beliefs, several studies in the literature revealed that a relationship that might exist between beliefs and what took place in a certain environment was complex as there was inconsistency between them. However, comprehending relationships between them and their constraint and opportunities provided by social context are of the essence for making effort to improve and develop certain behaviour.

Research about beliefs is important, because it has a impact towards the improvement of learning quality. Because of this, researchers have focused their research on teachers' beliefs, such as teachers' beliefs about the nature of mathematics, the learning-teaching of mathematics, and assessment (Purnomo et al., 2016; Wijaya et al., 2015). However, research related to teachers' beliefs about educational research has not been fully covered. This change in teachers' beliefs, in the end, is aimed to guarantee the implementation of research-based practices.

Teachers, as one of the important factors in education who has an effect on students' outcomes and development, hold beliefs about their students, subject matter, effective teaching, assessments, etc. These espoused beliefs tend to direct teachers to behave in certain ways during classroom practices. Therefore, what is critical is the beliefs held by teachers which are not likely to be in line with the nature of subject matter, teaching, and so forth. There are substantial studies related to exploring teachers' beliefs about students, subject matter, effective teaching, assessments, etc. However, there is scarcity of studies on exploring teachers' beliefs about the causes and problems related to research-based practices, including how instruments measure it, how is the description of teachers' profiles, how is the relationship with internal and external variables of teachers. Several researchers (e.g. Broekkamp & van Hout-Wolters, 2007; Everton et al., 2000; Groth & Bergner, 2007) conducted studies related to this, yet the developed instruments are in need of improvement in terms of factors and contextual adjustment.

## Methods

### Participant

The participants of the present study comprised of 466 in-service teachers at schools in Jakarta Region. Based on gender, 75.3 % of the participants were female and the rest were male teachers. In addition, most of them were elementary teachers ($n$ = 318), senior high school teachers ($n$ = 100), junior high school teachers ($n$ = 2), vocational teachers ($n$ = 12), and no information given ($n$ = 2). They came from various ethnics, such as Javanese, Sundanese, Betawi, Minangkabau, Batak, etc.

The researchers collected the responses using a paper-based and web-based questionnaire (i.e., google form) with a duration of about five months, from 4 May to 16 September 2018. The participants were selected conveniently. To get a high rate of responses, the snowball sampling technique was employed. Paper-based questionnaires were distributed by entrusting them to several teacher acquaintances, and they volunteered to share the questionnaire with their peers either in their respective schools or in a professional learning community. Teachers who received the questionnaire were also willing to distribute them to other colleagues they knew voluntarily. Similar to the way of distributing paper-based questionnaires, we contacted teacher acquaintances and colleagues via WhatsApps and asked them to share a web-based questionnaire via personal communication with teachers they know or WhatsApps groups at their respective schools and/or relevant teacher communities.

Through the web-based questionnaire, 272 responses were collected. However, 21 responses were removed due to double responses and being beyond the population. Cases outside this population can be identified from checking the schools' list where the assignment is working in the filled questionnaire. This case is very likely to occur when the survey uses the snowball sampling technique. Moreover, the use of web-based questionnaires is also possible to obtain multiple responses. Therefore, through the web-based questionnaire, a total of 251 responses were used for further analysis. Meanwhile, 215 responses were collected using the paper-based questionnaire.

#### Items Development

The instrument used in this present study was adapted from existing instruments developed by Broekkamp and van Hout-Wolters (2007) in which it consisted of 24 items. Responses to each item are on a 6-point Likert scale (ranging from 1 = strongly disagree to 6 = strongly agree). The questionnaire consisted of 24 negatively proposition items. However, the validity of the questionnaire was not clearly described. Henceforth, the present study tried to examine its validity and reliability.

The questionnaire was translated into the Indonesian language. Two academicians from the English Department at a private university accredited A (excellent) in Jakarta examined the consistency between English and Indonesian forms. Subsequently, face and content validity were reviewed involving two experts at the same university with specifications of expertise in the field of education and the field of language. Several required revisions were discussed among researchers and consultation with experts was carried out to reach an agreement. We also added a number of demographic question items in the first part of this questionnaire, including age, gender, ethnicity, education, teaching experience, school of assignment (name, status, and level), and also ownership of an educator certificate.

**Data Analysis**

In the beginning, missing data were identified. It was reported that 7.307% (n = 35) of cases and 3.348% values were detected as missing data. Therefore, after running the program for 5 iterations of multiple imputation methods, missing data was handled. Hair et al. (2019) summarize that the multiple imputation as a process generates multiple data sets with calculated data differently in each data set to provide aggregate, unbiased estimation of parameters and correct estimates of standard errors. Multiple imputation is recommended to cope with missing data (Fichman & Cummings, 2003; Schlomer et al., 2010).

To conduct factor analysis, the obtained data were split randomly into two different groups using SPSS. The first group of data consisted of 236 participants and it was analyzed using Principal Component Analysis (PCA). Meanwhile, the rest of the data which comprised of 230 participants were analyzed using confirmatory factor analysis (CFA).

Using the extraction method of PCA and combination of rotation methods (varimax vs promax), the 24-item questionnaire was analyzed using SPSS to generate the best factor structure. The threshold value of each variable is greater than 0.32 (Tabachnick & Fidell, 2014). At this stage, the internal consistency of each PCA obtained factor was identified. Furthermore, CFA using SPSS AMOS statistical software was carried out to confirm the structure of latent variables generated from PCA. This study took into account Chi-Square, degrees of freedom and *p*-value of bootstrapping bollen-stine statistical criteria. In addition, Normed Chi-Square (NC), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis index (TLI) were investigated with threshold criteria in each index summarized in Table 1 (Brown, 2015; Hair et al., 2019; Hooper et al., 2008; Purnomo, 2017b). Each type of index has reported at least one index from each category, namely, absolute fit, parsimony fit, and comparative fit (Brown, 2015). Based on the construct formed, the analysis was followed by examining whether the construct had adequate validity and reliability. The analysis focused on convergent validity and discriminant validity. On the other hand, instrument reliability was indicated by the high coefficient level of internal consistency.

| **Index** | **Threshold** | |
|---|---|---|
| | **Good** | **Acceptable** |
| **NC** | $1 \leq NC \leq 2$ | $2 < NC \leq 3$ |
| **RMSEA** | $\leq 0.05$ | $0.05 <$ RMSEA $\leq 0.08$ |
| **SRMR** | $\leq 0.05$ | $0.05 <$ SRMR $\leq 0.08$ |
| **CFI** | $\geq 0.95$ | $\geq 0.90$ |
| **TLI** | $\geq 0.95$ | $\geq 0.90$ |

**Table 1: Compatibility Criteria of Measurement Model**

Subsequent analysis was carried out using descriptive statistics such as mean, standard deviation, and range between items mean. This analysis was conducted to cope with the second question of this study of the profile of the teachers' beliefs. In addition, the *t*-test and correlation were undertaken to see differences between factors and the relationships between factors respectively.

Eventually, independent *t*-test was performed to examine the difference among teachers' beliefs across two categorical variables such as gender, school status, and certification status. Meanwhile, for non-two categorical variables, one-way ANOVA was carried out.

## Results

### Validity and Reliability of Teachers Beliefs about the Causes and Problems Related to Research-Based Practices Scale

#### *Principal Component Analysis*

Analysis of the correlation matrix was performed and the KMO test value was 0.913 which indicated that there was a very small partial correlation. In addition, Bartlett's test yielded $\chi^2(276) = 2707.656$, $p < 0.001$, indicating that the matrix had a non-zero bivariate correlation. Therefore, the correlations between items in the matrix were supported for factor analysis.

Kaiser Criteria, Scree Plot, and Horn's parallel analysis methods were taken into account to determine the number of factors. According to the result of PCA, there were six factors whose eigenvalues were greater than 1. Meanwhile, the scree plot suggested two or three factors. In addition, based on Horn's parallel analysis method, there were two factors whose eigenvalues value in the actual data were greater than that of the simulative data.

PCA was carried out using two factors and rotated using the promax method. Promax was chosen as it generated less non-overlapping variables. There were two items whose factor loadings were less than 0.32 (item 7 and item 23), thus the items were removed. Subsequently, PCA was re-performed. Hence, out of 24 there were 22 items explaining these two factors (see Appendix A). Solutions were calculated for 49.020% of the total variance.

The first factor has a loading factor which is in the range of 0.509 and 0.918, while the second factor is in the range 0.379 and 0.928. This shows that each variable has adequate loading factors. Both of these factors also have adequate reliability coefficients whose values are 0.902 and 0.877 respectively.

The first factor was labelled as "causes pertaining to the use of research". This factor included five items obtained from the factor of causes pertaining to the use of research and five items obtained from the factor of causes pertaining to research and the use of research. It was seen that the five items in the factor of causes pertaining to research and the use of research were more related to the problem of the application of research in practices. Therefore, these items could be included in the factor of causes pertaining to the use of research.

The second factor was labelled as "causes pertaining to research". This factor seemed to have various sources as it consisted of five items of problems which constituted research-practice gap, five items from the factor of causes pertaining to research, one item from the factor of causes pertaining to research and the use of research, and one item from factor of causes pertaining to the use of research. Five items of problems which constituted practice-research gaps indicated that the research itself was one of the possible causes of the gap between the results of the research and the practice in the field. Therefore, it obviously made sense as these items could be categorized into the factor of causes pertaining to research. On the other hand, there was one item of the factor of causes pertaining to research and the use of research, namely educational research. Unexpectedly it provided less contribution, even though educational research continued to develop well and the results were used optimally. That is to say that even though educational research is being developed and implemented well, contribution in the practice still lacks. It was certainly also related to causes pertaining to research. Eventually, one item in the factor of causes pertaining to the use of research was "discussing educational research should be conducted with practitioners and policymakers". The key to this statement laid in the term "not necessarily" which might bring about a gap between research and practice.

***Confirmatory Factor Analysis***

Before performing CFA, multivariate normality and multicollinearity were examined. According to the result of analysis using SPSS, multicollinearity and univariate normality were not violated. However, the normality assumption of multivariate data was not fulfilled, thus the Bollen-Stine Bootstrapping method was implemented (Ory & Mokhtarian, 2010; Walker & Smith, 2016).

CFA with the maximum likelihood (ML) method was performed and generated a reasonable fit index from the data of the two-factor PCA model. The two-factor PCA model maintains 20 items out of the 22 items. Deleted items were items 11 and 15. The summary of the CFA is presented below.

| | Good Fit | Acceptable Fit | Model 0 | Model 1 | Model 2 | Model 3 |
|---|---|---|---|---|---|---|
| **NC** | $1 \leq NC \leq 2$ | $2 < NC \leq 3$ | 3.372 | 3.606 | 2.259 | 2.105 |
| **RMSEA** | $\leq 0.05$ | $0.05 <$ RMSEA $\leq 0.08$ | 0.102 | 0.107 | 0.074 | 0.069 |
| **SRMR** | $\leq 0.05$ | $0.05 <$ SRMR $\leq 0.08$ | 0.068 | 0.070 | 0.058 | 0.053 |
| **CFI** | $\geq 0.95$ | $\geq 0.90$ | 0.809 | 0.808 | 0.912 | 0.928 |
| **TLI** | $\geq 0.95$ | $\geq 0.90$ | 0.788 | 0.785 | 0.896 | 0.914 |

*Note:*
*Model 1: Removal of item 11*
*Model 2: Pairs e1 and e2; e3 and e4; e4 and e5; e13 and e14; e14 and e15; e15 and e18; e16 and e20; e18 and e19; e19 and e20; e21 and e22 used as free parameters*
*Model 3: Removal of item 15*

**Table 3: Fit Indices and Model Comparison**

The first model (model 0) was the initial model of the PCA results. Model 0 produced RMSEA = 0.102; SRMR = 0.068; CFI = 0.809; TLI = 0.788 which did not indicate acceptable fit index. In model 1, item 11 was removed and reanalysis was carried out. This model 1 also did not meet adequate compatibility criteria. Then, covariance error of several latent variables (model 2), namely e1 and e2; e3 and e4; e4 and e5; e13 and e14; e14 and e15; e15 and e18; e16 and e20; e18 and e19; e19 and e20; e21 and e22 were matched accordingly. However, the value of TLI was still inadequate. The following analysis eliminated item 15 that had misleading error covariance. Eventually, this analysis resulted in an acceptable fit (NC = 2.105, $\chi^2_{159} = 334.737$ with *p*-bollen stine bootstrap < 0.05; RMSEA = 0.069; SRMR = 0.053; CFI = 0.928; and TLI = 0.914).

The values of the standardized factor loading of each variable were in the range of 0.565 and 0.801. Furthermore, the values of CR for the factor of causes pertaining to research and causes pertaining to the use of research were 0.87 and 0.90 respectively. Summary of the result of construct validity analysis, including AVE, MSV, and ASV, is shown in Table 3. In addition, Cronbach Alpha is presented to examine the reliability of each factor.

| Construct | Variables | Convergent Validity | | | MSV | ASV | $\alpha$ |
|---|---|---|---|---|---|---|---|
| | | *Factor loading* | CR | AVE | | | |
| **Causes pertaining to research** | 1 | 0.646 | 0.87 | 0.41 | 0.78 | 0.78 | 0.877 |
| | 2 | 0.662 | | | | | |
| | 3 | 0.568 | | | | | |
| | 4 | 0.683 | | | | | |
| | 5 | 0.721 | | | | | |
| | 6 | 0.610 | | | | | |
| | 8 | 0.663 | | | | | |
| | 9 | 0.632 | | | | | |
| | 10 | 0.602 | | | | | |
| | 24 | 0.565 | | | | | |
| **Causes pertaining to the use of research** | 12 | 0.699 | 0.90 | 0.49 | 0.78 | 0.78 | 0.907 |
| | 13 | 0.665 | | | | | |
| | 14 | 0.625 | | | | | |
| | 16 | 0.757 | | | | | |
| | 17 | 0.651 | | | | | |
| | 18 | 0.623 | | | | | |
| | 19 | 0.729 | | | | | |
| | 20 | 0.801 | | | | | |
| | 21 | 0.758 | | | | | |
| | 22 | 0.656 | | | | | |

**Table 3: Construct validity of the teachers' beliefs**

Table 3 shows that the standardized loading factor for each variable is sufficient as the values are more than 0.4. In addition, CR for each factor is at an adequate level (CR > 0.7). Meanwhile, the AVE do not reach its suggested value i.e. 0.5. Nevertheless, it could be concluded that the construct validity is sufficient even if it is based only on the value of CR. Table 3 also indicates that the AVE values are less than that of the MSV and ASV values in each factor, thus the discrimination validity is not met. The possible reason for this result is that correlation between the two factors is high. In addition, the reliability for this instrument is at an adequate level as the Cronbach alpha for each factor is greater than 0.7.

#### Profiles of Teachers' Beliefs about the Causes and Problems Related to Research-Based Practices

This section describes the profile of teachers' beliefs about the causes and problems related to research-based practices resulting from the analysis of both factors. Descriptive data such as mean, range between items mean, and standard deviation is presented in Table 4. Table 4 also indicates the Pearson correlation and the comparison of the two factors (*t*-test) in which the data do not violate the normality assumption.

| Factor | No. of items | M(SD) | Range between items mean | 1 | 2 | Mean Difference |
|---|---|---|---|---|---|---|
| 1. Causes pertaining to research | 10 | 3.419(0.920) | 2.630 – 3.943 | 1 | 0.772** | $t_{229} = 4.103$, $p < 0.001$ |
| 2. Causes pertaining to the use of research | 10 | 3.597(1.009) | 3.178 – 4.070 | | 1 | |

**. Correlation is significant at the 0.01 level (2-tailed).

**Table 4: Descriptive statistics and correlations for two factors**

Based on a summary of the results of analysis as shown in Table 5, it indicates that there is significant mean difference ($t_{229} = 4.103; p < 0.001$) in which the mean of the factor causes pertaining to research ($\bar{x} = 3.597; SD = 1.009$) is larger than that of the factor of causes pertaining to the use of research ($\bar{x} = 3.419; SD = 0.920$). This also is supported by the result of the range between items. That is to say that considerable participants in this study tend to possess negative beliefs about research use rather than problems related to the research itself and external causes from the gap between practice and research.

We also compared each item's means against the Broekkamp and van Hout-Wolters study (see Figure 1). Although this study used a 1 point scale less than Broekkamp and van Hout-Wolters study, we found that our sample teachers also tended to have negative beliefs about educational research. This trend can be seen from the mean of each item which is higher than 3 (see also Table 2 for comparison).

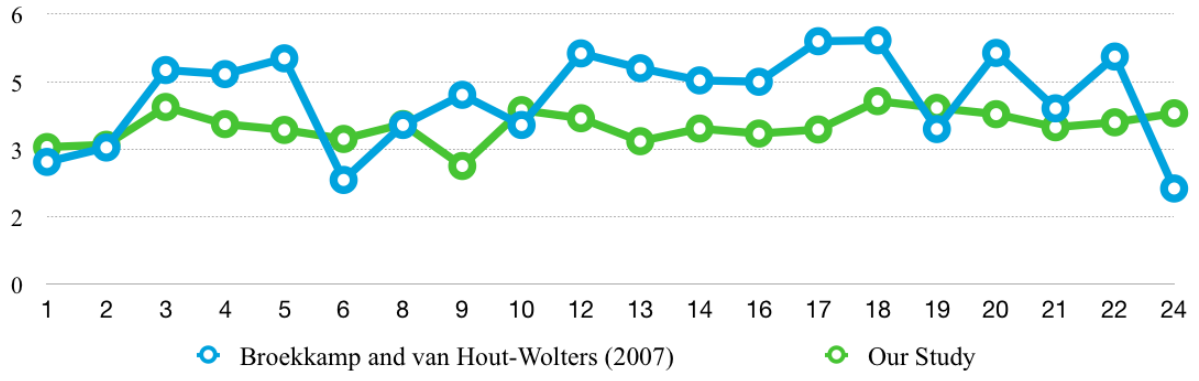


**Figure 1: Average scores between Broekkamp and van Hout-Wolters (2007) and Our Study**

In Figure 1, our study and the Broekkamp and van Hout-Wolters study show teacher agreement on the causes pertaining to the use of research higher than their agreement on causes pertaining to research. In other words, the sample of teachers from both our study and the Broekkamp and van Hout-Wolters study tended to have negative beliefs about the use of research rather than the problems related to the research itself.

#### Mean Differences of The Teachers' Beliefs Across Their Characteristics

This section describes findings concerning whether there is a significant difference between the mean of teachers' beliefs about the causes and problems related to research-based practices across their characteristics. Independent samples *t*-test and One-Way ANOVA were used to test the hypothesis. The result is summarized in Table 5.

| Characteristic | | $n$ | $M$ | $Sd$ | $t$ | $p$ |
|---|---|---|---|---|---|---|
| **Gender** | Male | 170 | 3.416 | 0.950 | -0.047 | 0.964 |
| | Female | 59 | 3.422 | 0.841 | | |
| **School Status** | Private | 132 | 3.416 | 0.976 | -0.031 | 0.975 |
| | Public | 97 | 3.420 | 0.847 | | |
| **Certification** | Not yet | 134 | 3.442 | 0.827 | 0.707 | 0.480 |
| | Yes | 93 | 3.355 | 1.036 | | |
| | | $n$ | $M$ | $Sd$ | $F$ | $p$ |
| **Experience** | Less than 4 years | 63 | 3.425 | 0.910 | 2.174 | 0.092 |
| | 4-10 years | 57 | 3.507 | 0.790 | | |
| | 11-20 years | 61 | 3.172 | 0.960 | | |
| | More than 20 years | 46 | 3.578 | 0.940 | | |
| **Years Old** | Less than 31 years | 88 | 3.460 | 0.850 | 0.278 | 0.841 |
| | 31-40 years | 52 | 3.3558 | .93503 | | |
| | 41-50 years | 43 | 3.3419 | .93840 | | |
| | More than 50 years | 43 | 3.4698 | 1.05999 | | |

**Table 5: Teachers' beliefs on the causes that relate to research from their characteristics**

Table 5 summarizes the mean of teachers' beliefs on the causes that relate to research across their characteristics. Based on the result of *t*-test analysis, three characteristics (i.e. gender, school status, and certification status) had non-significant differences in their means ($p > 0.05$). The non-significant differences in the means also were found in the characteristics of teaching experience and their age using One-Way ANOVA. Accordingly, the result showed that there were no significant differences in the means of teachers' beliefs on the causes that relate to research across gender, school status, certification status, years' experience, and age.

| | | $n$ | $M$ | $Sd$ | $t$ | $p$ |
|---|---|---|---|---|---|---|
| **Gender** | Male | 170 | 3.631 | 1.012 | 0.747 | 0.457 |
| | Female | 59 | 3.517 | 1.004 | | |
| **School status** | Public | 132 | 3.641 | 1.061 | 0.705 | 0.482 |
| | Private | 97 | 3.547 | 0.937 | | |
| **Certification** | Not yet | 134 | 3.646 | 0.884 | 1.003 | 0.317 |
| | Yes | 93 | 3.510 | 1.155 | | |
| | | $n$ | $M$ | $Sd$ | $F$ | $p$ |
| **Years of Experience** | Less than 4 years | 63 | 3.632 | 0.919 | 3.402 | 0.019 |
| | 4-10 years | 57 | 3.751 | 0.900 | | |
| | 11-20 years | 61 | 3.261 | 1.062 | | |
| | More than 20 years | 46 | 3.783 | 1.066 | | |
| **Age** | Less than 31 years | 88 | 3.732 | 0.851 | 0.936 | 0.424 |
| | 31-40 years | 52 | 3.458 | 1.038 | | |
| | 41-50 years | 43 | 3.561 | 1.124 | | |
| | More than 50 years | 43 | 3.526 | 1.166 | | |

**Table 6: Teachers' beliefs on the causes that relate to the use of research from the point of teachers' characteristic**

Table 6 presents the mean of teachers' beliefs about the use of research across their characteristics. The result of *t*-test analysis indicated that the three characteristics (i.e. gender, school status, and certification status) did not have significant differences among its means ($p > 0.05$). On the contrary, ANOVA one-way test showed that there was a significant difference among the mean of years of teaching experience ($p < 0.05$). Therefore, post hoc analysis was required to be carried out using the Tukey method. The summary of the result is shown in the following table.

| (I) Experience | (J) Experience | Mean Difference (I-J) | Sig. |
|---|---|---|---|
| Less than 4 years | 4-10 years | -0.119 | 0.911 |
| | 11-20 years | 0.371 | 0.157 |
| | More than 20 years | -0.151 | 0.859 |
| 4-10 years | Less than 4 years | 0.119 | 0.911 |
| | 11-20 years | 0.490* | 0.037 |
| | More than 20 years | -0.032 | 0.998 |
| 11-20 years | Less than 4 years | -0.371 | 0.157 |
| | 4-10 years | -0.490* | 0.037 |
| | More than 20 years | -0.522* | 0.036 |
| More than 20 years | Less than 4 years | 0.151 | 0.859 |
| | 4-10 years | 0.032 | 0.998 |
| | 11-20 years | 0.522* | 0.036 |

*Mean difference significant at 5% level

**Table 7: Post-Hoc analysis using Tukey method**

Table 7 shows the post-hoc analysis using Tukey method regarding significant differences among the means of years of teaching experience. In detail, the difference between the mean of the 4-10 years and 11-20 years groups is significant at the 5% level. The mean of 4-10 years group is greater than that of 11-20 years group by 0.490. In addition, the difference between the mean of the group of 11-20 years and the group of more than 20 years is significant ($p < 0.05$). The mean of the group of more than 20 years is greater than that of the group of 11-20 years by 0.522. To put it differently, the mean of the group of 11-20 years is the lowest.

## Research Limitations

We use questionnaires with negative statement formats all as developed by Broekkamp and van Hout-Wolters (2007). Therefore, there are indications that guide respondents to agree to critical statements. However, the purpose of this study is more to examine the teachers' beliefs about educational research, especially related to problems and causes of the gap between research and practices, so that using the format of negative statements becomes relevant. A follow up and recommendation for further study is to provide pool items which also contain positive statements, which in other words, does not only focus on the causes and problems of educational research but also on the value of educational research and open mindsets in educational research reports.

In addition, this study only used observation variables from certain teacher demographic characteristics, namely gender, certification status, school status, age, and teaching experience. It is also important to study further about the variables outside of demographic factors, such as comparison between veteran and beginner teachers' beliefs. Further study is also needed to develop a way to give treatment for teachers that have negative beliefs that are not in line with the development of professionalism and lastly a design to guarantee the quality of research-based practices to improve learning and quality of education.

## Discussion

This study focusing on teachers' beliefs about the causes and problems related to research-based practices includes how to develop a scale for measuring the teachers' beliefs

with valid and reliable measures. This study also explored the differences in teachers' characteristics beliefs held by teachers with respect to their demographic factors. This study has produced adequate instruments to measure teachers' beliefs about the causes and problems related to research-based practices. The findings of this study also indicate that teachers still tend to have negative perceptions about the use of research rather than the aspect of the research itself. For each characteristic, only the level of teaching experience has significant differences with respect to their beliefs. We will review each of these results in the following paragraphs.

First, the scale development and validation in this study produced two factors that had adequate validity and reliability criteria. The evidence for the validity of this instrument was obtained from the PCA (see Table 2) and confirmed by CFA with fit indices at the acceptable fit level (see Table 3) and each variable of the two factors has a sufficient loading factor, in which more than 0.4 is a fairly adequate threshold (Hair et al., 2019). Furthermore, the internal consistency of each factor in this instrument is also very high which is 0.877 and 0.907 (see Table 4). These scores are more than adequate in which the threshold is greater than 0.7 (Taber, 2018).

Two factors that describe the scale of the teachers' beliefs are the causes pertaining to the use of research and the causes pertaining to research. The causes pertaining to use of research factors include negative perceptions about the application of research in practices, for example lack of coordination, skills, or facilities to implement research and resources that are not based on research. This includes their reluctance to engage in research. On the other hand, the causes of pertaining to research include teachers' beliefs of invalid research, not applicable, and not connected to problems in the field. In this factor, there are several items that describe practitioners and policy makers who do not use, respond less, or do unsuitable research. This certainly creates a question, why these items are included in the second factor rather than the first factor. We consider that the context of engaging in using research is already in the practical use of research, while the attitudes of not responding, not using, and doing research are not in its purpose, it is a propositional attitude towards the research itself. Therefore, this includes teachers' beliefs about causes pertaining to research.

Second, the findings of this study indicate that most of the sample of this study tended to hold negative beliefs, especially related to the use of research rather than the aspect of the research itself. This finding can be verified from the significant differences between the causes of pertaining to the use of research factors and the causes of pertaining to research factors (see Table 5). In this factor, most teachers believe that researchers, practitioners and policy makers find it difficult to coordinate and facilitate themselves and each other to accommodate common interests in implementing research. As such, policies, curriculum, and teaching tools have not been based on the results of research, even though these tools greatly affect practices in the field. As stated by Broekkamp and van Hout-Wolters (2007), when practitioners are not actively using research, they may still be affected by indirect information, such as professional development programs, teaching materials, and educational policies, but some others belief that potential mediators (e.g., teacher trainers, publishers, and policy makers) do not use effective strategies to apply insights from research or do not place research in the first position. In other words, the relationship between the two factors is very strong.

Third, the findings of this study indicate that there are no significant differences between the characteristics analyzed both in the causes pertaining to research and the causes of pertaining to the use of research factors unless they are related to their teaching experience. In the characteristics of the teaching experience, there are a number of means that have significant differences, namely in the factors of causes pertaining to the use of research

with a significance level of 5% and 10% for the factor of causes pertaining to research. The mean in each level of teaching experience has the same tendency in both the first and second factors, namely in the order of the mean of the lowest groups with experience of 11-20 years, followed by less than 4 years, 4-10 years, and finally more than 20 years. In other words, veteran teachers tend to hold negative perceptions of educational research rather than other levels of teaching experience. This makes sense because veteran teachers generally are in their comfort zone of teaching. Although the teachers' beliefs variable is not exactly the same, this finding is in line with the results of the study of (Purnomo et al., 2018) which examines teachers' beliefs about the nature of mathematics. His research found that the higher the level of teaching experience those teachers have, the more they hold traditional (absolute) mathematical beliefs. For similar reasons, this finding can be related to teacher education which is not the same as the current situation. Veteran teachers receive education in stages, from teacher education schools (equivalent to diplomas), and lately they are required to educate at least a Bachelor's degree as mandated by Law Number 14 of 2005 on Teachers and Lecturers, which requires that teacher qualifications must be educated D-IV or S1 before 2015. At the education level, diplomas have not been comprehensively invested in knowledge related to research and make their reports not as graduation requirements.

Complementing the findings of this study, Everton, Galton and Pell (2002) found that young teachers were more likely to want to be involved in engaging in research. Although they were more likely to choose to engage in research rather than with research. They tend to prefer to be involved in research, by taking part in locally based on action research projects or by participating in various schemes run by the Teacher Training Agency. However, both types of involvement are equally very important in the development of professional teachers in the future.

The term research engagement refers to the definition that the terminologies "with research" and "in research" are different (Leat et al., 2015). The term "with research" refers to the expertise to access and obtain a collection of knowledge (in research). Furthermore, the term "in research" refers to the involvement of teachers in research both directly and indirectly. Direct involvement, which in terms of Leat et al. (2015) is grouped as the first level, is referring to the optimization of research skills possessed and therefore can develop expertise in articulating good questions, conducting interviews, selecting appropriate psychological steps, managing and analyzing data and so on. Indirect involvement (as the second level) was illustrated by the significant development of the teacher. Therefore, it formed the identity and then attached the belief that the teacher is an agent of change.

We agree that teachers are not always scientists, but we do not agree with the assumption that teachers are not researchers. The purpose of research is to improve the previous situation and to produce both tangible and intangible products that are useful for increasing the quality of education. Therefore, the traditional paradigm that the obligation of teachers is to teach only has to be abandoned. They have to conduct a research because "a teacher is also a researcher". Pesti et al. (2018) stated that daily teaching in a classroom could be equated with conducting research, because in teaching and learning, teachers continue to simulate various strategies in their experiments, as they reflect on themselves and or the work of their colleagues, and as they make decisions about their future steps based on this experience. The idea in this term has also become a serious thought and a challenge for policyholders and researchers in teacher education and development (Chudasama, 2021; Guerrero-Hernández & Fernández-Ugalde, 2020; Iliško et al., 2010; Pesti et al., 2018; Robinson, 2003; Ulla et al., 2017). The traditional paradigm separating teaching and research makes efforts to support student learning and develop teacher professionalism ineffectively. Robinson (2003) states that the quality of effective professional development is embedded in

work, not separated from the context of work, colleagues, and daily practices (c.f. Ball & Cohen, 1999). Teachers as researchers create a bridge between practice and theory/research results more effectively. Teachers as researchers also a form of teachers professional obligation when they want to make good decisions regarding planning, implementation, and evaluation in the teaching and learning process, they must think about their previous experiences, what knowledge supports them, and what the consequences are (c.f. Robinson, 2003). All of this requires experience in research activities. Moreover, university researchers need to address them to make a mutualistic relationship to both of them on the principle of not burdening the teacher in the administrative aspect.

## Conclusion

In this study, the scale of teacher beliefs about causes and problems related to research-based practices has been refined and validated based on data collected from teachers in the Jakarta region. Twenty items divided into two factors have been identified on this scale and meet the criteria for the validity and reliability of a suitable instrument to measure teacher beliefs about causes and problems related to research-based practice. In the future, the implication of using this scale is to help teachers be aware of their positive views on research in the teaching profession. This research can also have implications for educational researchers at least to come up with solution ideas to bridge the gap between research results and practice. This scale should be tested on a wider range of groups including samples from other countries, different cultural backgrounds and teachers from different levels of the teaching profession.

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## Appendix A. Principal Component Analysis Results

| **Items** | **Broekkamp and van Hout-Wolters's** factor | **Our Study's Factor** | |
|---|---|---|---|
| | | Causes pertaining to the use of research | Causes pertaining to research |
| 20. Tidak ada kolaborasi antara praktisi pendidikan, pembuat kebijakan, dan peneliti untuk mengakomodir kepentingan bersama [There is no collaboration on equal terms between educational practitioners, policy-makers, and researchers.]. | Causes that relate to research and the use of research | **.918** | -.136 |
| 22. Tidak ada fasilitas untuk kerja sama antara praktisi pendidikan, pembuat kebijakan, dan peneliti untuk mengakomodir kepentingan bersama [There are no facilities for equal cooperation between the educational practitioners, policy-makers, and researchers]. | Causes that relate to research and the use of research | **.892** | -.170 |
| 19. Praktisi pendidikan dan pembuat kebijakan sangat jarang bekerja sama dengan peneliti. [Educational practitioners and policy-makers very rarely cooperate with researchers.] | Causes that relate to research and the use of research | **.862** | -.103 |
| 21. Tidak ada keinginan untuk bekerja sama antara praktisi pendidikan, pembuat kebijakan, dan peneliti untuk mengakomodir kepentingan bersama [The desire to cooperate on equal terms is non-existent with educational practitioners, policy-makers, and researchers]. | Causes that relate to research and the use of research | **.771** | -.001 |
| 17. Praktisi pendidikan dan pembuat kebijakan tidak memiliki waktu dan sarana untuk menerapkan hasil penelitian kependidikan [Educational practitioners and policy-makers do not get the time and the means to use the results of educational research]. | Causes that relate to the use of research | **.711** | .021 |
| 14. Bahan-bahan pengajaran (buku teks, tes, dll.) tidak didasarkan pada penelitian [Teaching materials (textbooks, tests, etc.) are not based on research]. | Causes that relate to the use of research | **.662** | -.002 |
| 16. Hampir tidak ada praktisi pendidikan dan pembuat kebijakan yang memiliki keterampilan untuk menerapkan hasil penelitian ilmiah [Virtually nobody of the educational practitioners and policy-makers has the skills to apply scientific results]. | Causes that relate to the use of research | **.631** | .164 |
| 12. Kebijakan pendidikan nasional tidak didasarkan pada penelitian [National educational policy is not based on research]. | Causes that relate to the use of research | **.552** | .178 |
| 18. Praktisi pendidikan dan pembuat kebijakan sangat jarang melakukan penelitian sendiri [Educational practitioners and policy-makers very rarely carry out research themselves]. | Causes that relate to research and the use of research | **.534** | .118 |
| 13. Kurikulum perguruan tinggi yang mencetak guru tidak didasarkan pada penelitian [Teacher training colleges do not base their curricula on research]. | Causes that relate to the use of research | **.509** | .252 |
| 2. Penelitian kependidikan sampai saat ini belum menghasilkan manfaat secara praktis [Educational research has not yet produced practical applications]. | Problems that constitute a research-practice gap | -.198 | **.928** |
| 1. Penelitian kependidikan sampai saat ini belum menghasilkan pengetahuan ilmiah yang penting [Educational research has not yet produced important scientific knowledge]. | Problems that constitute a research-practice gap | -.155 | **.878** |
| 9. Tidak ada hubungan antara berbagai penelitian kependidikan [Educational research does not ask the right questions]. | Causes that relate to research | -.030 | **.710** |

| | | | |
|---|---|---|---|
| 8. Penelitian kependidikan tidak mengajukan pertanyaan yang dapat menyelesaikan permasalahan pendidikan [Educational research does not ask the right questions]. | Causes that relate to research | .058 | **.690** |
| 6. Penelitian kependidikan tidak dapat menghasilkan hasil yang bermanfaat karena pendidikan terlalu kompleks [Educational research cannot yield useful results because education is too complex]. | Causes that relate to research | .108 | **.626** |
| 4. Praktisi pendidikan dan pembuat kebijakan tidak menggunakan hasil penelitian [Educational practitioners and policy-makers do not apply the results of research]. | Problems that constitute a research-practice gap | .140 | **.584** |
| 10. Kualitas ilmiah penelitian kependidikan masih rendah [The scientific quality of educational research is usually poor]. | Causes that relate to research | .065 | **.564** |
| 5. Praktisi pendidikan dan pembuat kebijakan menggunakan penelitian tidak sesuai dengan peruntukkannya [Educational practitioners and policy-makers use re- search haphazardly and irresponsibly]. | Problems that constitute a research-practice gap | .328 | **.519** |
| 15. Mendiskusikan penelitian kependidikan tidak seharusnya dengan praktisi pendidikan dan pembuat kebijakan [Consulting educational research is not standard with educational practitioners and policy-makers]. | Causes that relate to the use of research | .016 | **.511** |
| 3. Praktisi pendidikan dan pembuat kebijakan kurang merespon penelitian kependidikan [Educational practitioners and policy-makers have a low opinion on educational research]. | Problems that constitute a research-practice gap | .188 | **.510** |
| 24. Penelitian kependidikan memberikan kontribusi lebih sedikit daripada yang umumnya diasumsikan, bahkan ketika penelitian tersebut terus berkembang dan hasilnya digunakan secara optimal [Educational research contributes much less to the field than is generally assumed, even when it continues to develop and the results are used optimally]. | Causes that relate to research and the use of research | .283 | **.394** |
| 11. Hasil-hasil penelitian kependidikan tidak dapat didapat dengan mudah [Reports on educational research are inaccessible]. | Causes that relate to research | -.062 | **.379** |
| **Percentage of variance explained (%)** | | 39.843 | 9.177 |
| **Cronbach's Alpha** | | .902 | .877 |

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 3 iterations