Item Analysis Training Problems with Software to Improve Teacher's Competencies in Blitar

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ABSTRACT

One of the demands of a professional teacher is being able to make quality questions. Item analysis is one way to obtain quality questions. Therefore, in this community service, the PKM team conducted an item analysis training held at Campus 3 of Malang State University in Blitar City, which was attended by 19 teacher participants from three sub-district representatives in Blitar City. The purpose of this dedication is to: (1) increase the awareness of teachers the importance of analyzing items, (2) provide insight about compiling good instruments and analyze items so that they get quality instruments, (3) assist to teachers in analyzing items using ITEMAN, Anates, and Excel. The method of carrying out this dedication activity is carried out with lectures, demonstrations, and practices, assignments, discussions, and presentations. The training was held for four days and was attended by all participants in a disciplined and orderly manner. PKM results show that all participants were able to (1) compile a good test instrument, (2) understand the importance of analyzing items, (3) analyze items using software using ITEMAN, Anates, and Excel.

INTRODUCTION

Teachers have a very important role in improving the quality of national education. Thus, the government sets academic qualifications and teacher competency standards outlined in Permendiknas No. 16 of 2007 (No, 16, p. 16). One of the core competencies of teachers is conducting assessment and evaluation of learning processes and outcomes. That is the Permendiknas teachers are required to develop assessment instruments and analyze the results of the assessment process and learning outcomes. From the results of previous community service evaluations and short interviews with several elementary school teachers in Blitar City, it was revealed that they generally had difficulty in knowing the character of the items that had been made. Difficulties experienced mainly in analyzing the items to determine the validity, reliability, distinguishing features, and the difficulty index of each item that has been made because they have to calculate manually. This is because not many teachers know the application that can analyze the items from student learning outcomes (Sayekti & Mahardika, 2014).

The rapid development of technology is very helpful for various sectors of life is no exception in the education sector. Many application programs can be used by teachers to support teacher professionalism. One example of software that can be used to analyze items in Excel, SPSS, ITEMAN, RASCAL, ASCAL, and ANATES.

Blitar city is known as the City of Patria, City of Lahar, and the City of Proclamation was legally formally established on April 1, 1906. Blitar city Defenders of an Orderly, Neat, Beautiful, and Safe Homeland also known as the city of heroes, the city of students, as well as a safe and peaceful city. Blitar city has been divided into three subdistricts, namely Sukorejo District, Kepanjenkidul District, and Sananwetan District. Of the three districts, it is completely divided into 21 Sub-Districts.

Based on the analysis of the situation above, a community service activity was carried out on " Item Analysis Training Problems With Software To Improve Teacher's Competencies In Blitar ". The Software Used In This Training is Iteman, Anates, and Excel.

This training in the hope can assist teachers in analyzing the items that have been created to improve the quality of classroom learning assessment of her which in turn will have an impact on improving the quality of education, especially in the area of Blitar.

LITERATURE REVIEW

Assessment is one important component of the education process. The concept of assessment arises based on the idea that learning is not just a transfer of knowledge from someone who knows better to those who do not know, but rather is active cognitive processing that occurs when someone interacts with new ideas (Hadiana, 2015).

Assessment is an integral part of learning activities in class. Based on the re-

sults of the assessment, many things that can be obtained by the teacher are: able to determine the next steps, know the success of student learning, the accuracy of the teaching methods used, motivate students, even assessments can influence learning behavior because students tend to direct their learning activities towards the estuary of the assessment conducted teacher. Because of the importance of assessment, teachers need to have a correct understanding of various aspects of assessment so that they can design and implement learning assessments well.

One of the assessment process and student learning outcomes can be done with tests. Of course, quality test questions are needed, which can measure the ability of students after participating in learning activities. A good test will be able to reveal the true state of students. Therefore, an analysis of the quality of the evaluation questions is needed so that the results of the evaluation represent the ability of students. This is in line with the opinion of Amalia & Widayati (2012) that the activity of analyzing items is an activity that teachers must do to improve the quality of the questions that have been written.

Item analysis activities are very helpful in obtaining quality questions that can provide information as precisely as possible by their objectives. The purpose of item analysis is to help improve tests through revisions or discarding ineffective questions and to find out diagnostic information to students whether they already/do not understand the material that has been taught (Kurniawan et al., 2017).

Item analysis activities have many benefits, including: (1) can help test users in evaluating the tests used, (2) very relevant for the preparation of informal and local tests such as tests prepared by teachers for students in the class, (3) support the writing of effective items, (4) materially can improve tests in class, (5) increase the validity of questions and reliability, and (6) to improve items through three components of analysis, namely the level of difficulty, differentiation, and deception question.

Based on the above thought, to see the quality of a test can be done using qualitative (theoretical) and quantitative (empirical) analysis. Qualitatively the test is said to be good if it meets the requirements of the preparation in terms of material, construction, and language, and construct, while quantitative analysis includes the measurement of item difficulty and item discrimination including the validity of the questions and their reliability. So, two ways can be used in item review, namely a qualitative and quantitative study of questions. Both of these techniques have advantages and disadvantages. Therefore, the best technique is to use both (merging).

There are several aspects related to the analysis of the questions so that a test can be said of quality, namely validity, reliability, the level of difficulty of the questions, different power, answer distribution patterns, and effectiveness of deceivers (Nur & Palobo, 2018). The following explanation. First, the validity of the test is defined by the extent to

which the test has measured what should be measured and can predict other behavior related to the measured variable. Second, the reliability of the test that illustrates the permanence of the test that is always associated with the consistency of measurements from one measurement to another. Third, the difficulty level is the comparison of the number of test-takers who answer correctly with the total number of participants and this depends on the ability of the examinees. Fourth, the difference in power which is the ability of a question to distinguish between students who have mastered and have not mastered the material. The five answer distribution patterns that can describe students determine the choice of answers to the possible answers that have been paired on each item. The sixth effectiveness of the deception problem is how well the wrong choice can deceive the test takers who do not know the answer keys available. The more test takers choose the deception, the deception functions well.

Item analysis was done by the teacher so far has been done manually which involves many formulas so it is not practical and results in many teachers not wanting to do item analysis. According to Nur & Palobo (2018), item analysis can be done effectively and efficiently through the help of computer applications. One of them is using ITEMAN, Anates, Excel, SPSS, RASCAL, and ASCAL software. In this service, the software used is ITEMAN, Anates, and Excel.

ITEMAN is a computer program that is used to classically analyze items. This program includes a package of the program in MicroCAT °n which was developed by the Assessment Systems Corporation beginning in 1982 and undergoing revisions in 1984, 1986, 1988, and 1993; starting from version 2.00 up to version 3.50.

The ITEMAN program can be used to: (1) analyze data files (ASCII format) answers to items generated through manual data entry or from a scanner engine; (2) scoring and analyzing multiple-choice questions and Likert scale data for 30,000 students and 250 items; (3) analyze a test consisting of 10 scales (sub-tests) and provide information about the validity of each item (distinguishing power, difficulty level, the proportion of answers to each option), reliability (KR-20/ Alpha), *standard error of measurement, mean, variance*, standard deviation, *skew, kurtosis* for the number of scores on the correct answer, minimum and maximum scores, median scores, and frequency distribution of scores.

Anates is a computer program software developed by UPI lecturers to analyze items. This program is particularly useful for teachers in general and observers of educational evaluation. Anates has the advantage that it can be used to analyze items in the form of description and multiple-choice and the program's instructions are easy to understand because it uses Indonesian.

The results of the analysis for multiple-choice and the description are quite complete, the multiple-choice not only produces output in the form of validity, reliability, difficulty level and the different power of questions but also can analyze the choice as a distractor in the multiple-choice test. Analysis of the description test is no less effective, for the test the description of Anates software users only needs to input data in the form of student scores per question and the maximum score for each question. Anates feature also makes it easy for users to add subjects or questions without having to re-input from the beginning (Ariany & Al-Ghifari, 2018)

In addition to the advantages described above, Anates also has weaknesses, namely: filling data can only be done manually, and errors in entering data will reduce its value in the final result.

MATERIAL AND METHOD

The competency that must be possessed by teachers according to the Ministry of National Education is that they are capable able to develop assessment instruments and analyze the results of the assessment process and the learning outcomes. From the results of previous community service evaluations and short interviews with several elementary school teachers in Blitar City, it was revealed that they generally had difficulty in knowing the character of the items that had been made. The difficulty is mainly in analyzing the items to determine the validity, reliability, distinguishing

features, and the difficulty index of each item that has been made. Many application programs that can be used by teachers to support teacher professionalism, for that training is needed item analysis using software to overcome the above problems. One example of software that can be used to analyze items in Excel, SPSS, ITEMAN, RASCAL, ASCAL, and ANATES.

The stages of activities undertaken to achieve the objectives of community service activities are: 1) Preparation of the program with the task force team enriching knowledge about the analysis of items, 2) Teacher data collection in the Blitar City area, 3) Agreeing on the schedule of community service activities, 4) Preparation of tools and materials for service activities, 5) Training implementation and 6) evaluation of the implementation and preparation of reports.

Strategic Intermediate Targets

The target audience as strategic audiences to be involved in this training activity was 19 people: Primary school teachers in Blitar City representing each sub-district in Blitar City who were invited through the Blitar City Education and Culture Office. Teachers who are prioritized graduates of education to be able to disseminate the results of training to elementary school teachers in the vicinity. Besides, it is expected to be able to foster teachers in their schools and be able to disseminate the results of training to teachers in the vicinity.

Participants are strategic targets, because the experience gained is not only for themselves, but can be transmitted to peers in the area to their sub-districts and no less important is practiced in learning in their classrooms.

Method of Implementation

In carrying out this training, several methods are used, namely: lectures, questions, and answers, demonstrations, practices, assignments, discussions, and presentations. The explanation is in Table 1. below.

The following explanation of some of the methods contained in the table is (1) Lecture and Question and Answer. This method is used to deliver material on criteria for constructing good instruments and analyzing items. (2) Demonstration and practice. The demonstration method is used to give examples or demonstrate how to analyze items using Anates, ITEMAN, and excel ready to use. Practical methods are used to make good instruments and analyze items using Anates, ITEMAN, and excel ready to use. With this method, all active participants practice the

Table 1.
Training Materials

No	Training Material	Method
1	Concept of Assessment in Curriculum 2013	Lecture, question and answer, discussion
2	Development of Test Instruments	Lectures, questions and answers, discussions, assignments, practices, and presentations
3	Guidelines for Writing	Lectures, questions and answers, discussions, assignments, practices, and presentations
4	Item Analysis Problem	Lectures, questions and answers, discussions, assignments, practices, and presentations
5	Item Analysis Analysis with ITEMAN	Lectures, questions and answers, discussions, assignments, practices, and presentations
6	Analysis of Problem Items with Anates	Lectures, questions and answers, discussions, assignments, practices, and presentations
7	Analysis of Problem Items with Excel	Lectures, questions and answers, discussions, assignments, practices, and presentations

theories that have been received in advance, either made manually or by using a software application program Anates, ITEMAN, and excel ready to use. with a computer. (3) Giving assignments. This method is used to give training participants individually and in groups to trainees to learn about the items. (4) Discussion and presentation. The discussion method is used by participants in groups to make good instruments and analyze items. It is also used to evaluate and discuss the good feedback about the pros ice would also result in community service activities. While the presentation method is used to report the work of individuals and groups.

RESULT AND DISCUSSION

Community service is one form of practice from the Tri Dharma of higher learning. One form of community service is the provision of training needed by a group of people. In this section, it is explained concisely about the implementation of community service activities ranging from coordination to the completion of community service activities.

The training activities for the analysis of test instrument items were carried out since the proposal was declared accepted and received certainty of funding assistance from the Faculty of Education. The activity began with conducting an operational design seminar with the Review Team from the Faculty. At the operational design seminar, input was obtained so that the target of community service participants was limited according to the number of

funds received. Besides, it is expected that there is a guide book output.

The training service activity was attended by 19 participants who were a group of teachers from the city of Blitar. The implementation of this activity lasts for 4 days namely on 18-19 and 25-26 October 2019. Each meeting is allocated within 8 hours. The activity which was also assisted by 2 PGSD students, generally went smoothly.

The first meeting of the training activities was held on Friday, October 18, 2019. The sequence of service activities on the first day, namely, the opening, the pretest by using online applications, followed by the basic concepts of material assessment and valuation principles that guided ole h Dra. Lilik Bintartik, M.Pd. From the activity of delivering the first material, it was obtained that in some of the training participants there were still misconceptions about the concept of assessment. As can see in Figure 1.

The next material is about the basic concepts of assessment instruments guided by Yuniawatika, S.Pd., M.Pd. In this second activity, the facilitator asks an assessment instrument that is often used in learning activities. Most participants only used the instrument in the form of multiple-choice, filling, and description, although there were many types of objective and essay types. This is in line with the findings of Kartini et al., (2017) that some elementary school teachers in Blitar City do not yet have adequate insights and skills regarding the 2013 curriculum

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assessment especially their instruments. As can see in Figure 2.

After Ishoma, the activities continued with the basic concept of material development and test instruments guided by Dra. Sri Estu Winahyu, M.Pd. The material discussed is about the steps in developing a test instrument accompanied by examples. Then it was interspersed with a coffee break and continued with the last material in this first meeting, which was about guidelines for casting with facilitators namely Yuniawatika, S.Pd., M.Pd. Participants expressed that usually participants

immediately made the test instrument without the accompanying grid and the guideline for the preparation that should have been prepared before distributing the test instrument. Whereas improving the quality of education can be achieved well if the teacher can prepare the learning process well and carefully (Yuniawatika & Nuraini, 2017). One of them is from the assessment element which can prepare the lattice and the guideline for casting well.

In the second meeting on 19 October 2019, the activity began at 08.00 guided by

Figure 1.
Submission of material by Dra.
Hj. Lilik Bintartik, M. Pd.

Figure 2.
Submission of material by
Yuniawatika, M. Pd.

Dra. Harti Kartini, M. Pd with the material namely item analysis both qualitatively and quantitatively. Also, the speaker discussed one piece of software that can be used to analyze the item, ITEMAN. ITEMAN is a computer program that is used to classically analyze items. As can see in Figure 3.

The event continued with Ishoma's activities. After Ishoma, the activity continued with the analysis of items using Anates and Excel ready-to-use software, guided by the resource person, Mr. Ibrahim Sani Ali Manggala, M.Pd. participants were very enthusiastic about using this software because participants had often heard of the software but this time they could immediately learn it. The training activities ended with giving individual assignments to design the test instrument grids along with the scoring guidelines. As can see in Figure 4.

On the third meeting on October 25, 2019, the activity began with the practice of developing test instruments and casting guidelines both holistically and analytically and ended with a presentation. During the drafting activities, the task force team toured the participants' activities while occasionally providing guidance. The participants seemed enthusiastic in carrying out their tasks. From the results of observations on the performance of the participants, it shows that the participants

Figure 3.
Submission of Material by
Dra. Harti Kartini, M.Pd.

Figure 4.
Submission of Material by
Ibrahim Sani Ali Manggala, M. Pd.

have been able to develop test instruments and prepare guidelines for scoring. The activity at the third meeting ended with presentations from each participant while being given input both by the task force team and by other participants. As can see in Figure 5.

October 26, 2019, was the last meeting of the training activities. The activity began with the practice of item analysis using the three software previously discussed namely ITEMAN, Anates, and Excel ready to use. From the results of observations on the performance of participants, it shows that using Anates and Excel ready to use software does not find any problems. But the participants still had difficulty using ITEMAN due to the many languages using foreign languages. After the

practice, the activity continued with the presentation of the participants' practice results. When making a presentation, the facilitator conducts alignment in analyzing the results of the item analysis. This needs to be done so that participants can understand the purpose or meaning of the numbers that arise from the results of the revised software. From the results of the presentation it was found that the participants had been able to develop test instruments, compile the guideline for testing, and analyze the test instruments using software both ITEMAN, Anates, and excel ready to use. As can see in Figure 6.

From the results of the performance, illustrates that the participants are enthusiastic

Figure 5.
Procession of Participant
Questions and Answers with
the Implementation Team

Figure 6.
Participant Assistance by
the Implementation Team

and liability response high enough participants. This can be seen from the results of the participants' performance in doing the assignments and when the participants presented their work.

The training activities ended with a post-test and carried out reflection and evaluation of all activities from the beginning to the end of the activity. all certificates are submitted then sharing of experience about what materials need to be improved by subsequent activities.

Pre-test and *post-test* in this training are arranged in the form of individual written

tests with a composition of questions for 2 5 multiple choice questions about item analysis. Based on the *pre-test* and *post-test results*, the average scores of the specific participants in the multiple-choice questions are as follows.

Based on Table 2. and Figure 7. above it can be seen that there is an increase. This improvement shows participants have a better understanding related to the theoretical and practical basis in analyzing test items.

In the reflection activity, participants were given written questions. From their answers, several things were known, namely:

Table 2.
Descriptions of Training Participants' Pretest and Posttest Data

No	Test	n	X_{min}	X_{max}	
1	Pretest	19	24	64	45.05
2	Postes	19	66	98	82

(1) All participants (100%) stated that the training activities were very useful. (2) For the majority of training time (62.6%) the participants stated that it was very adequate and adequate and the rest said it was sufficient. (3) The time provided for carrying out the tasks was adequate by more than half the participants (87.5%). (4) The explanation given by the speakers, 100% of the participants said that it was very easy to understand and understand. (5) The giving of papers and examples was assessed by the majority of participants (93.75%) which was very helpful in doing the assignment. (6) Overall, the training was considered very enjoyable because the participants were actively involved both physically and mentally. Besides, the participants felt happy because there were assistance and guidance to develop test instruments, compile guidelines for scoring, and the most fun activity was the analysis of test instruments using the software. Participants stated that there were no unpleasant activities because all the activities were fun. The task that is considered difficult is to analyze using Iteman. While the task that is deemed easy is to analyze using Anates and Excel ready to use. (7) For the shortcomings of this training, it was stated that there were
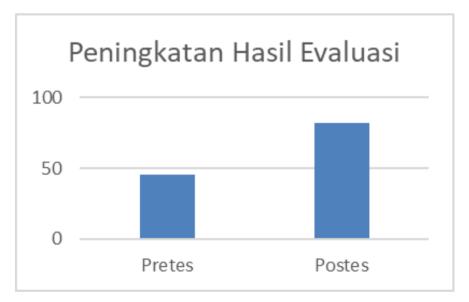

Figure 7.
Pretest and Posttest Graph of Training Results

no deficiencies by some participants. While others stated that the time was very limited. (8) Suggestions conveyed by participants include: there is a need for *Ice Breaking*, it is necessary to hold more often to improve teacher competency, training like this should be done frequently or periodically by involving more participants. The implementation time is expected to be extended so that the experience gained by the public becomes more. (9) Participants expect that there will be more training for other materials, namely the use of innovative learning media, the use of multimedia learning technology, misconceptions and deepening of mathematics or science material, the use of smartphone-based learning technology, teaching techniques, application of online application learning innovations, learning experiences. n material for the preparation of lesson plans and HOTS questions, and manufacturing of teaching aids. (10) When asked about the follow-up that will be carried out by the participants after attending this training, most of the participants stated that they would apply it in the learning in their respective classes. The training material is considered to inspire teachers to work and be creative in designing fun assessment instruments. They will try to analyze the questions used so that they can revise the questions so they can produce good quality questions. Besides, participants will disseminate their experiences to colleagues in their elementary school and other elementary schools and some participants said they would apply it to their students.

The results of the reflection from the participants found that the participants were pleased with the additional insights that could inspire the teacher in compiling good and quality questions. The training was declared running smoothly according to plan. Participants play an active role and the facilitator is very cooperative in guiding and directing participants in the work.

CONCLUSION AND RECOMMENDATION
Conclusion

The training activity of analyzing the test instrument items with the help of software to improve the competence of elementary school teachers in Blitar City is one of the community service activities carried out by the Community Service Team. Based on the explanation of the implementation, evaluation, and reflection of training activities for elementary school teachers in Blitar City, it can be concluded that the training program can be carried out properly and runs smoothly according to the planned activity. This activity was very well received, as evidenced by the active participation of the participants in the training and completing assignments well. During the training, no participants left the place before the training time ended. The response of the participants was also very good they expected additional training time and similar activities to be held periodically with other materials.

From the results of this activity, there were 19 dissertation test instruments on the results of the analysis of items that had been tested at the school where the participants served. Moreover, it is known that understanding d early skills of the participants experienced an increase in analyzing items.

Suggestion

Based on the results of the evaluation of the implementation of the training that has been conducted, several suggestions can be submitted, namely:

1. Ice Breaking is needed for each session to help participants focus more

2. There is a need for further activities in the form of training which is based on an analysis of the needs and expectations of elementary school teachers in the target area and is held periodically with more participants to improve teacher competency.

3. The time to carry out community service activities needs to be increased so that participants gain more insight and experience. This is in line with the expectations expressed in writing by most participants. The consequence of this expectation is to increase the amount of funds allocated for each proposal submitted to the institution. Another solution can be done with the active role of the target institution to participate in funding community service activities.

REFERENCES

Amalia, A. N., & Widayati, A. (2012). Analisis butir soal tes kendali mutu kelas XII SMA mata pelajaran ekonomi akuntansi di kota Yogyakarta tahun 2012. *Jurnal Pendidikan Akuntansi Indonesia*, *10*(1).

Ariany, R. L., & Al-Ghifari, A. (2018). Penggunaan Software Anates Untuk Validasi Instrumen Tes. *Jurnal Al-Khidmat*, *1*(1), 73–78.

Hadiana, D. (2015). Penilaian Hasil Belajar untuk Siswa Sekolah Dasar. *Jurnal Pendidikan Dan Kebudayaan*, *21*(1), 15–26.

Kartini, H., Yuniawatika, Y., Bintartik, L., & Winahyu, S. E. (2017). PELATIHAN PENILAIAN HASIL BELAJAR UNTUK MENINGKATKAN KOMPETENSI PROFESIONAL GURU. *Abdimas Pedagogi: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, *1*(1).

Kurniawan, R. Y., Prakoso, A. F., Hakim, L., Dewi, R. M., & Widayanti, I. (2017). Pemberian Pelatihan Analisis Butir Soal Bagi Guru di Kabupaten Jombang: Efektif? *Jurnal Pemberdayaan Masyarakat Madani (JPMM)*, *1*(2), 179–193.

No, P. (16). Tahun 2007 tentang Standar Kualifikasi Akademik dan Kompetensi Guru. *Jakarta: Dharma Bhakti*.

Nur, A. S., & Palobo, M. (2018). Pelatihan Analisis Butir Soal Berbasis Komputerisasi Pada Guru SD. *MATAPPA: Jurnal Pengabdian Kepada Masyara-*

kat, *1*(1), 5–11.

Sayekti, I. C., & Mahardika, A. (2014). *PENGENALAN DAN PELATIHAN SOFTWARE ANALISIS BUTIR SOAL PILIHAN GANDA MELALUI PRO-GRAM EXCEL UNTUK MENINGKAT-KAN PROFESIONALISME GURU DI SDN 2 MAGERSARI.*

Yuniawatika, Y., & Nuraini, N. L. S. (2017). Pendampingan Penyusunan Rencana Pelaksanaan Pembelajaran Tematik Sci-entific Dengan Pembelajaran Karakter Terintegrasi. *Abdimas Pedagogi: Jurnal Ilmiah Pengabdian Kepada Masyarakat*, *1*(1).