Content Validity Estimation of Assessment Instrument Based on Volleyball Information System of Volleyball Learning: Field Research

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Abstract. This study aims to estimate the value of the content validity of assessment instruments in playing volleyball with the basis of volleyball information system (VIS) on the basic skills namely serve, receive, set, block, spike and dig. The study was conducted toward 12 students as practitioners and five lecturers as academics of volleyball who are known as Subject Metter Experts (SME). This preliminary study was conducted in Bandung, Indonesia, by utilizing Focus Group Discussion (FGD) to assess the appropriateness of the basic skill items which are developed to assess student performance when they are playing volleyball. The instrument used is modified from the VIS that is developed by the Volleyball International Federation (FIVB) in 2005 with six main criteria, namely the serve, receive, set, block, spike and dig. The results of data analysis is gained by using the estimation of content validity (Lawshe’s CVR), it resulted the value ratio between 0.60 until the 1.00. The score exceed the minimum threshold criteria 0:50 as the standard that value ratio is acceptable. Thus, the results of the validation shows that the early stages of assessment instruments based on VIS is proven valid in measuring the content of the performance of volleyball playing for high school students.

1. Introduction
In the learning process, the measurement of learning outcomes is a process that is often carried out by each teacher, either at the primary school level (SD), junior high school (SMP) or senior high schools (SMA), it is intended to measure the ability of learners after getting through a learning process. Therefore, the measurement is called an act of giving an assessment of learning outcomes that have been achieved by learners [1]. In the measurement process there is a measuring tool or instrument used to obtain data on learning outcomes of students, so the instrument has an important role in the process of test, measurement and evaluation, it is because the instrument is a tool that is used to obtain data on learning outcomes of students. Instruments have two main criteria, namely the reliability and validity, it is assumed because basically the validity and reliability have a very important role in relation to the criterion of a test as a reliable measuring instrument [2].

Factual condition in the field, there are still many assessment instruments that do not have the criteria of accountable validity and reliability, one of which is an instrument to measure the skills of volleyball playing, in general, an instrument to measure the skills to play volleyball is still based on an objective assessment or simply measure the accuracy of punches on the target area based on some test items and
implemented not in condition to play. While the field conditions, the learning process has been modified to play volleyball in the real game. Therefore, measurement that should be implemented is a measurement which is based on the assessment of performance when they are competing. It became one of the problems or researchers’ GAP to solve the problem, so that on a practical level measurements on learning to play volleyball results will be more accurate and precise and efficient when used in the learning process.

The results of research related to the development and validation of assessment instruments in the volleyball game are basically still rarely carried out, a recent study conducted by Palao, Lopez & Ortega examine the model and the validity of the instrument for measuring techniques and tactics on a branch of beach volleyball, however, such instruments were used to measure the athletes when they are playing and competing instead of the conditions of the learning environment [3], as for instruments that can be used in learning is an instrument developed by Oslin, Mitchell & Griffin that is called Game Performance Assessment Instrument (GPAI), the instrument is used to measure the performance of playing and critical understanding, and ability to solve tactical problems by applying suitable skills [4], then AAHPER Volleyball skill Test that is included into the type of battery tests and aims to measure students' skills in mastering the basic techniques of playing volleyball namely Passing, Serving, Setting, Volleying [2]. While the instrument is typically used for measuring and assessing the performance of athletes in game conditions is volleyball information system (VIS), which was developed by the FIVB, the instrument is a program to complete a game that includes statistics for each individual player to a team [5]. VIS-based instrument has six assessment criteria, namely the evaluation of the attack, evaluation of the block, evaluation of the service, evaluation of the dig, evaluation of the set, and evaluation of the service reception [5]. Six evaluation criteria based on the real criteria in volleyball games are based on software. The scoring techniques that were applied in the VIS instrument using the technique of checklist with three categories of outcome assessment blow that success, fault, attempt [5]. Success category will be given when the athletes are successful in doing blow technique, fault category will be given when athletes do not succeed or die in doing blow technique, while the attempt will be given when the athletes successfully perform stroke technique and managed to shut down the opponent so as to make point increases for the team [5].

The issues above becomes one of the focus of issues on the problem to be solved, it aims to produce a more reliable instrument in the process of test, measurement and evaluation, particularly in the context of sport. Especially in terms of testing the validity of the type of content validity to be assessed by the experts judgment of academics and practitioners, because basically the content validity testing is still rarely applied in the instrument development process, particularly in instrument development skills.

2. Methods

2.1. Participants
 Participants in this preliminary study consist of 12 students as practitioners and five lecturers as academics sports volleyball who are known as Metter Subject Experts (SME). The participants were selected and determined using a purposive sampling technique [6] to the subject of inclusive criteria, namely (1) students from the student activity units (UKM) volleyball, (2) lecturers who have expertise in the field of volleyball.

2.2. Data Collection Procedures
 This preliminary study conducted in Bandung, Indonesia, by conducting Focus Group Discasion (FGD) [7]. It is aimed at checking compatibility between items that have been developed with indicators, materials or learning objectives have been set [8] The data obtained from the assessment results SME assessing the appropriateness of the task item movement developed by VIS instrument with indicator and the material being taught to students at the high school level.
2.3. Data Analysis Techniques

Statistical analysis technique that was used to estimate the content validity is validity ratio (CVR) Lawshe [7-10], the analysis used to estimate the content validity based on the judgement of the five SME of academics and 12 of the practitioners. Here’s the formula that is applied in the analysis of the CVR:

\[
CVR = \frac{M_p - M}{ \frac{M}{2}} = \frac{2M_p}{M} - 1 \quad (1)
\]

Note:
- \(M_p\) = The number of experts who said it was important;
- \(M\) = number of experts who validate

With the index ranged ratio \(-1 \leq CVR \leq 1\), and has the following criteria:
- \(M_p < \frac{1}{2}M\) so \(CVR < 0\);
- \(M_p = \frac{1}{2}M\) so \(CVR = 0\);
- \(M_p > \frac{1}{2}M\) so \(CVR > 0\)

3. Result

### Tabel 1. Panel Expert Judgment

| Scoring Indicator | Item | Judge | JK | Mean | CVR |
|-------------------|------|-------|-----|------|-----|
| KD Volleyball Playing | Servis | 1 1 1 1 1 1 0 1 6 | 0.86 | 0.71 |
| | Recept | 0 1 1 1 1 1 6 | 0.86 | 0.71 |
| | Set | 1 1 1 1 1 1 1 7 | 1.00 | 1.00 |
| | Attack | 1 0 1 1 1 1 6 | 0.86 | 0.71 |
| | Block | 1 1 1 1 1 0 1 6 | 0.86 | 0.71 |
| | Dig | 1 1 1 1 0 1 6 | 0.86 | 0.71 |

### Table 2. Result of Practitioner Courses

| Scoring Indicator | Item | Judge | JK | Mean | CVR |
|-------------------|------|-------|-----|------|-----|
| KD Volleyball Playing | Servis | 1 1 1 1 1 0 1 1 11 | 0.86 | 0.83 |
| | Recept | 0 1 1 1 1 1 1 11 | 0.86 | 0.83 |
| | Set | 1 1 1 1 1 1 1 12 | 1.00 | 1.00 |
| | Attack | 1 0 1 1 1 1 0 1 11 | 0.86 | 0.67 |
| | Block | 1 1 1 1 0 1 1 11 | 0.86 | 0.83 |
| | Dig | 1 1 1 0 1 1 0 9 | 0.86 | 0.50 |

Based on the analysis of content validity by using Lawshe's CVR technique, in Table 3.1 obtained the ration of content validity with the range between 0.71 until 1:00. Value ratio of 0.71 was obtained at a service item, recept, attack, block and dig, it shows that there is one of the experts who claim that the five items of skills considered important or too complicated when it is used for high school students. However, the ratio of 0.71 is still in the value ratios above the minimum value of 0.50 [8-9] for testing lawshe technique (CVR), this means that the five items they can be used in instrument-based basic skills volleyball playing based on VIS. Meanwhile, item set got the value of ratio content validity about 1.00.

Then the results of validation testing content rated by 17 students (table 3.2) ratio values obtained stretched between 0:50 until 1:00, this means that the value of ratio obtained already qualified to be a skill item to measure the skills of volleyball. Based on the results of the analysis, all the amount of content validity coefficient indexes are greater than 0.50 therefore items to be developed in the basic skills to play volleyball declared invalid in the content, whether it is assessed by academic experts in the field and at the level of practitioners who will be the observer / Assessor field. Items that have a ratio
value below 1.00 will be fixed in accordance with the advice of academics and practitioners, it aims to simplify the assessment process when the observations to be used in empirical testing of the validity of CVR. The graph of test results are presented below.

**Analysis Result of CVR Expert Judgment**

Graph 1. Graph of Judgment Analysis CVR Expert

**Analysis Result of CVR Practitioner**

Graph 2. Graph Analysis of CVR Practitioner

4. Discussion

The purpose of this preliminary study is to estimate the value of the content validity assessment instruments of volleyball playing by VIS based on the basic skills namely serve, receive, set, block, spike and dig. As mentioned in the previous discussion that the content validity test is a testing of the validity of the instrument development process, particularly on the development of skills assessment instrument based on VIS. In testing the content validity items, a test is valid if the items that are developed can properly measure indicators, materials or learning objectives that have been set and assessed by experts in specific scientific [7]. There are several analytical techniques that can be used to determine the estimated value of the content validity such as (1) Percentage of items that matched the indicators / objectives, (2) index, a match point with a goal, (3) Content validity ratio (CVR) from Lawshe, (4) index V of Aiken [7-10]. However, the analytical techniques that are used in the content validity test of this research is the technique of Content validity ratio by Lawshe.

The results of the analysis proved that the content validity applied Lawshe's CVR technique, obtained the range of ratio between 0.71 and 1:00. Their value ratio of 0,70 indicates that there is one expert who
claims that it is not suitable or too complicated to use high school students. However, the ratio was still at a value above the minimum value ratio of 0.50, meaning that the value of this ratio is acceptable and otherwise valid contents. Similarly, the assessment made by the practitioners who will be the observer in a test empirically, the results of an assessment of the items that have been developed stretches between 0:50 until 1:00. Value ratio of 0:50 that is caused by three assessors that stated that the item is not suitable for assessing the results of the basic skills to play volleyball, then the value of the ratio is 0.67 because there are two people appraiser stating that the items are developed is not suitable, and the value of the ratio of 0.83 indicates that one appraiser considers the item is not suitable for assessing the basic skills to play volleyball.

These results corroborate the theory that some of the content validity by using CVR will be influenced by a number of assessors from experts and the number of people who said it was important in assessing the suitability of an item with indicators [8]. Index ratio ranges from -1 to +1 ≤ CVR ≤ Mp criteria <½ M CVR <0; Mp = ½M CVR = 0; Mp> ½ M CVR> 0 [8-11]. Therefore, it needs to be revised in accordance with the advice given by the experts, the suggestions regarding the accuracy of the items are arranged based on the indicators and the accuracy of the sentence must be appropriate and could be understood. Based on these suggestions item re-revised and consulted back until the experts declared fit and declared the item is valid on testing content validity. It reinforces the theory that the content validity test to look for is the extent to which test items that cover the entire area of the contents of the object to be measured [10].

The results of the study expert analysis generated in this study supports the results of research and development such as [12], those who conducted the test phase as a phase of qualitative content validity by using analytical techniques CVR before continuing on empirical testing. In addition, the test results proved consistent in terms of content validity ratio with some of the results of research conducted [13-17]. Yet another study found some differences after the data analysis techniques are reviewed and assessed by experts, including some of the results of research development instrument developed [18-20] Some research using analytical techniques to assess the percentage of agreement of the expert after examining instrument has been developed so that the amount of the value of the deal stretched between 0 to 100%.

5. Conclusion
This early stage validation results show that instrument-based assessment of VIS proven valid in measuring the content of the performance of playing volleyball for high school students. Regarding the statement, test instruments that are tested in this preliminary study can provide feedback on the skill level of students involved in volleyball school learning programs.

References
[1] Morrow, J.R., Jackson, A.W., Disch, J.G., & Mood, D.P. (2005). Measurement and evaluation in human performance. (3rd Edn). Canada: Human Kinetics.
[2] Lacy, Alan C. (2011). Measurement & Evaluation in Physical Education and Exercise Science. San Francisco: Pearson Education, Inc.
[3] Palao, Lopez & Ortega. (2015). Design and validation of an observation instrument for technical and tactical actions in beach volleyball. Original article Motris, Rio Claro. 21(2), 137-147
[4] Oslin, Mitchell & Griffin. (1998) The Game Performance Assessment Instrument (GPAI) : Development and Preliminary Validation. Journal of Teaching in Physical Education, 17, 231-243.
[5] Staff Guidelines. (2005). FIVB Volleyball Information System. Handbook
[6] Johnson, B., & Christensen, L. (2012). Educational research: Quantitative, qualitative, and mixed approaches. (4th. Eds). Los Angeles: Sage Publication, Inc
[7] Denzin, N.K & Lincoln, Y.S. (2009). Handbook of Qualitative Research Edisi Bahasa Indonesia. Yogyakarta : Pustaka Belajar.
[8] Susetyo, B. (2011). Menyusun Tes Hasil Belajar. Bandung. CV. Cakra
[9] Gregory, J. R. (2011). *Tes Psikologi, Sejarah, Prinsip, dan Aplikasi*. Jakarta: Edisi Keenam. Erlangga.
[10] Azwar, S. (2012). *Penyusunan skala psikologis*. Yogyakarta: Pustaka Pelajar
[11] Naga, D. S. (2012). *Teori Sekor Pada Pengukuran Mental*. Jakarta: Nagarani Citrayasa.
[12] Hidayat & Mudjihartono. (2014). Reliabilitas dan factorial validity Of Basic Skills Learning Achievement Among. *Proceeding International Conference On Sport and Physical Education*. FPOK UPI.
[13] Shopia, T., Grant, L., Jhon, A., Spertus, I., Rob, A., Garen, M., & Robert, J. (2015). Development and *content validity* Testing of a Patient-Reported Treatment Acceptance Measure for Use in Patients Receiving Treatment via Subcutaneous Injection. *Journal Value In Health*. (18). 1000-1007
[14] Golnaz, J., Hossein, H & Azizeh, C. (2014). *Content validity* Analysis of the Master Program in TEFL. *Procedia Social and Behavioral Sciences*. (136). 293-297
[15] Maarten A., Carin D., Martijn S., Nico L.U., Paul J.M., Beth P., & Diane D. (2013). *Content validity* of the Dutch version of the Neck Bournemouth Questionnaire. *Journal Manual Therapy*. (18). 386-389.
[16] Sally E. Jensen., Karen Kaiser., Leilani Lacson., Julian Schink., & David Cella. (2015). *Content validity* of the NCCN-FACT Ovarian Symptom Index-18 (NFOSI-18). *Journal Gynecologic Oncology*. (136). 317-32
[17] Maria I., Teresa M., Allison S., Carmen F., Loreto M., Esther G. (2013). *Content validity* of the Spanish version of the Practice Environment Scale of the Nursing Work Index. *Journal Applied Nursing Research*. (26). e5-e9
[18] Susanto, E. (2010). Pengembangan Instrumen Tes Keterampilan Renang Anak Usia Pra Sekolah. *Jurnal Penelitian dan Evaluasi Pendidikan*. 14. (2). 1-24
[19] Ohiro, M. (2013). Pengembangan Rubrik Penilaian Proposal Penelitian Mahasiswa Pada Program Studi Tardis Biologi Jurusan Tarbiyah Stain Kerinci. Tesis UNP. Tidak diterbitkan.
[20] Donald L. P., Laurie B. B., Chad J. G., Nancy K.L., Mona L. M., Elizabeth M., Lena R. (2011). *Content validity*—Establishing and Reporting the Evidence in NewlyDeveloped Patient Reported Outcomes (PRO) Instruments for Medical Product Evaluation: ISPOR PRO Good Research Practices Task Force Report: Part 1—Eliciting Concepts for a New PRO Instrument. *Journal Value In Health*. (14). 967-977.