



Development of Basic Swimming Skills Assessment Instruments for PJKR FIKK UNY Students

Sridadi Sridadi^{1*} , Hedi Ardiyanto Hermawan², dan
A.M. Bandi Utama³

¹Yogyakarta State University, Colombo St. No. 1, 55282, Yogyakarta,
Indonesia

sridadi@uny.ac.id

Abstract. Basic swimming skills are a compulsory subject for all FIKK students. In providing a final assessment, currently there is no reference that can be used as a basis for assessing, so it is necessary to develop an assessment instrument. This study aims to test the content validity of the basic swimming skills assessment instrument for PJKR FIKK UNY students. The research method used in this research is Research and Development (R&D). The research design includes three stages adopting the 4-D model referring to the steps of the procedural model developed by Thiagarajan including Difine, Design, Development and Dissimination which only up to Content Validity. The data collection technique for the expert test uses the Delphi technique. The research instrument uses a Likert scale 1 – 4. Analysis of content validity test data uses the Aiken'V formula. This study produced an instrument for assessing basic swimming skills for PJKR FIKK UNY students who had fulfilled content validity and were declared valid with a coefficient of $V = 0.87$ higher than 0.740 which was included in the high category.

Keywords: Development, assessment instruments, swimming, FIKK students

1. Introduction

In the scope of physical education, sports and health, measuring basic swimming skills has an undeniable role in understanding students' abilities and progress. The Faculty of Sports and Health Sciences (FIKK) at Yogyakarta State University (UNY) as a center for prospective teacher education, has the responsibility to produce graduates who not only have theoretical knowledge, but are also able to apply skills in the real world. Within this framework, this scientific article presents research that explores and develops an accurate and relevant assessment instrument to assess basic swimming skills for students of the Physical Education, Health and Recreation (PJKR) Study Program at FIKK UNY [1]. With the assessment carried out, it will

© The Author(s) 2023

Y. Prasetyo et al. (eds.), *Proceedings of the 6th Yogyakarta International Seminar on Health, Physical Education, and Sports Science (YISHPESS 2023)*, Advances in Health Sciences Research 73,

https://doi.org/10.2991/978-94-6463-356-6_11

provide a real picture of the achievements of the abilities and skills that students have while attending lectures [2].

Basic swimming skills are a faculty subject given to all FIKK students whose aim is to provide students with the knowledge and skills to be equipped as future teachers so that they are able to implement according to the PJOK curriculum at the elementary, middle, high school and vocational levels. This course has a weight of two semester credit units consisting of one theory credit and one practice credit with freestyle swimming (crawl) and breaststroke (breaststroke) material. For basic swimming skills, students must pass a skills test with the target of covering a distance of 100 meters freestyle (crawl) and 100 meters breaststroke (breaststroke). The aspects assessed are style and mileage.

In assessing style, there are several assessment indicators including leg movements, arm movements, and how to take a breath. So far, the assessment process that has been carried out has not used a written reference (a kind of rubric) that can be used as a guide in assessing basic swimming skills[3]. It is necessary to develop an assessment instrument for basic swimming skills for PJKR FIKK UNY students

By focusing on improving evaluation methods, this research is expected to make a significant contribution to improving the quality of swimming teaching and learning in the FIKK UNY environment. Through the development of assessment instruments that are appropriate to the curriculum context and learning objectives, PJKR students are expected to experience deeper and more meaningful learning experiences in honing their basic swimming skills [4]. The results of this research will not only provide academic benefits, but will also provide a strong foundation for the development of practical skills needed for students as prospective professional teachers in the world of education and teaching.

2. Method

This research includes development research (Research and Development). This research design uses a 3-D model, a modification of D-4[5] [6]. The 3-D model includes three stages, namely, defining, designing, developing.

2.1 Define

The first step is a preliminary study using document analysis techniques with literature review techniques [7], [8] for concept definitions and operational definitions related to assessing basic swimming skills.

2.2 Desain

The second step is formulating objectives, designing assignments and preparing assessment rubrics using literature review techniques [7], [8]. In preparing the assessment rubric, it refers to three swimming indicators, namely leg movement, arm movement and how to take a breath.

2.3 Develop

The third step is asking for expert opinions and judgments related to definitions, objectives, tasks and scoring rubrics using the Delphi method [9] involving nine experts [10]. The aspect that requires expert opinion is the suitability between the indicators and the rubric (criteria) that have been created. The indicators asked for the opinion and assessment of experts are leg movements, arm movements and how to take a breath [11], both freestyle and breaststroke swimming.

2.4 Research subject

The research subjects involved 9 expert judgment people, consisting of seven experts in the field of swimming, and two evaluation experts.

2.5 Data Collection Instrument

This research instrument uses a questionnaire with a rating scale of 1 to 4.

2.6. Data Analysis

The initial stage of content validation uses qualitative analysis, namely input from expert judgment, then the results of the analysis are revised to be corrected, then returned to expert judgment until they are truly accepted without further improvements [12]. Data from expert judgment results were analyzed using the Aiken's formula. to obtain content validity [13] of the instrument developed.

3. Results

In this research, researchers involved nine experts, including seven experts in the field of swimming and two experts in the field of evaluation. After going through a long process with several revisions, it was finally agreed that the basic swimming skill assessment instrument for PJKR FIKK students was declared feasible to proceed to the next stage. The results of the assessment of nine experts obtained the following data.

Table 1. Data from expert assessment results

STYLE	INDICATOR	Conformity between the indicators with the assessment rubric								
		Expert Assessment								
		1	2	3	4	5	6	7	8	9
<i>Crawl</i>	Limb Movement	4	4	3	4	4	3	3	4	3
	Arm Movement	3	4	4	4	4	4	4	3	4
	Movement Take a Breath	3	4	4	4	4	3	3	3	3
<i>Breaststroke</i>	Limb Movement	3	4	4	4	3	4	3	3	3
	Arm Movement	4	4	4	3	4	3	3	4	4
	Movement Take a Breath	3	4	4	4	4	4	4	3	4

Next, the assessment data was analyzed using the Aikens' formula to obtain results as in table 2

Table 2. Results of Aikens' V analysis

Style	Indicator	Expert									Sigma S	n(c-1)	V	Information									
		1	2	3	4	5	6	7	8	9													
<i>Crawl</i>	Limb Movement	4	4	3	4	4	3	3	4	3	3	3	2	3	3	2	2	2	2	23	27	0,85	High Category
	Arm Movement	3	4	4	4	4	4	3	4	2	3	3	3	3	3	2	3	2	3	25	27	0,93	High Category
	Movement Take a Breath	3	4	4	4	3	3	3	3	2	3	3	3	2	2	2	2	2	2	22	27	0,81	High Category
<i>Breaststroke</i>	Limb Movement	3	4	4	3	4	3	3	3	2	3	3	3	2	3	2	2	2	2	22	27	0,81	High Category
	Arm Movement	4	4	4	3	4	3	3	4	3	3	3	2	3	2	2	3	3	3	24	27	0,89	High Category
	Movement Take a Breath	3	4	4	4	4	4	3	4	2	3	3	3	3	3	3	2	3	3	25	27	0,93	High Category
																						0,87	High Category

The research results show that the assessment instrument developed through the Delphi method with the participation of nine experts has a high level of content validity [14] [15], with an Aiken validity coefficient of 0.87. This shows that the questions in the instrument have a high level of suitability with the aspects to be measured or assessed [16], and the instrument can be considered as a valid tool in measuring the intended concept. Therefore, this instrument has the potential to provide accurate and relevant assessment results.

4. Discussion

The Delphi method is a research approach that involves a series of iterative discussions between a group of experts with the aim of reaching agreement regarding the suitability of indicators and assessment rubrics. The participation of nine experts [10] in the Delphi method provided an opportunity to build agreement and a common view regarding the instrument being developed. The Delphi process, which involves a series of literacy questions and answers, makes it possible to carefully formulate questions based on the views of diverse experts. Data from expert assessment results were analyzed using Aiken's value [17] to obtain content validity coefficients [18]. The Aiken's V validity coefficient is a statistical measure used to measure the content

validity [19] of an assessment instrument. The value of the Aiken's V validity coefficient ranges from 0 to 1, with higher values indicating a higher level of content validity.

Based on the analysis results, the Aiken's V validity coefficient value of 0.87 indicates that the assessment instrument developed through the Delphi method has a high level of content validity [15] [20]. This shows that the questions in the instrument are very appropriate and relevant to the criteria that have been established to measure the intended concept [21] [22]. The value of the coefficient V indicates that experts tend to agree on the relevance and suitability of the question with the concept to be measured.

The results of the Aiken's V analysis which is close to 0.87 provide confidence that the assessment instrument developed through the Delphi method really measures what it is supposed to measure [23]. This also shows that the questions in the instrument have passed in-depth evaluation by experts and have been declared an important part in measuring relevant variables according to established criteria.

5. Conclusion

The research results show that the assessment instrument developed through the Delphi method involving the participation of nine experts has a high level of content validity, with an Aiken validity coefficient of 0.87. This shows that the questions in the instrument have a high level of suitability with the aspects to be measured or assessed, and the instrument can be considered as a valid tool in measuring the intended concept. Therefore, this instrument has the potential to provide accurate and relevant assessment results.

These results indicate that the criteria specified in the assessment rubric are in accordance with the indicators that have been determined in basic swimming skills for PJKR FIKK UNY students. The high validity coefficient value (0.87) gives confidence that this instrument substantially measures the desired variable. Thus, this assessment instrument provides strong confidence and is suitable for use in assessing basic swimming skills for PJKR FIKK UNY students.

References

- [1] T. Vogt and I. Staub, 'Assessment of basic aquatic skills in children: Inter-rater reliability of coaches, teachers, students and parents', *Journal of Physical Education and Sport*, vol. 20, no. 2, pp. 577–583, Mar. 2020, doi: 10.7752/jpes.2020.02085.
- [2] P. S. Mustafa and N. K. Masgumelar, 'Kajian Review: Pengembangan Instrumen Penilaian Sikap, Pengetahuan, dan Keterampilan dalam Pendidikan Jasmani dan Olahraga', *Biormatika: Jurnal ilmiah fakultas keguruan dan ilmu pendidikan*, vol. 8, no. 1, pp. 31–49, 2022, [Online]. Available: <http://ejournal.unsub.ac.id/index.php/FKIP>

- [3] P. Di Paola, 'The assessment of swimming and survival skills: Is your programme fit for its purpose?', *International Journal of Aquatic Research and Education*, vol. 11, no. 4, 2019, doi: 10.25035/ijare.11.04.06.
- [4] L. Sinclair and C. M. P. Roscoe, 'The Impact of Swimming on Fundamental Movement Skill Development in Children (3–11 Years): A Systematic Literature Review', *Children*, vol. 10, no. 8, p. 1411, Aug. 2023, doi: 10.3390/children10081411.
- [5] B. Lev, S. R. Thiagarajan, and S. Ramu Thiagarajant, 'Fundamental Information Analysis', *Journal of Accounting Research*, vol. 31, no. 2, pp. 190–215, 1993, [Online]. Available: <http://www.jstor.org/stableURL:http://www.jstor.org/stable/2491270http://www.jstor.org/page/info/about/policies/terms.jsp>
- [6] N. Lestari, '56 PROSEDURAL MENGADOPSI MODEL 4D DARI THIAGARAJAN SUATU STUDI PENGEMBANGAN LKM BIOTEKNOLOGI MENGGUNAKAN MODEL PBL BAGI MAHASISWA', 2018.
- [7] A. Prieto-ayuso, J. C. Pastor-videdo, S. González-villora, and J. Fernández-río, 'Are physical education lessons suitable for sport talent identification? A systematic review of the literature', *Int J Environ Res Public Health*, vol. 17, no. 6, 2020, doi: 10.3390/ijerph17061965.
- [8] A. Casey and V. A. Goodyear, 'Can Cooperative Learning Achieve the Four Learning Outcomes of Physical Education? A Review of Literature', *Quest*, 2015, doi: 10.1080/00336297.2014.984733.
- [9] A. D. Dewantoro, 'Penentuan Rekomendasi Strategi Pembelajaran Daring Menggunakan Metode Delphi', *Jurnal Teknik Industri*, vol. 11, no. 1, pp. 23–29, 2021.
- [10] S. R. Maulita, S. Sukarmin, and A. Marzuki, 'The Content Validity: Two-Tier Multiple Choices Instrument to Measure Higher-Order Thinking Skills', in *Journal of Physics: Conference Series*, Institute of Physics Publishing, Mar. 2019. doi: 10.1088/1742-6596/1155/1/012042.
- [11] F. Sovia Can, H. Irawadi, R. Mardela, P. Studi Pendidikan Kepelatihan Olahraga, and F. Ilmu Keolahragaan, 'Analisis Keterampilan Teknik Renang Gaya Dada', *Jurnal Patriot*, vol. 3, pp. 351–362, 2021, doi: 10.24036/patriot.v%vi%i.747.
- [12] L. Prastyawati and F. Hanum, 'Pengembangan model pembelajaran', *Harmoni Sosial*, vol. 2, pp. 21–29, 2015.
- [13] E. Susanto, Subagyo, D. Tirtawirya, M. H. Anwar, Mujriah, and N. K. Ilmah, 'Development of an assessment for responsibility in junior high school swimming lessons', *Cogent Soc Sci*, vol. 9, no. 1, 2023, doi: 10.1080/23311886.2023.2176369.
- [14] H. Ihsan, 'Pembelajaran Kewirausahaan Berbasis Multimedia P EDAGOGIA : Jurnal Ilmu Pendidikan', *Pedagogia*, pp. 173–179.
- [15] K. Kurniawati, 'ANALISIS VALIDITAS ISI INSTRUMEN TES BERPIKIR KRITIS IPS KELAS V SD KOTA YOGYAKARTA', *Pelita*, vol. 21, no. 1, pp. 130–140, 2021.
- [16] H. Fakultas Ekonomi, 'VALIDITAS ISI: TAHAP AWAL PENGEMBANGAN KUESIONER', 2017.

- [17] A. Etika, A. 1*, M. Khumaedi, and E. Susilaningsih, 'Validity and Reliability of Development of Self-confidence Assessment Instruments for Students on Chemistry Subject', [Online]. Available: <http://journal.unnes.ac.id/sju/index.php/jere>
- [18] K. Bashoori and S. Supahar, 'Validitas dan reliabilitas instrumen asesmen kinerja literasi sains pelajaran fisika berbasis STEM', *Jurnal Penelitian dan Evaluasi Pendidikan*, vol. 22, no. 2, pp. 219–230, Dec. 2018, doi: 10.21831/pep.v22i2.19590.
- [19] E. Almanasreh, R. Moles, and T. F. Chen, 'Evaluation of methods used for estimating content validity', *Research in Social and Administrative Pharmacy*, vol. 15, no. 2. Elsevier Inc., pp. 214–221, Feb. 01, 2019. doi: 10.1016/j.sapharm.2018.03.066.
- [20] N. R. An Nabil, I. Wulandari, S. Yamtinah, S. R. D. Ariani, and M. Ulfa, 'Analisis Indeks Aiken untuk Mengetahui Validitas Isi Instrumen Asesmen Kompetensi Minimum Berbasis Konteks Sains Kimia', *PAEDAGOGIA*, vol. 25, no. 2, p. 184, Sep. 2022, doi: 10.20961/paedagogia.v25i2.64566.
- [21] M. S. B. Yusoff, 'ABC of Content Validation and Content Validity Index Calculation', *Education in Medicine Journal*, vol. 11, no. 2, pp. 49–54, Jun. 2019, doi: 10.21315/eimj2019.11.2.6.
- [22] FaRa, 'Details of content validity and objectifying it in instrument development', *Nurs Pract Today.*, vol. 1(3), pp. 163–171, 2014, [Online]. Available: <http://npt.tums.ac.ir>
- [23] P. Permatasari, H. Hardeli, B. S. Alora, and S. Mulyani, 'Validity of Discovery Learning-Based E-module with Video Demonstration on Reaction Rate Material for High School Student', *Jurnal Penelitian Pendidikan IPA*, vol. 8, no. 3, pp. 1258–1266, Jul. 2022, doi: 10.29303/jppipa.v8i3.1628.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

