# Nofriyandi Nofriyandi

## 5 Desember 2025 JSA Wasti Danardani 364_374

Artikel Yeni Hadianti

### Document Details

Submission ID
trn:oid:::3618:124443422

Submission Date
Dec 14, 2025, 5:55 PM GMT+7

Download Date
Dec 14, 2025, 5:57 PM GMT+7

File Name
5 Desember 2025 JSA Wasti Danardani 364_374.pdf

File Size
1.1 MB

11 Pages

5,633 Words

30,957 Characters

# 7% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

## Filtered from the Report

- Bibliography

## Exclusions

- 7 Excluded Sources

## Match Groups

**26** Not Cited or Quoted 6%
Matches with neither in-text citation nor quotation marks

**3** Missing Quotations 1%
Matches that are still very similar to source material

**0** Missing Citation 0%
Matches that have quotation marks, but no in-text citation

**0** Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

## Top Sources

5% Internet sources
3% Publications
5% Submitted works (Student Papers)

## Integrity Flags

**0 Integrity Flags for Review**

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

## Match Groups

- **26** Not Cited or Quoted 6%
  Matches with neither in-text citation nor quotation marks
- **3** Missing Quotations 1%
  Matches that are still very similar to source material
- **0** Missing Citation 0%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

## Top Sources

5% Internet sources
3% Publications
5% Submitted works (Student Papers)

## Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

| | | |
|---|---|---|
| 1 | Internet | idoc.tips 1% |
| 2 | Student papers | Blair High School on 2025-12-05 <1% |
| 3 | Student papers | Universitas Islam Riau on 2025-08-05 <1% |
| 4 | Internet | louisdl.louislibraries.org <1% |
| 5 | Internet | doaj.org <1% |
| 6 | Internet | wiredspace.wits.ac.za <1% |
| 7 | Internet | bmcmedinformdecismak.biomedcentral.com <1% |
| 8 | Internet | journal.uir.ac.id <1% |
| 9 | Internet | www.researchgate.net <1% |
| 10 | Publication | Ghali, S.A.. "An effective way of increasing the stability of quays", Coastal Enginee... <1% |

11 Internet
link.springer.com <1%

12 Internet
repository.up.ac.za <1%

13 Student papers
Associatie K.U.Leuven on 2019-11-14 <1%

14 Student papers
Culver-Stockton College on 2021-08-03 <1%

15 Publication
Domician Máté, Jolita Vveinhardt, Anna Fekete. "Training environment and spons... <1%

16 Internet
staging-mededu.jmir.org <1%

17 Internet
tmfv.com.ua <1%

18 Internet
www.research.unipd.it <1%

19 Publication
Michael Kellmann, Sarah Jakowski, Jürgen Beckmann. "The Importance of Recove... <1%

20 Student papers
Universitas Tanjungpura on 2023-09-21 <1%

21 Internet
jiecr.org <1%

22 Publication
Ade Gafar Abdullah, Vina Adriany, Cep Ubad Abdullah. "Borderless Education as a... <1%

23 Student papers
Universitas Tanjungpura on 2023-06-06 <1%

24 Student papers
University of Southampton on 2024-05-08 <1%

Journal Sport Area
http://journal.uir.ac.id/index.php/JSP
Vol. 10. No. 3. December, (2025)

# Development and expert validation of a competition management model for basic artistic swimming strokes

**Wasti Danardani**[abcde,*], **& Syarif Hidayat**[abc]

**Universitas Pendidikan Ganesha, Indonesia**

Received 16 July 2024; Accepted 21 November 2025; Published 14 December 2025
Ed 2025; *10*(3): 377-387

## ABSTRACT

**Background**: Artistic swimming in Indonesia has grown slowly due to limited participation and the absence of standardized regulations at the beginner level. Although basic stroke events are often held, they lack a consistent and validated competition system, creating a gap that reduces fairness and hampers athlete development. **Objectives**: This study aimed to design and validate a standardized management model for basic stroke artistic swimming competitions. **Methods**: Research and development (R&D) following Borg and Gall was applied at the expert validation stage. Ten nationally and internationally certified judges evaluated the model using a 5-point Likert scale covering arena layout, personnel duties, and scoring procedures. Data were analyzed descriptively, with ≥ 3.5 considered valid. **Finding/Results**: Expert evaluation indicated a high level of feasibility (mean score = 4.6), confirming that the proposed model aligns with international guidelines and is suitable for implementation. Experts agreed that the competition arena, personnel structure, and integrated scoring system—which combines technique execution and swimming speed—provide fair and objective evaluation for beginner-level athletes. **Conclusion**: The validated model offers the first standardized management framework for basic stroke artistic swimming competitions in Indonesia, supporting consistent event organization and nurturing athlete development. However, the current study is limited to expert assessment. Further field trials involving real competition settings are required to determine the model's effectiveness in practice.

**Keywords:** Artistic swimming; competition management; expert validation; model development

https://doi.org/10.25299/sportarea.2025.vol10(3).18118



**Corresponding Author:** Wasti Danardani, Department of Sport Coaching Education, Faculty of Sport and Health, Universitas Pendidikan Ganesha, Singaraja, Bali, Indonesia
wasti.danardani@undiksha.ac.id

**How to Cite:** Danardani, W., & Hidayat, S. (2025). Development and expert validation of a competition management model for basic artistic swimming strokes. *Journal Sport Area*, *10*(3), 377-387. https://doi.org/10.25299/sportarea.2025.vol10(3).18118

**Authors' Contribution**: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection

## INTRODUCTION

Artistic swimming was introduced in Indonesia in the 1980s; however, its development has progressed slowly, as shown by the participation of no more than eight provinces in the National Sports Week (PON). In contrast, other aesthetic sports such as sport dance have experienced rapid growth, reaching participation from 21 provinces in PON XXI 2024. Artistic swimming is a minority sport in terms of enthusiasts globally (Rincón et al., 2023). According to an interview with Mrs. Ully Pitaloka, Technical Commission for Artistic Swimming

of PB Aquatics Indonesia, the limited number of athletes and participating regions poses a risk that artistic swimming may not be contested in future national events such as PON.

**Table 1. Provincial Participation in the PON Artistic Swimming Competition**

| Host | Province |
|---|---|
| PON XV 2000 Jawa Timur | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Sumatera Selatan. |
| PON XVI 2004 Sumatera Selatan | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Jambi. |
| PON XVII 2008 Kalimatan Timur | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Kalimatan Timur. |
| PON XVIII 2012 Riau | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Kalimatan Timur. |
| PON XIX 2016 Jawa Barat | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Kalimatan Timur, Jawa Tengah. |
| PON XX 2021 Papua | DKI Jakarta, Jawa Barat, Jawa Timur, DI Yogyakarta, Sulawesi Selatan, Papua. |
| PON XXI 2024 Aceh-Sumatera Utara | DKI Jakarta, Jawa Barat, DI Yogyakarta, Sulawesi Selatan, IKN, Jawa Tengah, Kep. Riau. |

(https://akuatikindonesia.id)

Artistic swimming is recognized as one of the most technically demanding aquatic sports, requiring proficiency in swimming, gymnastics, ballet, and musical coordination within a single routine (Williams et al., 2024). Where in doing one race number an athlete is required to have the ability to swim, gymnastics, ballet, and be able to follow the rhythm. The complexity of movements in artistic swimming displays can help develop multiple intelligence in children (Danardani et al., 2018). Herefore, providing early-stage competitive experiences is essential to sustain participation and develop athlete motivation. One initiative taken by the Commission on Artistic Swimming is the implementation of basic stroke competitions aimed at novice athletes (Gerber et al., 2019; Isoard-Gautheur et al., 2016). These events are more suitable for younger athletes, as advanced routine competitions require extensive training and technical mastery (Ntomali et al., 2021).

However, basic stroke competitions are not officially recognized within the World Aquatics competition structure, and no standardized rules currently exist. As a result, many competitions rely on informal and inconsistent regulations set by committees, judges, and coaches. This lack of standardization reduces fairness and makes competition administration difficult, limiting the sport's ability to drive consistent athlete development across regions. Establishing structured rules is essential, as effective event management can improve participation, quality, and athlete interest (Artanayasa et al., 2023).

In the coaching pathway, basic strokes represent foundational skills taught before athletes progress to figures and routines. Without a formalized competition system at this level, young athletes lack structured feedback and competitive benchmarks, which are important for motivation and long-term performance progression. Effective competition management supported by expert involvement is needed to ensure objectivity, quality assurance, and administrative credibility (Davison & Freestone, 2023; Torres-Luque et al., 2020).

Previous developments in artistic swimming research have primarily focused on athlete performance, technical mastery, and routine evaluation, while limited attention has been given to developing standardized competition systems for beginner athletes. As a result, there remains a research gap in the availability of validated, nationally applicable management models for basic stroke competitions. This gap affects the ability to organize consistent competitions and to support sustainable athlete development across provinces. Therefore, this study aims to develop and validate a standardized competition management model for basic stroke artistic swimming in Indonesia. The novelty of this research lies in establishing the first expert-validated framework aligned with international guidelines, which can support structured, fair, and replicable competition implementation for novice categories. The validated model is expected to serve as a foundation for subsequent implementation and field testing in future development stages.

## METHOD

This study employs the Borg and Gall model of development research to create and test the effectiveness of a basic style artistic swimming race management model. The model development follows three stages: (1) preliminary research and data collection, research planning, early product development, and expert validation; (2) product revision and early testing; (3) field testing, final product revision, and dissemination. Currently, the research is at the first stage, focusing on the development and expert validation of the initial product using descriptive qualitative data analysis.

The expert validation instrument consisted of 16 items assessing three components: competition arena, personnel duties, and scoring system. Each item was rated using a 5-point Likert scale (1 = very unsuitable to 5 = very suitable). Validation criteria followed standard in which a mean score ≥ 3.5 indicates acceptable validity (van den Akker, 1999; van den Akker et al., 2006). Descriptive statistics were used to determine the level of agreement among experts.

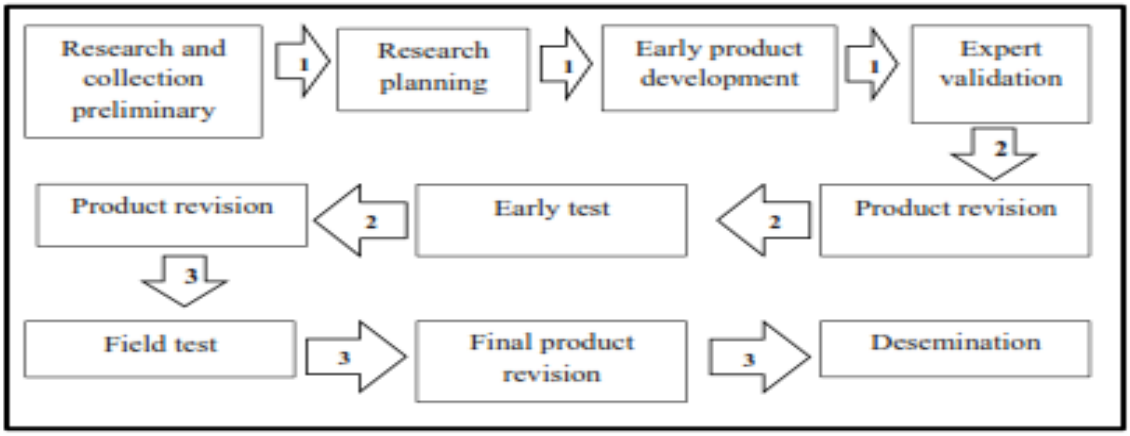


**Figure 1. Borg and Gall research procedur**

### Design

The research design is developmental and iterative, aiming to construct and validate a competition management model specific to basic stroke artistic swimming. The design process integrates a literature review on swimming and artistic swimming competitions, observation of existing competition practices, and expert input to refine the product. The model encompasses three core components: (1) competition arena organization, (2) roles and duties of competition personnel, and (3) a scoring and calculation system for competition results.

### Participants (Expert Panel)

The initial product validation involves 10 experts who are artistic swimming judges certified at national and international levels in Indonesia. Their role is to assess the suitability and effectiveness of the proposed competition management model. Expert evaluation is mandatory and follows prior validated methodological examples in related sports development research.

### Data Analysis

For the first stage of the study, the data analysis approach is descriptive qualitative. The expert assessments are collected via a suitability questionnaire using a Likert scale (1 to 5, from strongly disagree to strongly agree). The responses are analyzed by calculating average scores, percentages, and suitability indices to descriptively represent the consensus and validation results on the initial product.

The product of the artistic swimming competition management model will be assessed by experts, namely artistic swimming competition judges with. Expert assessment in development research is considered mandatory to obtain expert validation. This has been done in previous studies such as in the development of PUC tools (Artanayasa et al., 2022), and the development of swimming lecture textbooks (Surahman & Yeni,

2019). The artistic swimming competition model develops three things, namely (1) the competition arena, (2) the duties of the personnel implementing the competition, and (3) the calculation of the competition.

## RESULTS AND DISCUSSION

The validation results indicated a high level of agreement among experts (mean = 4.6), suggesting that the proposed model is suitable for implementation. This aligns with previous findings emphasizing the importance of expert validation in sport model development (Jara et al., 2020; Torres-Luque et al., 2020). The integration of technical and speed scores ensures fairness and objectivity, encouraging young athletes to enhance both skill execution and performance efficiency. These findings highlight the model's practical value in supporting athlete development and competition organization at the beginner level. In this study, the results of the judge's assessment of the field design and competition personnel can be seen in Table 1 and Table 2 about judge's response at scoring system.

**Table 2. Judges' Response to The Organizational System of The Basic Stroke Competition**

| No | Statement | 1 Very Unsuitable | 2 Not Suitable | 3 Quite Suitable | 4 Suitable | 5 Very Suitable | Total |
|---|---|---|---|---|---|---|---|
| 1 | Personnel suitability for the basic stroke competition. | 0 | 0 | 0 | 40% | 60% | 100% |
| 2 | Personnel suitability with positioning in the basic stroke competition. | 0 | 0 | 0 | 40% | 60% | 100% |

**Table 3. Judges' Response to The Ranking Scoring System**

| No | Scoring System | 1 Very Unsuitable | 2 Not Suitable | 3 Quite Suitable | 4 Suitable | 5 Very Suitable | Total |
|---|---|---|---|---|---|---|---|
| 1 | Procedure for giving stroke score | 0 | 0 | 10% | 20% | 70% | 100% |
| 2 | Procedure for giving speed score | 0 | 0 | 0 | 30% | 70% | 100% |
| 3 | Explanation of speed score calculation | 0 | 0 | 10% | 30% | 60% | 100% |
| 4 | Procedure for calculating the total basic stroke final score | 0 | 10% | 0 | 40% | 50% | 100% |

### Pool Modification

The form of artistic swimming competition based on its technique is divided into two, figure and routine. Figure is a basic technique element that is used as the basis for creating a series of routines. Figure assessment is done individually. The routine is a series of movements with musical accompaniment with solo, duet, and team categories. The implementation of the competition is divided into age groups, this is to distinguish the level of difficulty of the contested figures and the duration of the display in the routine. Thus figure and routine numbers can be followed by athletes with established skills. At the same time, the basic stroke numbers which are the basics of techniques for beginners are not included in the race. Aiming to increase the motivation of novice athletes to practice, this basic stroke competition is made. The minimum swimming pool size is 30 m wide and 20 m long, with a minimum water depth of 3 m in an area of 12 m wide and 12 m long. The minimum water temperature is 26°C with a tolerance of ± 1°C. The water must be very clean and clear. **Figure 2** displays the artistic appearance of the swimming pool.


**Figure 2. Artistic Swimming Pool**

Development research is an effort to improve or find solutions to existing problems. It is realized in the form of a product that is assessed by experts to determine the suitability between the needs and fulfillment of the expected needs (Artanayasa et al., 2022; Putro et al., 2018). In this work, the engineering of the organizational system for the implementation of the basic stroke competition is compiled based on the track swimming competition which is adopted to meet the needs of the basic stroke competition in artistic swimming. Modifications to the results of the engineering management, facilities, and infrastructure for the artistic swimming competition in the basic style can be seen in **Figure 3**.

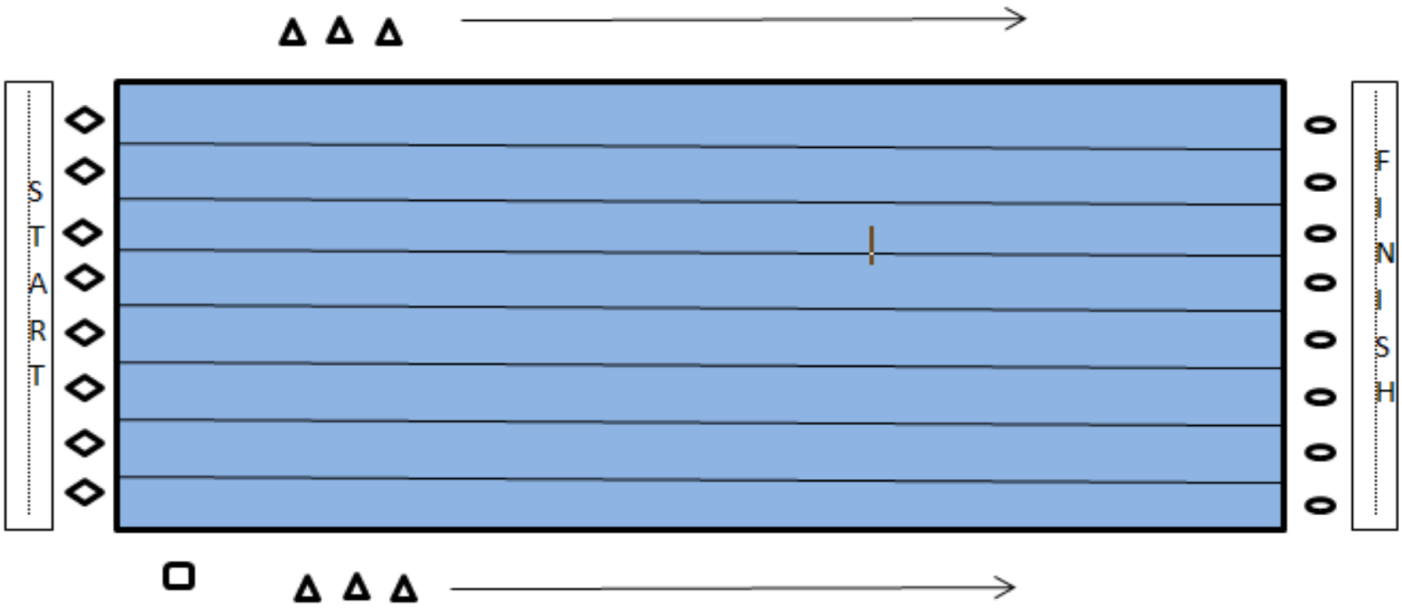


**Figure 3. Pool and Race Officials**

**Table 4. Explanation of Basic Stroke Race Officials.**

| Symbol | Name | Tasks |
|---|---|---|
| | Timer | In charge of taking the swimmer's time. |
| | Style Jury | In charge of assessing the basic stroke during the course. Consists of 3 people on each side of the pool, to supervise the nearest half of the course. |
| | Starter | In charge of dispatching swimmers with the signal "willing"/"2x whistle" – "ready" – "yes"/"whistle." |
| | Helper | In charge of assisting swimmers in the starting position. |

## Race Facilities and Infrastructure

A competition can be held if there are rules that can determine the course of the competition. Official competitions also set a standard field that is used so that the competition has validation. So that competitions conducted in different regions have the same validation of race results. Drafting rules can help organize a competition and form a new habit (Janowski et al., 2020; Ratten & Jones, 2020).

The development of basic stroke numbers in artistic swimming requires an arena that can be used anywhere. For this reason, it is necessary to modify the pool that will be used to organize basic stroke numbers. The modifications made can facilitate the implementation of the competition and can increase interest in participating in a competition (Buszard et al., 2020; Ferioli et al., 2020; Martino et al., 2019).

Modifications were made to the pool used, namely using a 25 m long pool. As well as using facilities that are adapted to basic stroke numbers, especially in the starting place. Other facilities such as track barriers use the rules of the race in the swimming track race number. Pool conditions are a special concern in paying attention to the level of safety and comfort for users to spectators (Balliauw et al., 2020; Yuan et al., 2022).

Modifications to the pool length using a length of 25 m are assumed from the artistic swimming competition pool area which measures 20 m x 30 m (World Aquatics, 2022). The pool length assumption uses a 25 m track because artistic swimmers will not swim more than 30 m. In doing routine sets in the race, swimmers will not use basic strokes with a distance of 30 m. This means the choice of a 25 m pool is more in line with the needs of swimmers. The pool length standards set by WA are 25 m and 50 m. Choosing one of the two standard pool sizes that are already available in almost every aquatic stadium is an option to facilitate the implementation of basic stroke numbers in artistic swimming sports.

The development of the race arena in new numbers is an effort to adjust to the needs of the new sport (Barbu et al., 2021). Modifying the basic stroke competition is an effort made to increase swimmers' interest in choosing artistic swimming as an achievement path. The target of this race is young swimmers who are still learning to recognize artistic swimming. In modifying a sport, it will be more targeted if it is done to young athletes (González-Serrano et al., 2020).

**Table 5. Development of Artistic Swimming Management System for Besic Stroke**

| Management System | Routine | Figure | Basic stroke |
|---|---|---|---|
| Pool | 25 m x 30 m | 2 m x 3 m and one point with a red ribbon as a marker | 2,5 m x 25 m (adoption of the 25 m pool track swimming race) |
| Scoring | Jugdes assessment. The final score is the combination of the three panels (Artistic, execution and difficulty) | Jugdes assessment. The average of the center values by discarding the highest and lowest values. | Jugdes assessment and time record. The judges' scores are combined with the travel speed. |
| Judge | Consists of 15 judges, 5 artistic judges, 5 execution judges, and 5 difficulty judges. | 5-7 Judges, Judges are placed at the judging table parallel to the pool. | 6 judges, 3 on the right side and 3 on the left side of the pool. 8 timers in each line. |
| Manpower | Timer (counting duration), Judges (observing the show), helper/runner (colleting form). | Judges (observing the show), helper/runner (colleting form). | Timer (taking time), Judges (observing the stroke), helper/runner (colleting form and help the swimmer). |

## Competiton Organization System for Basic Stroke Competition Numbers

To carry out a basic stroke number race, human resources are also needed according to the needs of the task in the field. The race organization is like a community organization that is structured in order to work

optimally (Chersulich Tomino et al., 2020; Ekholm, 2019). The basic stroke number is a modified race from artistic swimming and track swimming. The point is that the style performed is a basic stroke in artistic swimming which is competed in a track like track swimming. So that it requires the organization of the race task executor to be adjusted in order to carry out a good work assignment. To fulfill all of this, management, administration, regulation, and the duties and authority of officers are needed to facilitate the competition (Lumintuarso et al., 2021; Wu, 2023).

Adopting the track swimming race officers, the basic stroke number requires officers in the pool area which includes timers (time takers), style judges, and starters (departure officers). The timer (time taker) is tasked with taking the swimmer's time from the starting place to reach the finish line. Starter (departure officer), in charge of dispatching swimmers from the starting place. A starter in dispatching athletes using the signal "willing"/"2x whistle" – "ready" – "yes"/"whistle."

Assessing basic strokes cannot be done by anyone, only people who understand basic stroke techniques and have been certified (Horbenko & Lysenko, 2023; Plessner et al., 2023). Style judges are responsible for judging the basic stroke during the course. The style judges consist of 3 people on each side of the pool, to oversee the nearest half of the course. The total number of style judges is 6 people. The number of judges who judge more than one person increases the objectivity of the assessment, a judge should judge with consistency and a high level of confidence in the results to demonstrate high objectivity as a judge (Ntomali et al., 2021; Ponciano et al., 2018).

In addition to the three officers who are directly related to the course of the race, officers who help athletes are also called helpers. Helper is in charge of assisting swimmers in the starting position. This is because the start is not done from the starting block, but the athlete is already in the pool. Some basic strokes begin with the feet attached to the pool wall.

The organization of workers in a sports activity is a series that is in accordance with the objectives of the activity. Coming from various sectors that are used in supporting the competition. Each work section has different worker qualifications. Influenced by the form of work and responsibilities assigned in the competition (Broch, 2022; Moustakas & Robrade, 2023).

In the end, the modifications made to the management of the race organization were declared to be in accordance with the views of the judges. Of the 10 judges assessing the management modifications made 40% stated appropriate and 60% stated very appropriate. This shows that the officer personnel in the field are assigned according to the needs of the basic stroke race number. In addition, the positioning of personnel officers is very helpful for assessing athletes who compete.

**Design of Scoring System on Basic Stroke**

The assessment in the basic stroke consists of two items, namely the assessment of the judges and the results of swimming speed. The jury assessment consists of three judges who will assess the basic stroke movement from start to finish which is called the style score (score 1) with the formulation Total Score I = $\frac{JG1+JG2+JG3}{3}$

JG meaning Judge, in this case, 3 stroke judges are needed to give scores and will be used as an average score. Swimming speed (score 2) is obtained using the time taken by the timer which will be used as the arrival rank. Ranks will be scored inversely, the highest rank has the largest score. Formula score 2 = $\frac{t}{n}$ x 10 ; t : score from speed (speed of swimming), n : number of all participants, 10 (ten) : refers to the Basic Stroke Judgement as a perfect score.

Total Score Basic Stroke = (Score Speed x 40%) + (Score Stroke x 60%)
= (( $\frac{t}{n}$ x 10) x40%) + (($\frac{JG1+JG2+JG3}{3}$) x 60%)

**Table 6. Design of Scoring System on Basic Stroke**

| Number event | Description event | Assessment focus | System Scoring |
|---|---|---|---|
| Figure | A competition number in artistic swimming that displays basic technical | • Quality of technique,<br>• Accuracy of body position,<br>• Control of movement, and | • Judge : 3-5 judge<br>• System scoring: |

| Number event | Description event | Assessment focus | System Scoring |
|---|---|---|---|
| 2 | movements and without accompaniment performed individually. Performed by early age categories or beginners as a form of basic skills assessment. | • Stability while in the water. | – 3 judge are summed and averaged<br>– 5 judge are discarded the highest and lowest scores, then the 3 scores were summed and averaged.<br>– The average result will be multiplied by the standard Degree of Difficulty (DoD). Each figure technique has a different DoD. |
| 2 Routine | A competition that features a series of technical and choreographed movements in the water performed in synchronization with musical accompaniment, either individually, in duets, teams, or in free combinations. | • Difficulty/Element<br>• Artistic/Artistic Impretion<br>• Execution | • Judge : 5 jugde/panel<br>• System scoring :<br>– 5 judge are discarded the highest and lowest scores, then the 3 scores were summed and averaged.<br>– total scoring on routines influenced by DoD and finalty |
| Basic Stroke | A competition of basic stroke on a pool track that is done in a race from start to finish without music and is done individually. | • Accuracy of body position,<br>• Control of movement, and<br>• Stability while in the water.<br>• Time (speed) | • Judges : 6 (3 judges on each side of the pool).<br>• Scoring system :<br>– 3 judge are summed and averaged<br>– moving swim time records that will be compared in the form of a score.<br>– The accumulated judges' scores are added to the speed score, with a weighted proportion of 50:50. |

Procedure for giving speed score, explanation of speed score calculation, and procedure for calculating the total final score of basic stroke. The Basic Stroke artistic swimming competition is a combination with track swimming. The use of a 25 m track pool that is traveled with Basic Stroke with a very distinctive technique. The distance is calculated by the speed achieved along the 25 m. As for the Basic Stroke, it will be assessed by judges like figure and routine with guidelines that have been compiled previously.

The procedure for giving stroke score is the value given by Judges stroke 1, 2, and 3 summed up and divided by the average. The score value given to assess based on Basic Stroke Judgement. The procedure for giving speed score is giving score based on the time taken by the timer which will be used as the arrival ranking. The rank will be scored inversely, the highest rank has the largest score. The largest score is tentative depending on the total number of participants in the basic stroke event number that is followed.

The race system is combined in 2 swimming race numbers, so in determining the champion's decision involves 2 assessments, namely stroke score and speed score. The explanation of the calculations carried out in determining the champion is considered appropriate for the judges. Being debated among the judges is in determining the amount of weight given between stroke score and speed score.

## CONCLUSION

This study developed and validated the first standardized management model for basic stroke artistic swimming competitions in Indonesia. The model fills a scientific gap by providing a structured competition framework that integrates technical and performance evaluation, offering a fair and transparent system for novice athletes. Practically, the model can serve as a national reference to support consistent event administration, improve judging objectivity, and strengthen athlete development pathways within aquatic organizations and PB Aquatics Indonesia. The current study is limited to expert validation and has not yet been tested in real competition environments. Therefore, future research should conduct pilot implementation and field testing across multiple provinces to evaluate feasibility, usability, and measurable impact. Findings from these trials will be essential for refining the model and supporting its adoption as a standardized national guideline.

## ACKNOWLEDGEMENTS

Thank you to the support from the Undiksha Bali Research and Community Service Institute in the form of financial support. to the artistic swimming judges for providing assistance in this research.

11

## CONFLICT OF INTEREST

All authors in this manuscript have declared no conflict of interest in this research.

## REFERENCES

Artanayasa, I. W., Kusuma, K. C. A., & Ariawan, K. U. (2022). Need Analysis of Digital Technology-Based Push Up Test: Instrument of Arm Muscle Strength. *Journal Sport Area*, *7*(3), 361–368. https://doi.org/10.25299/sportarea.2022.vol7(3).10641

Artanayasa, I. W., Kusuma, K. C. A., & Ariawan, K. U. (2023). Push-Up Counter (PUC) as an Instrument of Arm Muscle Strength: Validity and Reliability. *Journal Sport Area*, *8*(3), 350–359. https://doi.org/10.25299/sportarea.2023.vol8(3).13245

Balliauw, M., Verlinden, T., De Croocq, L., Fobe, A., & Van Den Spiegel, T. (2020). A Strategic Managerial Approach to Corporate Sports Hospitality: The Case of Belgian Football. *Journal of Business & Industrial Marketing*, *35*(1), 61–75. https://doi.org/10.1108/JBIM-06-2018-0200

Broch, T. B. (2022). The Cultural Sociology of Sport: A Study of Sports for Sociology? *American Journal of Cultural Sociology*, *10*(4), 535–542. https://doi.org/10.1057/s41290-022-00177-y

Buszard, T., Oppici, L., Westerbeek, H., & Farrow, D. (2020). Implementation of a Modified Sport Programme to Increase Participation: Key Stakeholder Perspectives. *Journal of Sports Sciences*, *38*(8), 945–952. https://doi.org/10.1080/02640414.2020.1737370

Barbu, M. C. R., Tohăneanu, A. A. A., Diaconescu, D. L., Burcea, G. B., Popescu, M. C., & Dragomir, M. (2021). The Creation of New Sports and Sports Venues. *Journal of Sport and Kinetic Movement*, *I*(37), 14–19. https://doi.org/10.52846/jskm/37.2021.1.2

Chersulich Tomino, A., Perić, M., & Wise, N. (2020). Assessing and Considering the Wider Impacts of Sport-Tourism Events: A Research Agenda Review of Sustainability and Strategic Planning Elements. *Sustainability*, *12*(11), 4473–4484. https://doi.org/10.3390/su12114473

Danardani, W., Soegiyanto, K. S., Setijono, H., & Sulaiman, S. (2018). Artistic Swimming Helps the Intelligence Development. *International Seminar on Public Health and Education 2018 (ISPHE 2018)*, 81–85. https://doi.org/10.2991/isphe-18.2018.18

Davison, G., & Freestone, R. (2023). Architectural Design Competitions: The Effects of Competition Format on Design Processes and Outcomes. *Journal of Architecture*, *28*(5), 825–846. https://doi.org/10.1080/13602365.2023.2257713

Ekholm, D. (2019). Sportas a Means of Governing Social Integration: Discourses on Bridging and Bonding Social Relations. *International Journal of the Sociology of Leisure*, *36*(2), 152–161. https://doi.org/10.1123/ssj.2018-0099

Ferioli, D., Rucco, D., Rampinini, E., la Torre, A., Manfredi, M. M., & Conte, D. (2020). Combined Effect of Number of Players and Dribbling on Game-Based-Drill Demands in Basketball. *International Journal of Sports Physiology and Performance*, *15*(6), 825–832. https://doi.org/10.1123/ijspp.2019-0645

Gerber, M., Brand, R., Antoniewicz, F., Isoard-Gautheur, S., Gustafsson, H., Bianchi, R., Colledge, F., Madigan, D. J., Brand, S., & Ludyga, S. (2019). Implicit and Explicit Attitudes Towards Sport among Young Elite Athletes with High Versus Low Burnout Symptoms. *Journal of Sports Sciences*, *37*(14), 1673–1680. https://doi.org/10.1080/02640414.2019.1585313

González-Serrano, M. H., Sanz, V. A., & González-García, R. J. (2020). Sustainable Sport Entrepreneurship and Innovation: A Bibliometric Analysis of This Emerging Field of Research. *Sustainability*, *12*(12), 1–26. https://doi.org/10.3390/su12125209

Horbenko, O., & Lysenko, A. (2023). Features of the Methodology for Judging Competitions in Dance and Dance Sport. *Scientific Journal of National Pedagogical Dragomanov University*, *8*(168), 36–39. https://doi.org/10.31392/npu-nc.series15.2023.8(168).07

Isoard-Gautheur, S., Guillet-Descas, E., & Gustafsson, H. (2016). Athlete Burnout and the Risk of Dropout among Young Elite Handball Players. *Sport Psychologist*, *30*(2), 123–130. https://doi.org/10.1123/tsp.2014-0140

Janowski, M., Zielinski, J., Ciekot-Sołtysiak, M., Schneider, A., & Kusy, K. (2020). The Effect of Sports Rules Amendments on Exercise Intensity during Taekwondo-Specific Workouts. *International Journal of Environmental Research and Public Health*, *17*(18), 6779–6790. https://doi.org/10.3390/ijerph17186779

Jara, D., Gómez, M. Á., Ortega, E., & de Baranda, P. S. (2020). Design, Validation, And Reliability Of An Observational Notational Instrument For The Football Goalkeeper's Defensive And Offensive Technical-Tactical Actions. *Kinesiology*, *52*(2), 250–257. https://doi.org/10.26582/k.52.2.14

Lumintuarso, R., Suharjana, Widiyanto, & Ndayisenga, J. (2021). Sports Management of Indonesian Sports Athletics Preparations in Asian Games 2018. *International Journal of Human Movement and Sports Sciences*, *9*(1), 56–61. https://doi.org/10.13189/saj.2021.090108

Martino, L., Fonzo, E., Cassese, F. P., & D'isanto, T. (2019). Principles of Adaptation of the Rules for Disabled Athletes for an Inclusion Sport. *Journal of Human Sport and Exercise*, *14*(Proc2), 215–220. https://doi.org/10.14198/jhse.2019.14.Proc2.08

Moustakas, L., & Robrade, D. (2023). Sport for Social Cohesion: From Scoping Review to New Research Directions. *Sport in Society*, *26*(8), 1301–1318. https://doi.org/10.1080/17430437.2022.2130049

Ntomali, S., Adamakis, M., Venetsanou, F., Chairopoulou, C., & Psychountaki, M. (2021). Which Factors Are Influencing Artistic Swimming Performance? *European Journal of Physical Education and Sport Science*, *6*(12), 62–76. https://doi.org/10.46827/ejpe.v6i12.3674

Plessner, H., Ermark, F., Schütz, L. M., & Schweizer, G. (2023). Sports Performance Judgments - An Update From a Social Cognitive Perspective. *Asian Journal of Sport and Exercise Psychology*, *3*(1), 13–23. https://doi.org/10.1016/j.ajsep.2023.01.002

Ponciano, K. R., Fugita, M., Figueira Júnior, A. J., da Silva, C. B., Meira Júnior, C. de M., & Bocalini, D. S. (2018). Reliability of Judge's Evaluation of the Synchronized Swimming Technical Elements by Video. *Revista Brasileira de Medicina Do Esporte*, *24*(3), 182–185. https://doi.org/10.1590/1517-869220182403170572

Putro, B. N., Kurniawan, A., & Fudin, M. S. (2018). Pengembangan Buku Pedoman Man to Man Defense Bola Basket untuk Pelatih. *Journal Sport Area*, *3*(2), 111–120. https://doi.org/10.25299/sportarea.2018.vol3(2).2326

Ratten, V., & Jones, P. (2020). New Challenges in Sport Entrepreneurship for Value Creation. *International Entrepreneurship and Management Journal*, *16*(3), 961–980. https://doi.org/10.1007/s11365-020-00664-z

Rincón, A. B., Trinidad, A., & López-Valenciano, A. (2023). Bibliometric Study on Artistic Swimming. *Frontiers in Sports and Active Living*, *5*(September), 1–6. https://doi.org/10.3389/fspor.2023.1196144

Surahman, F., & Yeni, H. O. (2019). Pengembangan Buku Ajar Mata Kuliah Renang Bagi Mahasiswa Pendidikan Jasmani Kesehatan dan Rekreasi. *Journal Sport Area*, *4*(1), 218–229. https://doi.org/10.25299/sportarea.2019.vol4(1).2413

Torres-Luque, G., Blanca-Torres, J. C., Giménez-Egido, J. M., Cabello-Manrique, D., & Ortega-Toro, E. (2020). Design, Validation, and Reliability of an Observational Instrument for Technical and Tactical Actions in Singles Badminton. *Frontiers in Psychology*, *11*(December), 1–10. https://doi.org/10.3389/fpsyg.2020.582693

van den Akker, J. (1999). *Principles and Methods of Development Research.* In: van den Akker, J., Branch, R.M., Gustafson, K., Nieveen, N., Plomp, T. (eds) Design Approaches and Tools in Education and Training. Springer, Dordrecht. https://doi.org/10.1007/978-94-011-4255-7_1

van den Akker, J., Gravemeijer, K., McKenney, S., & Nieveen, N. (2006). Introducing educational design research. In *Educational Design Research*. Routledge. https://doi.org/10.4324/9780203088364-9

Williams, E. L., Mathias, C. J., Sanatani, S., Tipton, M. J., & Claydon, V. E. (2024). In at the Deep End: The Physiological Challenges Associated with Artistic Swimming. *Clinical autonomic research : official journal of the Clinical Autonomic Research Society*, *34*(6), 619–624. https://doi.org/10.1007/s10286-024-01070-z

World Aquatics. (2022). *Artistic Swimming Manual For Judges, Technical Controllers, Referees & Coaches 2022-2025*.

Wu, A. (2023). Sport's Competition Risk Adjustment of Policy Tools Application, Content Construction and Optimization Strategies. *Frontiers in Sport Research*, *5*(7), 37–46. https://doi.org/10.25236/FSR.2023.050707

Yuan, R., Han, Y., & Lu, X. (2022). Nonlinear Random Matrix-Based Intelligent Management Model for Swimming Place Waters. *Mathematical Problems in Engineering*, *2*(1), 1–12. https://doi.org/10.1155/2022/7601021