

ABSTRAK

Cabang olahraga renang merupakan olahraga individu berbasis waktu, di mana pencapaian terbaik ditentukan oleh catatan waktu tercepat. Pengukuran limit latihan atlet renang gaya bebas 50 meter di Klub Renang Gajah Mada Kabupaten Mojokerto selama ini masih mengandalkan pelatih dan analisis manual, yang berpotensi menimbulkan kurangnya transparansi, ketidakpuasan atlet, dan hambatan dalam optimalisasi program latihan. Untuk mengatasi permasalahan tersebut, penelitian ini mengembangkan Sistem Pendukung Keputusan (SPK) berbasis metode *Rank Order Centroid* (ROC) untuk menentukan bobot kriteria secara proporsional, dan metode *Multi-Objective Optimization on the Basis of Ratio Analysis* (MOORA) untuk menghitung peringkat atlet secara objektif. Sistem kemudian diuji dengan membandingkan hasil perankingan yang dihasilkan (*Rank X*) dengan perankingan manual (*Rank Y*) menggunakan korelasi *Rank Spearman* pada tiga periode pengamatan: Juli, Agustus, dan September. Hasil pengujian menunjukkan bahwa seluruh alternatif atlet memiliki selisih peringkat nol ($d = 0$), sehingga total kuadrat selisih $d^2 = 0$ dan koefisien korelasi Rank Spearman (ρ) = 1. Hal ini menandakan adanya korelasi sempurna antara perankingan sistem dan manual. Dengan demikian, sistem ROC–MOORA mampu menghasilkan perankingan atlet renang yang valid, konsisten, dan adil, serta dapat digunakan sebagai alat evaluasi untuk meningkatkan efisiensi dan efektivitas program latihan di klub renang.

Kata kunci: Atlet Renang, Limit Latihan, ROC–MOORA, Sistem Pendukung Keputusan, Korelasi *Rank Spearman*

ABSTRACT

Swimming is a time-based individual sport, where the best achievement is determined by the fastest time. Measuring the training limits of 50-meter freestyle swimmers at the Gajah Mada Swimming Club in Mojokerto Regency has so far relied on coaches and manual analysis, which has the potential to cause a lack of transparency, athlete dissatisfaction, and obstacles in optimizing training programs. To overcome these problems, this study developed a Decision Support System (DSS) based on the Rank Order Centroid (ROC) method to determine the criteria weights proportionally, and the Multi-Objective Optimization on the Basis of Ratio Analysis (MOORA) method to calculate athlete rankings objectively. The system was then tested by comparing the resulting ranking results (Rank X) with the manual ranking (Rank Y) using Spearman's Rank correlation in three observation periods: July, August, and September. The test results showed that all alternative athletes had a ranking difference of zero ($d = 0$), so that the total squared difference $d^2 = 0$ and the Spearman's Rank correlation coefficient (ρ) = 1. This indicates a perfect correlation between the system and manual rankings. Thus, the ROC–MOORA system is capable of producing valid, consistent, and fair rankings of swimmers and can be used as an evaluation tool to improve the efficiency and effectiveness of training programs in swimming clubs.

Keywords: *Swimmers, Training Limits, ROC–MOORA, Decision Support System, Spearman Rank Correlation*