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# ORIGINAL ASPECTS REGARDING THE MONITORING AND DIRECTING OF THE EFFORT OF STUDENTS OF THE UNIVERSITY OF BUCHAREST, WITHIN THE LESSONS OF NAUTICAL SPORTS ACTIVITIES

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**Abstract.** *Background*. Through its specific objectives and tasks, nautical sports activities contribute to the psycho-somatic and social development of practitioners, becoming a discipline beloved by students, they number increasing from year to year. This discipline, shortly introduced in the DEFS 'curriculum, responded to a need to diversify the socio-educational interests of University of Bucharest` students, the University of Bucharest being the only university in the country that does not have a sports profile, which offers such lessons to its students.
*Objectives.* The present paper, through its content and its approach, aims to highlight the main aspects of the specific effort, applied and recorded in kayak lessons. The subject is Dang Huan Fang, student at the Faculty of Geology and Geophysics, 1st place holder in two important competitions organized this year: the "Alexandru Bizim" University Cup and the Kayak Challenge 2025.
*Methods.* Our scientific approach aimed, mainly, at presenting some model trainings, specific to the preparatory period, with the objective of developing endurance through specific and non-specific means for the 1000m kayak race.
*Results.* The information provided by the Garmin Fenix 5 device used in this research contributes decisively to optimizing the planning and programming strategy of the practical activity of students enrolled in the nautical sports activities discipline, constituting essential feedback for those directly and indirectly involved in the training process.The obtained data are based on objective, efficient and modern monitoring, used for the first time at the level of non-profile higher education, thus providing an overview of the specific demand for these activities.
*Conclusion.* Through its content, our project emphasizes the importance and opportunity of using modern and efficient means of monitoring the parameters of the effort specific to the 1000m kayak race, all in the context of a general strategy for training UB students, practitioners of the race referred to previously, which should have as a starting point a particular training model, based on modern means, adapted to the particularities of the race and the motor profile of the practitioners.

**Keywords:** monitoring, nautical sports activities, students.

## Introduction

In Romania, kayaking began to be practiced after the First World War, with our athletes being trained by Czechoslovak specialists. The first regatta in Romania took place in Arad in 1936. Later, Lake Snagov became the cradle of the country's greatest achievements in this sport, and to this day, it

offers modern nautical facilities equipped with high-performance equipment. It is also the main training site for the olympic teams.[1]

Kayaking is a sport that is rarely offered at universities. However, the University of Bucharest (UB) is an exception, being the only university in Romania that has recently introduced kayaking lessons into the DEFS' curriculum, offering students the opportunity to practice this sport. Due to its rarity, kayaking is becoming increasingly popular among UB students, with the number of enrolled students rising annually. In addition to its uniqueness, students appreciate the positive psycho-somatic and social effects that come with practicing kayaking.

Furthermore, the nautical sports activities discipline provides students with the opportunity to discover new skills and passions. This was the case for our subject, the UB student Dang Huan Fang (female, 24–25 years old), a student at the Faculty of Geology and Geophysics. She is an amateur athlete with no prior experience in sports, other than the kayaking lessons she began after enrolling in the course. She joined the nautical sports activities course in the academic year 2024/2025 and had her first experiences with kayaking in October 2024.

What is remarkable about our subject is the fact that, despite having no prior experience in kayaking or related disciplines, she achieved outstanding performance in a very short time (approximately five months). Her performance significantly exceeded those of other UB students who participated in the same course. She has developed a new passion for kayaking, which is the reason for her regular attendance at the kayak lessons. Thanks to her qualities and her high interest in kayaking, she was selected as the subject of this study. In February 2025, she agreed to participate at two important competitions for amateurs held in May 2025: the Kayak Challenge 2025 (1000 m race) and the "Alexandru Bizim" University Cup (200 m sprint), both of which require more advanced training.

In this paper we present the training process that prepared our subject for the 1000 m kayak race, using both specific and non-specific means and specific training models in order to improve endurance and strength. Furthermore, we aim to demonstrate that sufficient and modern monitoring of the subject's performance can improve her overall performance not only during the preparatory period, but also at the kayak competitions.

## Motor skills in kayak-canoe

Kayaking and canoeing engage various motor skills depending on the specific event being performed. In long-distance races, endurance is the more important motor skill, while in short-distance races, strength – expressed in various forms – is emphasized.

To enhance understanding, the following are definitions of motor skills from different disciplines, including physical education theory and methodology, physiology and psychology.

Definitions of Motor Skills:

- After Ardelean, T. (1990)[2]:
  Motor skills are attributes of muscular activity, conditioned by psychological processes and capabilities, as well as by the structure and fundamental capabilities of different body systems and body parts. They are expressed through motor acts.
- Şerbănoiu, S. (2004)[3]:
  „Motor skills can be defined as innate characteristics of an individual's motor capacity, whose level evolves over time depending on multiple factors."

[1] Igorov M., Igorov A. (2017) Kaiac-canoe. Teoria Antrenamentului. Editura Discobolul. Bucureşti, pag. 6.
[2] Ardelean, T., (1990), Particularităţile dezvoltării calităţilor motrice în atletism, Editura IEFS, Bucureşti, pag. 4.
[3] Şerbănoiu S. (2004), Metodica Educaţiei Fizice, Editura Cartea Universitară, Bucureşti, pag. 19.

## Speed

Pradet, M. (2001)[4] defines an athlete's speed as being his capability to move, or cause a part or all of their body to move, over the longest distance possible in the shortest possible time, facing only their own body weight.

## Endurance

Endurance, as defined by Grigore, V. (2001)[5], is the motor skill that enables the body to sustain intense efforts over a prolonged period.

## Strength

- Dragnea, A. (1996) defines strength as follows: "Human strength is achieved through the contraction of one or more muscle groups and represents the capability to overcome, resist, or yield to external or internal resistance."
- After Țifrea C. (2002)[6], strength is defined in the biomechanic point of view as the ability to overcome or resist external forces through muscular tension.

## Skill (Coordinative Ability)

In the opinion of N. Alexe and V. Ludu (1993), cited by M. Teodoru (2004), a skill is the individual's ability to quickly and accurately select and perform motor actions appropriate to unexpected situations, with high efficiency.

All components of coordination are present in kayak-canoe disciplines, although in varying proportions. The most crucial component is balance.

## Balance

Balance is a fundamental and complex element of human motor behaviour. Performing both simple and complex movements requires a highly developed sense of balance. After Horghidan, V., (2000)[7], "balance is the control element of energy", while Sbenghe, T., (2002)[8] describes balance as "the ability to maintain or move the body without falling". The authors Marcu, V., şi Chiriac, M., (2009)[9] state that "maintaining balance involves keeping the body's center of gravity above the base of support within a specific sensory context". "From a biomechanical perspective, balance refers mainly to internal forces generated by muscle contraction" (Gagea, A., 2002)[10].

According to Epuran, M., (1982)[11], balance involves several types of sensory perceptions:

- Verticality and tilt perception – Provides feedback on body and head position relative to the vertical axis, particularly via ankle joints and the soles of the feet.
- Linear motion perception – Felt at the start and end of linear body movements.

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[4] Pradet M. (2001). Pregătirea fizică, partea a II-a. Centrul de cercetări pentru probleme de sport. Bucureşti pag. 5.
[5] Grigore,V.,(2001), *Gimnastica artistică – Bazele teoretice ale antrenamentului sportiv*, Editura Semne, Bucureşti, pag. 38.
[6] Țifrea C. (2002). *Atletism. Efortul de antrenament şi de concurs*. Editura Dareco, Bucureşti. pag. 177.
[7] Horghidan, V., (2000), *Problematica psihomotricității*, Editura Globus, Bucureşti, pag. 129.
[8] Sbenghe, T., (2002), *Kinesiologie. Ştiința mişcării*, Editura Medicală, Bucureşti, pag. 18.
[9] Marcu, V., Chiriac, M., coord., (2009), *Evaluarea în cultură fizică şi sport*, Editura Universității din Oradea, pag. 183.
[10] Gagea, A., (2002), Biomecanică teoretică, Editura Scrisul Gorjean, Târgu-Jiu, pag. 137.
[11] Epuran, M., (1982), *Psihologia educației fizice*, Vol. I, Editura IEFS, Bucureşti, pag. 132.

- Rotational motion perception – Felt during changes in rotational motion at the start and end of a body movement, especially during acceleration or deceleration. Prolonged rotation can cause dizziness.

Although described separately, these sensations work in close coordination, resulting in proprioceptive sensitivity – a key component in motor control.

According to the authors Ciofu, I., Golu, M., Voicu, C., (1978), cited by Zaharie, N.V.,(2013)[12], "proprioception is essential for maintaining dynamic balance", which is a defining characteristic in all kayak-canoe events.

Maintaining balance requires the interaction of two movement centers: "the center of pressure (the force exerted on the ground via the feet), and the center of gravity (the point where gravitational force acts on the body)" (Alexe, D.I., 2009)[13].

## Motor Structure of the 1000 m Kayak Event

The effort required in the 1000 m kayak race is mixed, combining both anaerobic and aerobic systems in the following proportions:

- Anaerobic: 40%
- Aerobic: 60%

The predominant motor skill in this event is forced in the endurance regime, which varies in form depending on the respective moment during the race. Alecu A. (2019)[14] outlines the race sequence as follows:

- S1 – Start (approximately 20-30 meters / 8-10 strokes): Explosive strength
- S2 – 30 to 300 meters (68-74 strokes): strength-speed-endurance
- S3 – 300 to 700 meters (88-90 strokes): endurance strength
- S4 – 700 to 1000 meters: strength-endurance-speed

## Materials and Methods

The preparatory period before the first 1000 m kayak race at the 10th May 2025 lasted approximately two months (March-May 2025) in which the subject trained twice or three times per week with specific means. The subject's performance was monitored between the 23th April and 22th May 2025 with the Garmin Fenix 5 device which records the distance travelled in km, the maximum speed that was reached during a whole training session and the time in minutes and seconds. Additionally, the device calculates the average speed in km/h for preselected distances.

One training unit lasts around 60-75 minutes and includes the following:

- Warm-up onshore (gymnastic exercises)
- Warm-up offshore with the kayak (movements attentive to the technique)

Depending on the target of the respective training session, we present some examples of possible training models that were applied offshore with the kayak:

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[12]Zaharie, N.V., (2013), *Psihomotricitatea – factor determinant în realizarea obiectivelor pregătirii inițiale în Gimnastica Artistică Feminină*, Teză de doctorat, București, pag. 46.

[13]Alexe, D.I., (2009), *Manifestarea echilibrului la pubertate în funcție de dominanța emisferelor cerebrale, în vederea orientării în probele tehnice de atletism*, Teză de doctorat, București, pag. 249.

[14] Alecu A. (2019).Aspecte Metodologice în antrenamentul sportiv în kaiac canoe. Editura Universității din Pitești pag. 67.

- For more strength: 10 x 200 m, 1–2 minutes break in between
- For more endurance: 6 x 500 m, 3–4 minutes break in between or 3 x 1000m, 5–7 minutes break in between
- Possible combinations that train not only force, but also endurance, for example alternately 2 x 500m and1000m, 2 x 200 m, with breaks in between that are mentioned beforehand

We mention here that the training models were adapted depending on the collected data of the Garmin Fenix 5 device and the feedback of the subject. At the end of the training session, the subject cools-down offshore by exercising the technique.

Besides the kayak lessons, the subject prepared herself with non-specific means that were done irregularly, approximately once in one or two weeks. The physical exercises were carried out with resistance bands with which mostly the muscles of the upper part of the body were strengthened.

## Results

The Garmin Fenix 5 (Garmin Connect)[15] device illustrates graphically the subject's performance during kayaking offshore and delivers exact numbers about the time, speed and distance travelled. We mention that the average speed of the whole recorded time during the kayak lesson shown in Fig. 1 – Fig. 6 is not representative due to the tracked warm-up, breaks and cool-down. Therefore, we utilized only the average speed of the subjects' active moments of the training, excluding warm-ups, breaks and cool-downs, to calculate afterwards the average speed performed on the kayak of the respective training session (see corresponding tables).

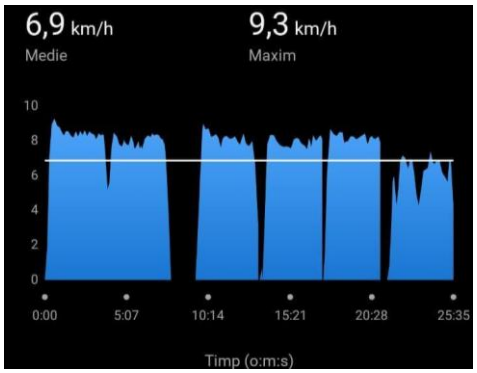


**Figure 1.** Performance on the 23th April.

| 23th April | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,5 | 8,2 |
| 0,5 | 7,8 |
| 0,5 | 7,5 |
| 0,5 | 7,4 |
| 0,5 | 6,9 |
| Average speed of the day | 7,56 |

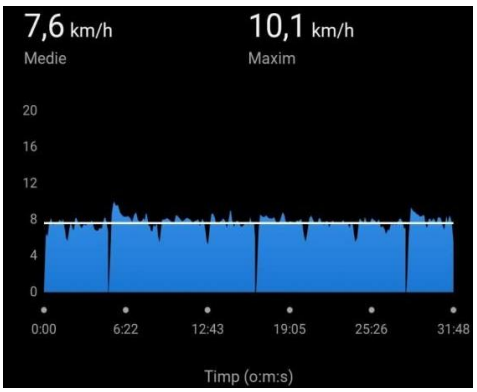


**Figure 2.** Performance on the 25th April.

| 25th April | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,5 | 7,7 |
| 0,5 | 7,6 |
| 0,5 | 7,7 |
| 0,5 | 7,6 |
| 0,5 | 7,4 |
| 0,5 | 7,8 |
| Average speed of the day | 7,63 |

[15] https://play.google.com/store/apps/details?id=com.garmin.android.apps.connectmobile&pli=1

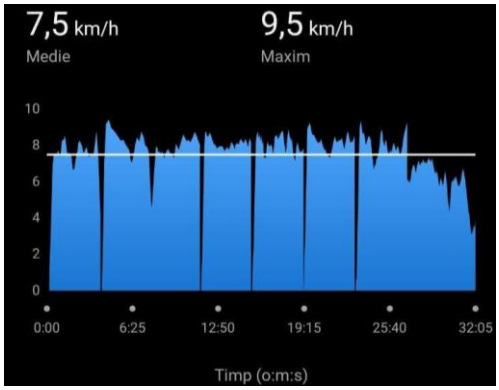


**Figure 3.** Performance on the 29th April.

| 29th April | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,5 | 7,9 |
| 0,5 | 7,9 |
| 0,5 | 7,8 |
| 0,5 | 8,1 |
| 0,5 | 8,3 |
| 0,5 | 7,8 |
| Average speed of the day | 7,97 |


**Figure 4.** Performance on the 5th May.

| 5th May | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,5 | 8,2 |
| 0,5 | 7,9 |
| 0,5 | 8,1 |
| 0,5 | 7,8 |
| 0,5 | 8,0 |
| Average speed of the day | 8,0 |

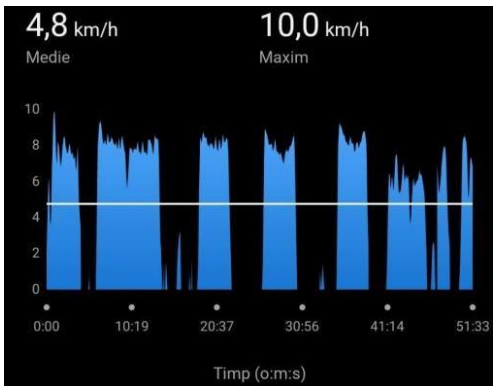


**Figure 5.** Performance on the 7th May.

| 7th May | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,5 | 8,1 |
| 0,5 | 7,8 |
| 0,5 | 8,0 |
| 0,5 | 7,7 |
| 0,5 | 8,2 |
| Average speed of the day | 7,96 |

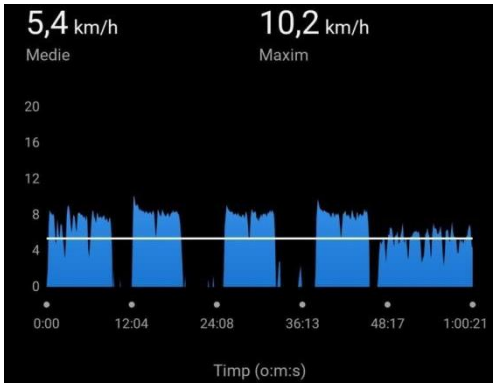


**Figure 6.** Performance on the 22th May.

| 22th May | |
|---|---|
| Distance (km) | Average Speed (km/h) |
| 0,95 | 8,1 |
| 0,96 | 7,9 |
| 1,00 | 8,0 |
| Average speed of the day | 8,0 |

Based on the recorded data by the Garmin Fenix 5 device, the subject's average performance speed during kayaking has increased from 7.56 km/h in April to 8.0 km/h in May, which means an improvement of 0.44 km/h within one month. As for the maximum speed that was reached during each kayak lesson, an increase can be observed as well, from 9.3 km/h in April to 10.2 km/h in May.

It is very likely that the training sessions with specific means had a significant, positive influence on the subject's performance that led in the end to her success at both competitions in which she occupies twice the 1st place. Non-specific means may have contributed lesser to the overall performance, but their contribution should not be neglected. The constant monitoring and the subject's feedback were very helpful for adaptions of the training models according to the targets of the training units and the needs of the subject.

## Conclusions

This paper has analysed the training of our subject for the 1000 m kayak race (Kayak Challenge 2025, 10th May 2025) by using specific and non-specific means. For the monitoring of the subject's performance during active kayaking on the lake, the Garmin Fenix 5 device has been utilized. It becomes clear that monitoring plays a key role for planning and improving training models in order to maximize the overall performance of the subject. Furthermore, monitoring provides a reference point and valuable feedback both for the trainer and the subject, and represents a powerful tool for performance improvements. Modern and efficient monitoring on a regular basis, like demonstrated in this paper, can be applied in any kind of sport in which an advanced training, for example for upcoming competitions, is required.

## Authors' contributions

The authors have equally contributed to this study.

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