

SEMBLANZA

Rudolf von Laban's Labanotation: the origin of notational analysis methods in sport sciences.

[La Labanotación de Rudolf von Laban: el origen de los métodos de análisis notacional en las ciencias del deporte].

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Rudolf von Laban

Rudolf von Laban (born in 1879, Poszony, Hungary; and died in 1958, Addlestone, England) was one of the most significant figures in the movement analysis and dance in Europe during the 20th century (Lepczyk, 2009). He was considered a pioneer of modern dance and a theorist of the dance movements. Particularly, his work was considered a breakthrough in the history of dance notation systems (Barbacci, 2002; Lepczyk, 2009, 2011).

According to Barbacci (2002) Laban had a life marked by idealism and deep disillusion, on the one hand, he lived in the most important cultural cities in Europe (Paris, Vienna, Munich, Berlin, Zurich, and London) where he met and kept contact with intellectuals and artists, this experience allowed him to be influenced by some theories such as "Naturphilosophie", which developed a biological and romantic vision of movements. In fact, Laban considered the movement as a "Dance of Nature" (Barbacci, 2002). On the other hand, he also was influenced by negative disillusion because he lived through two World Wars, the Weimar Republic and also the origins of Nazism. Laban tried to study the movement from a natural perspective where man has a place in the universe, thus the movement is related to the mind and body, as well as to individuals and groups (Barbacci, 2002).

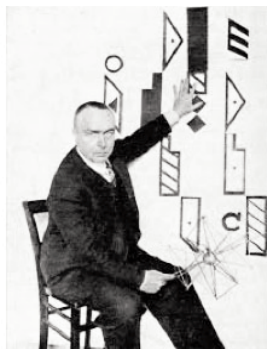


Figure 1. Rudolf von Laban (retrieved from www.wikipedia.org accessed September 21th, 2014).

Labanotation

Laban started studying the movement based on space and quality (i.e., choreutics and eukinetics, respectively), and he initially created a dance notation system in 1926 (Coreographie). But, two years later the Labanotation system was published and described in "Schriftanz" (dance journal) based on Laban's movement notation system that was firstly called "Kinetography Laban", and it was renamed as "Labanotation" the name that is used today (Laban, 1960; Barbacci, 2002; Lepczyk, 2009, 2011).

Laban's main aim when creating the Labanotation system was to prevent the loss of choreographies and popular dances due to that they were considered as real forms of art. Thus the notation allowed for recording, analysing and studying dances along the years (Barbacci, 2002). The notation system was considered a formal and universal language of human movements, it was based on geometric symbols that represented the human movements in space and time (Laban, 1960; Foroud & Whishaw, 2006; Lepczyk, 2009, 2011).

The Labanotation provides kinematic and non-kinematic features of movement that allows you to identify qualitative processes within human movements. Thus the observed concepts and terms may be used as a framework for movement analysis (Laban, 1960; Foroud & Whishaw, 2006; Lepczyk, 2009, 2011). Accordingly, Laban established geometric symbols (staff) that are placed in columns that represent human body parts (i.e., legs, arms, torso, and head), and then provided four components for movement descriptions when writing geometric notations (Laban, 1960; Lepczyk, 2009, 2011):

1. The direction of the movement, drawing the shape of the symbol.
2. The level in space, drawing the shade inside the symbol.
3. The time, drawing the length of the symbol; and
4. Body parts that are moving, drawing the placement of the symbol on the lateral expansion of the staff.

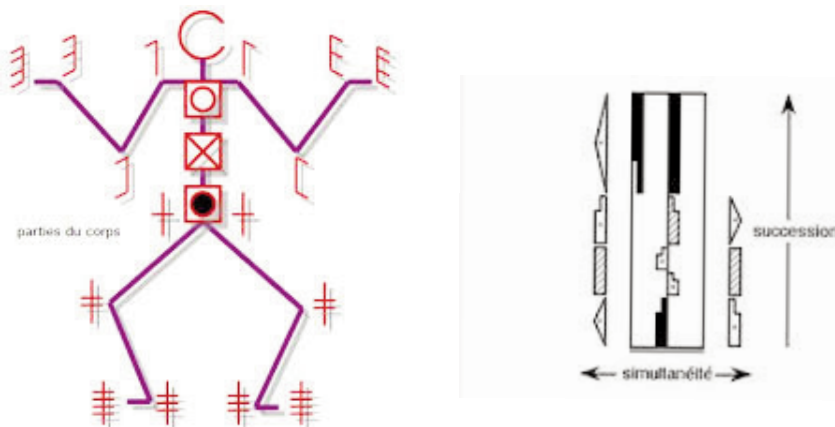


Figure 2. Labanotation representations: human body part symbols (left photo) and geometric symbols form movement sequence (right photo) (retrieved from www.wikipedia.org accessed September 21th, 2014).

The evolution of Labanotation

Laban identified some problems during movement notation systems (Laban, 1960; Lepczyk, 2009, 2011; Racz, Hughes, James, Vuckovic, & Dancs, 2013): i) the difficulty to record a complicated movement accurately; ii) the importance of movement gathering in an economical and legible way; and iii) the importance of innovation when movement notation systems were developed. According to this rationale, the use of Labanotation had an evolution to the development of new movement notation techniques; particularly, in 1947 another concept of dance notation was described by Jean and Rudolph Benesh (Choreology). And also, in 1960 Motif writing was designed for a better understanding of movement analysis in real time and with less complex notation. This system allowed for a deconstruction of the most basic elements of the movement, and then established the core elements of a given movement (O'Donoghue, 2010; 2014). These notation systems were widely used in dance, but they also had a great interest and impact on theatre, non-verbal language, drama, physical therapy, ergonomics, pedagogy, or communication (Barbacci, 2002; Foroud & Whishaw, 2006). However, the use of these notation systems to other physical activity and sport context has been reduced. This was because its final objective was recording the patterns of movements instead of its quantification (Racz et al., 2013). Therefore, nowadays the use of Labanotation keeps its original use for behavioural analyses, and on the other hand notational analysis established an evolution and development of these notation systems to game analysis in sport.

Notational Analysis in sport

This theoretical framework established that notation systems like Labanotation was a starting base of notational analysis (Racz et al., 2013), and it has been used in its original form or with slight modifications in different motor behavioural contexts such as dance assessment (Hernández, 2012), time motion and video analysis in classical ballet (Wyon et al., 2011), special cognition and motor control research (Longstaff, 2000), games and movement based interaction (Kořtomaj & Boh, 2009), intuitive movements in perceptive adventure games (Höysniemi & Hämäläinen, 2004), reading and motor learning (Block, 2001), or when studying literacy through movement with perceptive disabled students (Block & Campbell, 2001).

From a notational analysis perspective of motor behaviour, the analysis of movement patterns during sports is of great importance for coaches, physical therapists or performance analysts, in fact the observation of movement classifications has been recently used for investigating game behaviours such as agility demands and injury risk in sport (Robinson & O'Donoghue, 2008), the feedback that is used during training drills and competition games, kinematic differences of sport techniques, or postural information (O'Donoghue, 2010; 2014). Additionally, as was described by O'Donoghue (2010) the judges has to assess the athletes behaviours using notational analysis during individual sports (e.g., gymnastics or synchronised swimming) and dual sports that involve interpretation of the regulations and precise technical execution (e.g., boxing, judo or taekwondo). These data notations are part of the current body of observational methodology used for assessing motor behaviours and movement analysis, and they reflect the evolution and interest for movement recordings in the field of sport.

On the other hand, from a game analysis perspective, some notational analysis reviews (Hughes & Franks, 1997; O'Donoghue, 2010; 2014; Racz et al., 2013) described that data notation (notation systems) has been used since the beginning of the 20th century, the first attempts for manual data notation were focused on game statistics in French Rugby Championship final in a newspaper article published by Martin in 1907, and some years later exploring the statistics of baseball players and their relationship with success (Fullerton, 1912). However, as Racz et al., (2013) explained the first notation system used for sport analysis was developed by Messersmith and Corey (1931), these authors tried to collect the distances covered by basketball players during a game. From that moment the use of notational systems were used in different sports during the 1960s in football, during the 1970s in tennis, squash and wrestling, and during the 1980s in volleyball, rugby or field-hockey (O'Donoghue, 2010; 2014). During the 1990s and the first decade of the 21th century the notational analysis has reached great interest in different sports and disciplines (Racz et al., 2013). Specially due to the incorporation of video and new technologies that allowed computerised notational analysis in real time or after matches (Hughes & Franks, 1995; O'Donoghue, 2010; 2014).

Actually, the use of notational analysis procedures can be applied to several research topics in sports. Particularly, O'Donoghue (2010; 2014) argued that there are some main topics that are currently studied through notational analysis methods that involve the use of observational sheets, data gathering or notation systems such as critical incidents and perturbations (Ferreira, Volossovitch, & Sampaio, 2014); analysis of the coaches' behaviours (Ortega, Piñar, Salado, Palau, & Gómez, 2012); performance indicators in sport (Prieto-Gómez, Pérez-Tejero, Gómez, 2013); work-rate analysis and injury risk (Dellal, Lago-Peñas, Rey, Chamari, & Orhant, 2013); reliability methods for observational analysis (Robinson & O'Donoghue, 2007); analysis of technique and technical effectiveness (Baiget, Fernández-Fernández, Iglesias, Vallejo, & Rodríguez, 2014); tactical patterns of play (Gómez, Lorenzo, Ibáñez, & Sampaio, 2013); performance profiling (O'Donoghue, 2005); the effectiveness of performance analysis support (Castellano & Alvarez, 2013); and analysis of referees and judges (O'Donoghue, 2014). Therefore, these research topics are closely related to the notation systems, both manual and computerised notational analyses that have its origins in Labanotation system. Thus, Rudolf von Laban's legacy helped us to improve the research methods for observational analyses and data gathering during sport competitions, trainings and games, and consequently a better description of teams' and players' performances using notational analysis procedures.

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