

Problem:

Analyses of World and European Championships show that the efficiency of fighting actions (WQ, WI) of German athletes is lower than that of the winners and that the tendency is falling. A simultaneously increasing opponents' efficiency (-WQ) indicates, among other things, that there are weaknesses in defence capability (fig. 1). In order to guarantee a targeted and individual support for German judo players, quick responses to developments in tactics and technique are essential, and it is necessary to determine errors and their causes. With the analysis methodology used so far, it was only possible to analyse quantitative aspects of fighting actions. Qualitative analyses and the consideration of tactical aspects could not be carried out due to lack of routines for gathering and for analysis, so that the knowledge in this fields was insufficient. This sets narrow limits on the current practical requirements and, in general, a new system of competition analysis is necessary.

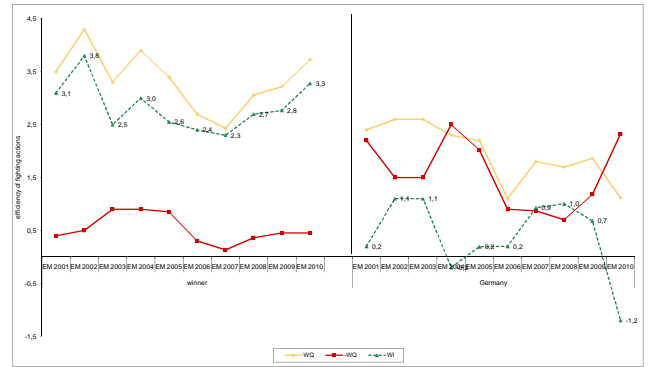


Fig. 1. Longitudinal presentation of the performance development (efficiency) of female winners and of German female participants at the ECh since 2001 (Oswald, 2010)

Procedure:

The video analysis software utilius® vs of ccc software gmbh (Fröhner, Heinrich, Maspfuhl, Hummel & Vetterlein, 2007) was to be the basis for the development of a new analysis methodology because it offers the best conditions with its direct reference between gathered data and relevant video sequences. For that, a basic adaptation to judo-specific requirements was necessary. For the analysis of competition and training, the gathering and analysis of qualitative features of technical tactical actions in judo is to be carried out in addition to the persisting quantitative ones (table 1).

As a result, the following tasks emerged:

1. Development of an online module for video digitization (entry masks, dialogue for input and naming of video files), see fig. 2
2. Development of a specific system of categories for judo to characterize relevant fighting actions (attribution of categories and features)
3. Creation of a modular administration of athletes and competitions
4. Integration of a platform of analysis to present the profiles of players, of weaknesses (see. fig. 3) and of errors
5. Creation of specific analysis modules (entry masks, analysis portal and calculation of specific match parameters)
6. Creation of a database for video and analysis

Table 1. Comparison of the analyses with old and new analysis methodology

Feature	old analysis	new analysis
reference to video	missing	interactive video profiles
data gathering and analysis	quantitative	quantitative, qualitative
feedback	not possible	observative training video feedback
transfer of results	report and video files	individual analyses, interactive competitors' profiles report

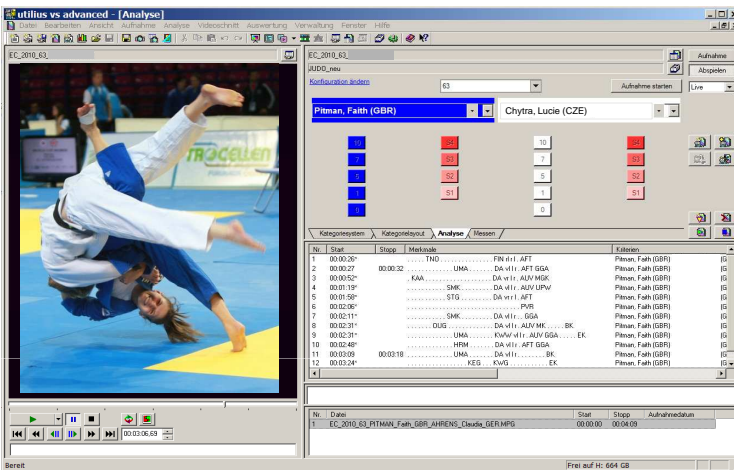


Fig. 2. Online input module utilius vs judo

Table 2. Error analysis of selected female athletes at the ECh 2010 (one part of competition analysis)

type of attack error	direct attack	feint	counter-attack (throw-throw)	counter-attack (grip-grip)	counter-attack (grip-throw)	combination (throw-throw)	combination (grip-grip)	combination (throw-grip)	total			
wrong situation	13	93%	0%	0%	0%	1	7%	0%	14			
distance too far	17	85%	0%	1	5%	0%	0%	2	20			
grip loosened	8	80%	0%	1	10%	0%	1	10%	10			
insufficient grip control	8	67%	0%	1	8%	0%	0%	3	12			
insufficient consequence	16	76%	0%	1	5%	0%	1	5%	21			
insufficient Kuzushi	6	100%	0%	0%	0%	0%	0%	0%	6			
insufficient change of position	13	81%	0%	1	6%	0%	0%	2	16			
backward body position	1	100%	0%	0%	0%	0%	0%	0%	1			
other	2	50%	0%	2	50%	0%	0%	0%	4			
total	84	81%	0	7	7%	0	1	1%	12	12%	0%	104

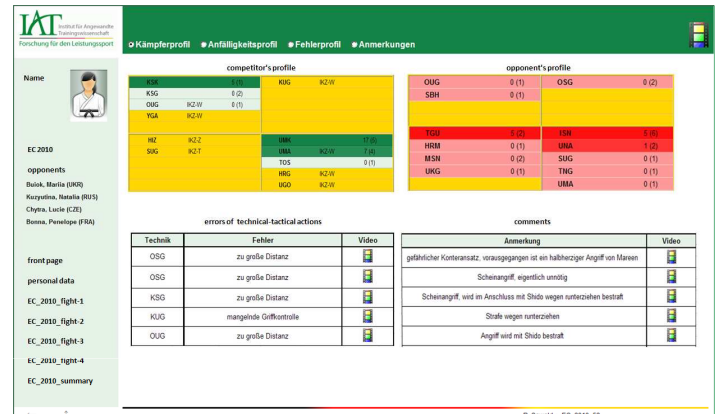


Fig. 3. Competitor's profile of a female athlete at the ECh 2010

Results and discussion:

After completion of tasks 1 to 4, in 2009, the first practical application to analyse technical tactical actions during competition-like training was made. During the direct competition preparation for the ECh and the WCh, training matches of elite athletes were analysed and recommendations for training were given. As a new issue, individual goals for performance (individual fighting concept-IKZ) and the control of their implementation were integrated. So it was shown that the method is useful to determine the individual technical tactical performance capacity. The direct reference to the video material and the opportunity to make error analyses allow for faster and more effective corrections and determinations of priorities during the training. After corrections as a result of the first testing phase the new analysis methods were applied in 2010 in the competition analysis of selected athletes at the ECh (see table 2). Another upgrade of the systems is planned until 2012.