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PILOT WORK ON EVALUATION OF WOMEN WATER POLO TACTICS PATTERN

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Abstract

In water polo lacks a codified methodology for tactics training, which is thus only left to coach's discretion.

Nine women water polo matches, during season 2011/2012 (Italian female Serie A1), have been analyzed by a water polo coach, helped by a statistician and a performance analyst. Purpose of the analysis process was to identify single events during the matches, to examine the tactical pattern implemented in this events, to obtain by the coach an evaluation on tactical pattern compliance and then to put this compliance in relation to event's outcome. Aim of the work is to verify the efficacy of different attack patterns, when they were well-performed, in order to create a codified methodology for teaching water polo through tactics.

The research approach is integrated and consists of 3 distinct methods: case study (9 matches of the Italian Serie A1 Women's Championship, season 2011/2012, played by the Volturno sc) for the analysis of matches, action research method for coach contribution, and theoretical-argumentative method to deduce a theoretical framework in which define the data processing.

The research team examined matches with Dartfish TeamPro, isolating single keyframes relative to attack events, identifying the implemented attack pattern, then the coach expressed an evaluation on attack pattern compliance.

The results showed a general efficacy of tactical patterns (when they are well performed), but showed significant differences within correlation coefficients of single patterns, confirming the need for developing a common methodology for teaching waterpolo through tactics.

Keyword: performance analysis, case study, action research.

Introduction

In water polo lacks a codified methodology for tactics training, which is thus only left to coach's discretion.

This pilot work represents an attempt to develop methods and consequential tools to analyze, and then train, tactical water polo side, knowing that "the coaches of team sports analyze matches and performances of team and opposing teams to get useful data in coaching" (M. D. Hughes&I. Franks, 2008) and that, "currently, the process of training, its organization, and teaching methodology need more knowledge on the qualitative aspects of sports performance (R. Schmidt, C. Wrisberg 2008)".

Nine women water polo matches, during season 2011/2012 (Italian female Serie A1), have been analyzed by a water polo coach, helped by a statistician and a performance analyst. It is vital that the reliability of a data gathering system is demonstrated clearly and in a way that is compatible with the intended analyses of the data. The data must be tested in the same way and to the same depth in which they will be processed in the subsequent analyses (M. Hughes, 2004; G. Raiola & A. Di Tore, 2011). Purpose of the analysis process was to identify single events during the matches, to examine the tactical pattern implemented in this events, to obtain by the coach an evaluation on tactical pattern compliance and then to put this compliance in relation to event's outcome. Aim of the work is to verify the efficacy of different attack patterns, when they were well-performed, in order to create a codified methodology for teaching water polo through tactics. The data, collected via Dartfish TeamPro Software, were analyzed trough a "Waterpolo Tactics Analyzer" software, developed as a web-based application at University of Salerno and released under GNU/GPL license, which returned basic descriptive statistics and the correlation coefficient of each pattern with events outcomes. The results show a positive and statistically significant correlation ($\rho > 0.9$) coefficient between tactical compliance and events outcome, and highlight the need for developing a common methodology for teaching water polo through tactics, confirming once again that "the practical value of performance analysis is that well-chosen performance indicators highlight good and bad techniques or team performances " (M. Hughes, 2007).

Method

The research approach is integrated and consists of 3 distinct methods: case study of 9

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matches of the Italian Serie A1 Women's Championship, season 2011/2012, played by the Volturno sporting club) for the analysis of matches, action research method for coach contribution, and theoretical-argumentative method to deduce a theoretical framework in which define the data processing. The survey of data is entrusted to performance analysis, carried out with the help of a water polo coach, a statistician and a performance analyst.

The tool used for measuring is the Dartfish TeamPro software.

The assessment of compliance for the tactical patterns is entrusted to the coach, on the basis of the video analysis-aided confrontation of attack pattern design against attack pattern effectively implemented during match.

The research team examined matches with Dartfish TeamPro, isolating single keyframes relative to attack events, identifying the implemented attack pattern, then the coach expressed an evaluation on attack pattern compliance. Figure 1 illustrates evaluation process.

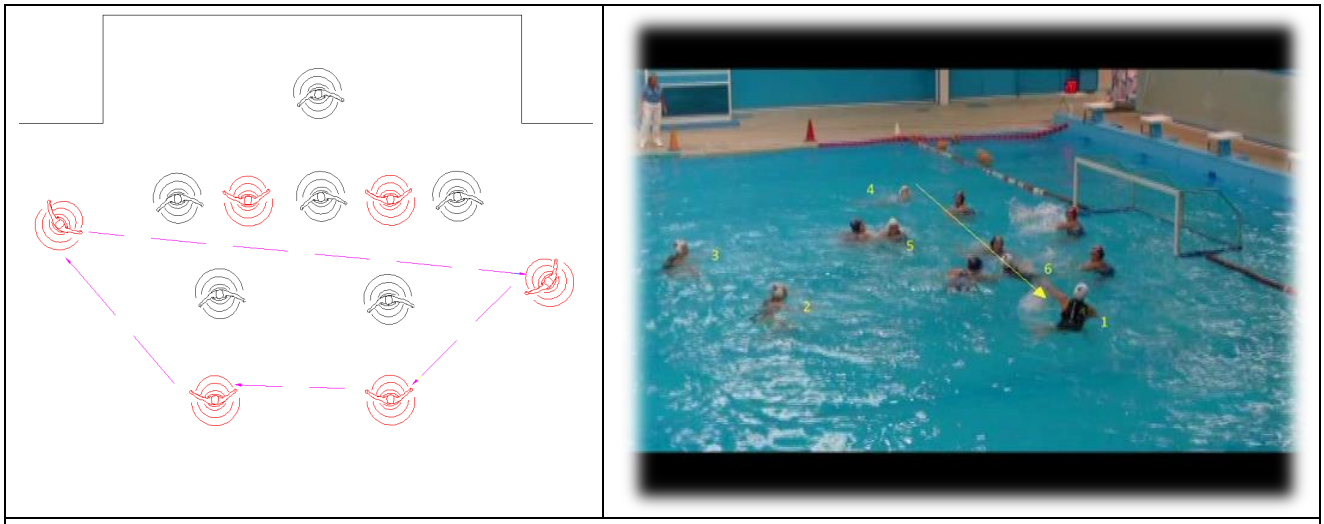

Figure no. 1 - confrontation between pattern design and effectively implemented pattern during match for attack pattern named "schema1"

A spreadsheet containing, for each row, the match id, the event id, the attack pattern id, the coach's evaluation (compliant/non compliant) and the event outcome (goal / non goal) was filled.

This data sheet is processed trough the "water polo Tactics analyzer software", which produces basic descriptive statistics and the correlation coefficient of each well-implemented attack pattern with events outcomes.

In total, 7 attack patterns on 73 events during 9 matches were analyzed. The analyzer software output is discussed by the research team, with consciousness of internal validity, allowed by action research method, of this kind of qualitative analysis.

Results

The performance analysis concerned 7 attack patterns on 73 events during 9 matches.

An evaluation table was constructed by combining, for each single event, the Boolean evaluation of the coach on the compliance of patterns with the event final outcome.

Here are reported:

- confrontations, as an example, of pattern design with Dartfish screenshot of pattern implemented during game, followed by coach's evaluations2;
- Correlation coefficients between "compliant" attack pattern and event outcome for each attack pattern ;

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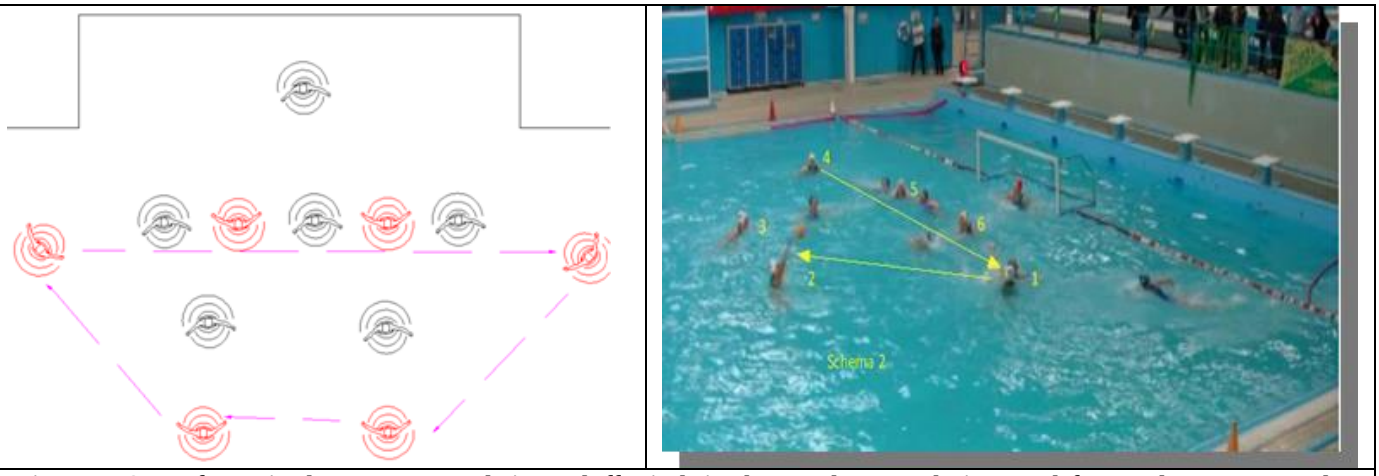

Figure no. 2 - confrontation between pattern design and effectively implemented pattern during match for attack pattern named "schema2"

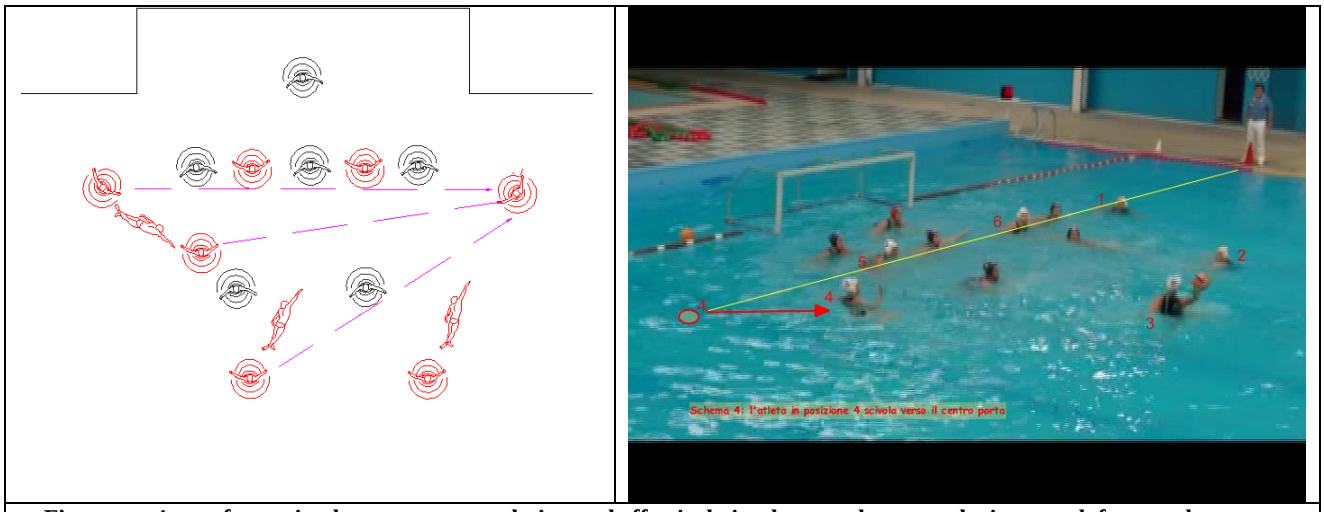

Figure no. 4 - confrontation between pattern design and effectively implemented pattern during match for attack pattern named "schema4"

pattern	occurrence	"compliant " occurrence	goals
schema_1	15	10	6
schema_2	6	3	3
schema_3	8	3	2
schema_4	8	4	3
schema_7	25	21	13
schema_1.2	7	5	1
schema_6	4	4	2

schema_1			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	2	1	0
volturno vs fiorentina fi	0	0	0
volturno vs ortiga sr	3	2	1
volturno vs firenze pn	2	2	2
volturno vs padova	1	0	0

volturno vs messina	1	1	1
volturno vs imperia	2	1	1
volturno vs pro recco	2	2	0
volturno vs bologna	2	1	1

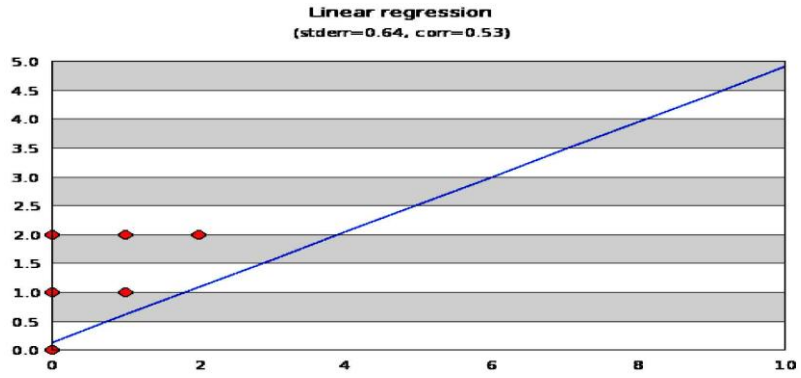

Figure no. 3 - linear regression for schema_1

schema_2			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	2	1	1
volturno vs fiorentina fi	2	1	1
volturno vs ortiga sr	0	0	0
volturno vs firenze pn	0	0	0
volturno vs padova	0	0	0
volturno vs messina	0	0	0
volturno vs imperia	0	0	0
volturno vs pro recco	0	0	0
volturno vs bologna	2	1	1

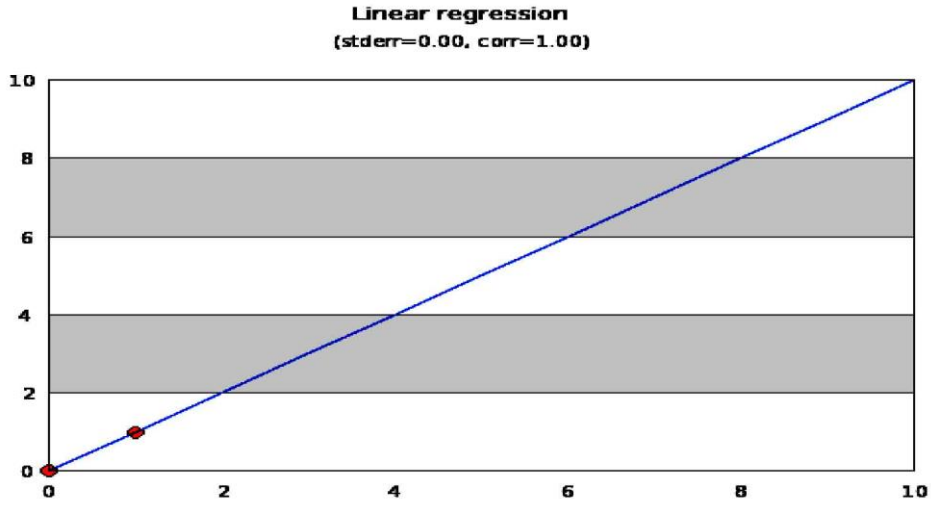

Figura 4 - linear regression for schema_2

schema_3			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	1	1	1
volturno vs fiorentina fi	1	1	1
volturno vs ortiga sr	0	0	0
volturno vs firenze pn	1	0	0
volturno vs padova	1	0	0
volturno vs messina	3	1	0
volturno vs imperia	0	0	0
volturno vs pro recco	0	0	0
volturno vs bologna	1	0	0

schema_4			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	1	0	0
volturno vs fiorentina fi	1	1	1
volturno vs ortiga sr	0	0	0
volturno vs firenze pn	0	0	0
volturno vs padova	0	0	0
volturno vs messina	0	0	0
volturno vs imperia	1	0	0
volturno vs pro recco	0	0	0
volturno vs bologna	5	3	2

schema_7			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	2	2	1
volturno vs fiorentina fi	4	3	2
volturno vs ortiga sr	2	1	1
volturno vs firenze pn	3	2	2
volturno vs padova	3	2	1
volturno vs messina	3	3	2
volturno vs imperia	2	2	2
volturno vs pro recco	3	3	1
volturno vs bologna	3	3	1

schema_1.2			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**
volturno vs orizzonte ct	1	0	0
volturno vs fiorentina fi	0	0	0
volturno vs ortiga sr	2	1	1
volturno vs firenze pn	0	0	0
volturno vs padova	0	0	0
volturno vs messina	1	1	0
volturno vs imperia	1	1	0
volturno vs pro recco	0	0	0
volturno vs bologna	2	2	0

schema_6			
Match	**Pattern occurrence**	**Compliant pattern occurrence**	**goals**

volturno vs orizzonte ct	0	0	0
volturno vs fiorentina fi	1	1	0
volturno vs ortiga sr	1	1	1
volturno vs firenze pn	1	1	0
volturno vs padova	0	0	0
volturno vs messina	1	1	1
volturno vs imperia	0	0	0
volturno vs pro recco	0	0	0
volturno vs bologna	0	0	0

Confrontation between correlation coefficients of single patterns

Attack pattern	Stderr	correlation (compliant patterns / compliant patterns)
schema_1	0.43678760300431	0.76332253361379
schema_2	0	1
schema_3	0.30860669992418	0.75592894601845
schema_4	0.11624763874382	0.98810492932246
schema_7	0.54916964736528	0.22360679774998
schema_1.2	0.34684398780965	0.22941573387056
schema_6	0.37796447300923	0.5976143046672

Figure no. 5 - standard error and correlation coefficient for each pattern

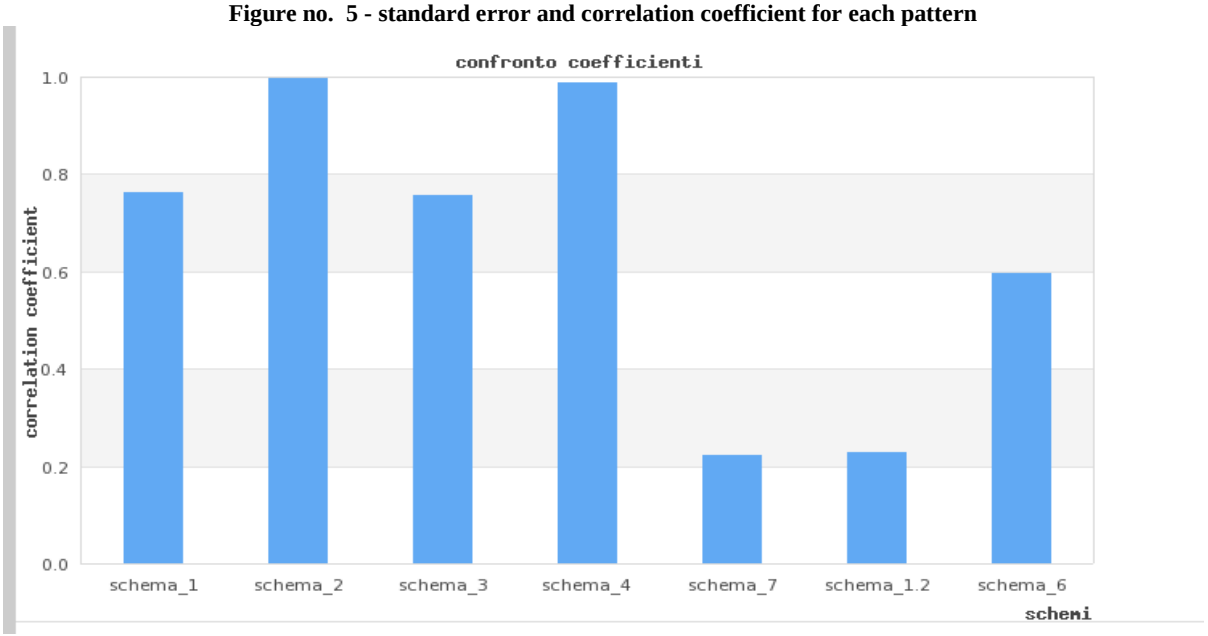

Figure no. 6 - confrontation between correlation coefficients of single patterns

The results show a positive and statistically significant correlation ($\rho > 0.9$) coefficient between total occurrence of well-performed patterns and outcomes of events in which tactical patterns are compliant, but the graph in figure 8 shows significant differences between the correlation coefficient of single patterns.

Discussion

The results showed a general efficacy of tactical patterns (when they are well performed), but showed significant differences within correlation coefficients of single patterns, knowing that "the correlation coefficient indicates magnitude or amount of a relationship and the direction of relationship"(Morrow, Jackson).

A more consistent data base is needed, in order to establish direct, evident and general relationship between so calculated coefficient and pattern efficacy, and the research team is conscious of internal validity of this kind of qualitative analysis, which can't extend, without adjustments, to other teams.

Although, analysis results represents a tool for the coach, in order to better train team in next season,

which were an aim of action research, and showed a general trend on tactical pattern efficacy, which will be deeply investigated in future works.
Furthermore, the results confirm the need for developing a common methodology for teaching waterpolo through tactics.

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