

The “PUZZLE” – a teaching aid for training session and microcycle planning

By Günter Lange

The planning of training sessions and microcycles is central to the work of coaches. Instead of simply providing detailed descriptions of the training plans of successful athletes as “recipes” for student coaches to copy, the philosophy of the IAAF Coaches Education and Certification System is to teach course participants how to construct their own plans and thus learn the skills involved. The author presents a pedagogical tool he has developed for this purpose, the PUZZLE, and how it can be used on CECS courses and by coaches in their day to day work. After providing some background to the project, he describes the physical components of the PUZZLE, which include pieces representing training units, means and methods (both general and event specific), load and regeneration. The pieces are colour-coded to assist the user to avoid the most common mistakes in preparing training plans (load imbalance, fitness/skill unit imbalance, inappropriate arrangement of fitness/skill units, inappropriate means for training objectives). How the PUZZLE is used in a workshop setting to develop training plans is described, including assessment and feedback procedures. The author concludes by listing the advantages and limitations of the PUZZLE.

ABSTRACT

Günter Lange is employed as an international sports development expert by the German National Olympic Committee. He has served as a national coach for distance runners in four countries. A lecturer in the IAAF Coaches Education and Certification System since 1986, he has conducted more than 100 courses in 30 countries. He is currently based in Nepal.

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Introduction

Those involved in coach education have received a great number of requests from coaches of all levels throughout the world for a “recipe” that will help them plan successful training programmes. Moreover, the demand from coaches for detailed information on the training programmes of successful athletes is also high. This indicates a wide-spread acceptance of the importance of training programming and creates a learning opportunity for coaches to increase their understanding of the complexity and multitude of possibilities of such planning.

Within the IAAF Coaches Education and Certification System (CECS) the philosophy of knowledge and skill acquisition is based upon

a student centred approach. A "learning by doing" style of teaching, which emphasises the maxim "Don't give fish, teach fishing" is at the core of the CECS. This philosophy runs counter to the practice of providing coaches with a recipe for training.

In light of the above, the challenge was to create a tool that would enable coaches to enjoyably develop and improve their craftsmanship¹ and skill in this central area of their work. The resultant product is the "PUZZLE".



Originally the PUZZLE was designed as a teaching aid for the CECS Level II Coaches' Courses. It has proved to be a unique and valuable instructional tool for microcycle planning workshops for all event groups², which has extended well beyond the scope of the CECS.

The basic premise of the PUZZLE is to provide components, building blocks, for coaches to manipulate into appropriate training plans. As a basic systematic and logical guideline, the PUZZLE encompasses the stages of planning and evaluation leading to the production of a training programme. This tool also facilitates a dynamic discussion and exchange of experiences.

The PUZZLE was designed to stimulate coaches' creativity as they identify and select the content of a training session or microcycle. This includes selection of the appropriate biomotor abilities and identification of the predominant energy systems involved. In addition,

the use of the available means and methods appropriate to the training goals and the determination of the resultant neural, metabolic or structural load, can be realized by using the PUZZLE.

The PUZZLE has proven to be an effective pedagogical tool, for both teaching and evaluation. It is also a very valuable instrument to assist with the daily and weekly planning of training by individual coaches, coaches' councils, and team coaches.

However, discussion of the pedagogical and methodical advantages of the PUZZLE should not overlook the limitations of this tool. The Puzzle cannot, nor is intended to:

- ◆ Overcome a lack of basic knowledge or understanding of specific coaching principles (eg the correlation of biomotor abilities and energy system)
- ◆ Counter any of the fundamental errors made in the process of constructing training programmes. These errors commonly include choosing the incorrect methods with respect to the goals; not establishing the appropriate load and recovery, and not selecting goals or content that are age-, development- or period-related)
- ◆ Monitor the external versus the internal load that the training imposes on the athlete

The coach must select a real athlete from the group of athletes with whom he/she is currently working. The temptation to use

¹ Compare: McEwen, F. The IAAF Coaches Education and Certification System. Level II Update. NSA 3; 99 p.69

² Compare: G. Lange: Syllabus/Modules of a 5 - 6 day MC Planning Workshop optional covering either all 4 event groups (Sprint/Hurdles; MLD; Jumps; Throws) or 4 events of one event group (eg: Distance: 400/800m; MLD; LD/Marathon; Steeple/XC)

hypothetical athletes must be avoided. This requires the coach, when using the PUZZLE, to cover the necessary variations and range of possibilities in the complex process of training planning. This follows the application of the pedagogical principle of "TASK – Fitting".

Educational considerations

"Learning by doing" (here: to design daily / weekly training plan) in the lively interactive production process of a workshop using the

PUZZLE with other coaches enables the student coach to gain additional knowledge, understanding and application of training plan design principles.

The creative and practical use of the PUZZLE allows the student coach to design and evaluate training sessions and microcycle plans in a workshop situation⁴. The coach, by evaluating and giving feedback on the training plans prepared by other course partici-

Details of PUZZLE components

The PUZZLE contains 234 interlinked components listed below.

■ Training Units	9	pieces:	47
■ Means and Methods	19	General	pieces: 82
	5	Sprints and Hurdles	pieces: 16
	8	Middle -, Long Distance; RW	pieces: 22
	9	Jumps	pieces: 31
	7	Throws	pieces: 25
■ Load and Regeneration	4		pieces: 11

The PUZZLE³ challenges the coach to design training sessions and microcycles for all four event groups in athletics:

PUZZLE (pieces)	Units	Means and Methods	Load/ Regeneration	S
Training Session	9	0	0	47
Sprints and Hurdles	9	22	4	156
Middle -, Long Distance; RW	9	26	4	162
Jumps	9	25	4	171
Throws	9	23	4	165
"ALL IN ONE"	9	48	4	234

³ Acknowledgements: The ten year production process of the PUZZLE with pilot courses in all 5 continents was supported by the assistance/feedback of many expert colleagues around the world. In particular the author would like to acknowledge the valuable contributions of the following individuals (in alphabetic order): Abdelmalek, El Hebil (MAR); Czingon, Herbert (GER); Dr. Feng Shu Yong (CHN); Gadea, Oscar (URU); Dr. Hamdi Abd El-Rahim (EGY); Hernandez, Jesus Molina (CUB); Hollings, Stephen (NZL); Locatelli, Elio (ITA); Lumintuarso, Ria (INA); McEwen, Fletcher (AUS); Mouchbahani, Ralph (GER); Pöhlitz, Lothar (GER); Poppe, Didier (FRA); Seagrave, Loren (USA); Sunderland, David (GBR); Velzian, John (KEN); Wangemann, Björn (GER).

⁴ During coaches course systematical reduction of group size to individual design/production at the end of the coaches course (evaluation)

pants, learns coaching skills in a systematic and logical fashion. These skills are based upon the following:

- ◆ A student-centered learning approach
- ◆ An appropriate level of task difficulty, which is pedagogically necessary, will motivate and stimulate the coach to learn the skills of training programme construction.
- ◆ An increased knowledge and understanding by the course participants through the production of training sessions and microcycles of real athletes coached by the coaches in the workshop.

Pedagogical nucleus

The pedagogical nucleus of the PUZZLE is a menu consisting of 61 systematically selected components numbering 234 PUZZLE pieces. Components, including Units; Means and Methods; Load/Regeneration, provide the framework of the design and construction process of the training plan. The framework has been established by limiting the maximum available number of training components (eg speed endurance) per microcycle in order to reduce the risk of overloading athletes. The coach retains the flexibility to choose and arrange, either correctly or incorrectly, the given components with the appropriate means and methods along with the volume, intensity and recovery. The coach, in the construction of the training plan, therefore, must consider the following factors:

1. The biological/training age/development/training period related goals of the microcycle and training sessions.
2. The means and methods related to the goals
3. The load related to goal and methods (eg volume/intensity/recovery)

“Less can be more”

The identification and selection process of the relevant 61 units or means and methods to construct the training session and microcycle was guided by the intent to provide a

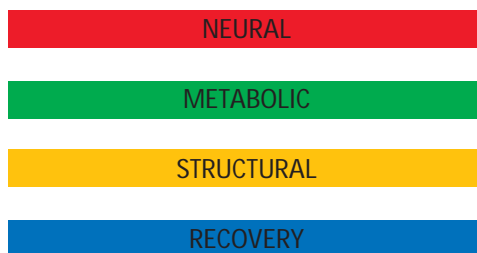
common tool for all four event-groups. Furthermore, the process was based upon the pedagogical axiom - “keep it simple”.

Colour Coding

Colour coding of all the puzzle components and pieces provides additional support during the learning process and augments the feedback and evaluation. The instructional goal of the four-colour code is to help the students and their lecturers to identify the most common errors in training planning. These have been shown to be:

- ◆ An imbalance of neural/metabolic/structural load and recovery
- ◆ A lack of skills (predominant neural) or a lack of fitness (predominant metabolic) units
- ◆ Inappropriate arrangement of skill and fitness units
- ◆ Inappropriate selection of methods and means relative to the goals

The colours of the puzzle pieces reflect the focus of their content and are ordered as follows:



Technical aspects

The author has tested the practical application of the PUZZLE during a number of seminars and courses from New Zealand to Puerto Rico. The outcome was that the PUZZLE pieces (units, means and methods, load) have been numbered, magnetized and plastic coated. As a result, each piece can be easily reorganised on the planning board during the production and feedback process. The plastic

coating allows the inscription of the Volume/Intensity/Recovery details by using non-permanent marker and makes the PUZZLE pieces extremely durable. Use of a large planning board facilitates discussion and feedback with fellow students and lecturers and allows easy reorganisation of the components. The microcycle plan board is constructed of metal so that the pieces stick to the surface. In some cases the backs of metal filing cabinets have been used with excellent results!



The "black box"⁵ of the microcycle PUZZLE

The content and the structure of the PUZZLE was evaluated and approved by IAAF CECS consultants and experts, including all the editors of CECS Level II, at a conference in France in April 2000. Beyond the use in IAAF CECS courses as the tool for the

design and evaluation of Training Sessions in Level I and Microcycle Plans in Level II, the PUZZLE has become the key teaching aid of training planning workshops.

Content



Microcycle Puzzle (234 pieces)

⁵ compare: Watson / Skinners "black box" model

Microcycle plan

The PUZZLE uses an operational "platform" to design and evaluate the Training Session or Microcycle plan that employs seven-day "Microcycle Plan". It is introduced as a planning tool in Level I, and is then used by the students as a Coaches Diary¹.

The Microcycle Plan structures, not only the necessary profile and details of the athlete and the training phase, but provides the option of a case study using athletes coached by the participants.



THE MICROCYCLE PLAN

EVENT(S) _____

MALE FEMALE
 AGE _____ YEARS _____
 TRAINING AGE _____ YEARS _____
 NAME _____

GOAL PERFORMANCE(S) _____
 PREVIOUS YEAR'S BEST PERFORMANCES _____
 PRESENT LEVEL OF GENERAL ENDURANCE _____

PERIOD							
PHASE							
MESOCYCLE							
MICROCYCLE							
DAYS	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
DETAILS OF SESSION							
TRAINING EMPHASIS							
LOADING							

Training session PUZZLE (units)

The 47 pieces of the 9 microcycle components (MC) are listed below:

MC Biomotor Ability	Units/Microcycle (week)
1. Schoolsport / Games	03
2. Regeneration	05
3. Flexibility	06
4. Endurance	14
5. Strength	08
6. Speed	04
7. Coordination/Technique	04
8. Test / Competition	02
9. Joker	01

¹ Students eligible for Level II receive an IAAF Coaches Diary (Microcycle Plan) to monitor the day by day coaching activities of the potential Level II participants after Level I and before Level II Course invitation

Coordination / Technical

HURDLING

Sprints & Hurdles M.21

I 100%

V 7 [3 HURDLES]

R 3'

MC.7

Some pieces have the additional optional selection (by ticking) to cover all biomotor abilities, all pieces provide the space for the coach to add the Means & Methods, as well as write in the Intensity, Volume and Recovery. An example of the "Coordination/Technical" Component is given below:

Coordination / Technical

HURDLING

Sprints & Hurdles M.21

I

V

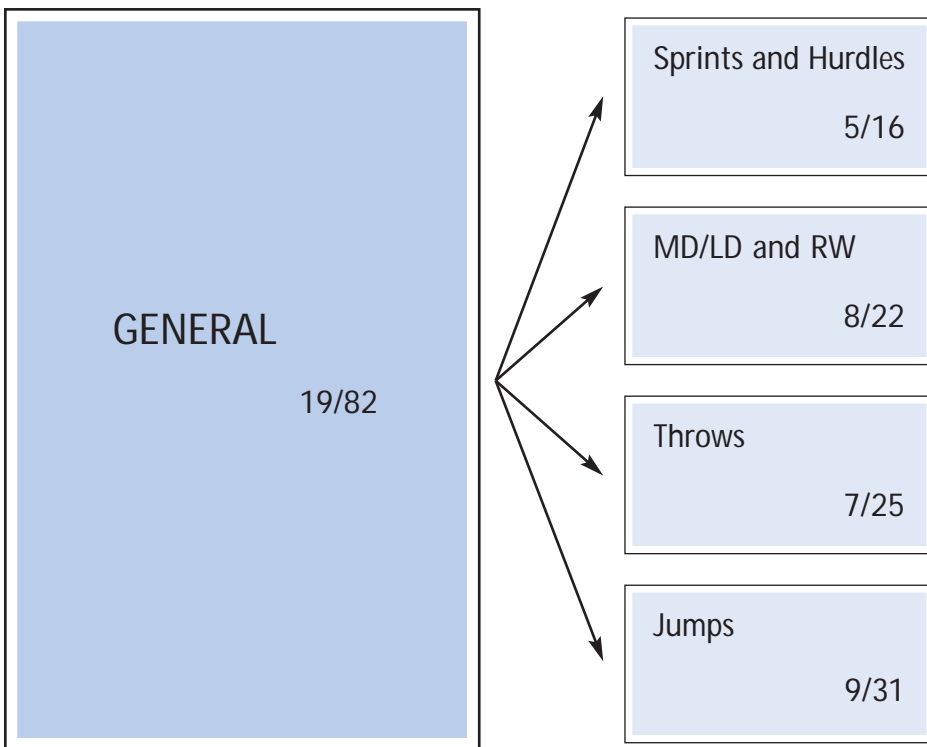
R

MC.7

Microcycle PUZZLE
(means and methods)

To be user-friendly for the coaches from all track & field events a total of 176 puzzle

pieces of the 48 means and methods cover all 4 event-groups and is structured as indicated:



General

The 82 pieces of the 19 general means and methods (M1-19) cover the training forms used in all four event-groups:

	Number of pieces
1. Stabilisation / Balance	04
2. Circuit	03
3. Weights	07
4. Resistance runs	03
5. Plyometric / Multi-jumps	04
6. Hill up / Down	02
7. Multi-throws	02
8. PNF	02
9. Interval-extensive	02
10. Continuous run	14
11. Continuous run (regeneration)	07
12. Fartlek	02
13. Ins and outs	02
14. Delta Lactate (Δ)	02
15. Interval-intensive	02
16. Technique drills	07
17. Assisted runs	03
18. (S)DWR / watertraining	07
19. Bicycle	07

Sprints and hurdles

The 16 pieces of the 5 sprints and hurdles means and methods (M20-24) cover:

	Number of pieces
20. Start	03
21. Hurdling	05
22. Relays	03
23. Gun starts	03
24. Technical Runs	02

Middle/long distance and race walking

The 22 pieces of the 8 middle/long distance and race walking means and methods (M20-27) cover:

	Number of pieces
20. Continuous Run (Fast)	02
21. Long Slow Distance (LSD)	03
22. Five Pace Run	03

23. Barrier Clearance	02
24. Over- / Underdistance	02
25. Competition Simulation	01
26. Ski (roller)	07
27. Test (V _{cr} /Kosmin / SL Stability)	02

Throws

The 25 pieces of the 7 throws means and methods (M20-26) cover:

	Number of pieces
20. Throws (Competition Implement)	03
21. Throws (Heavier Implement)	03
22. Throws (Lighter Implement)	03
23. Throws (General)	03
24. Jumps	03
25. Sprints	03
26. Technique Imitation	07

Jumps

The 31 pieces of the 9 jumps means and methods (M20-28) cover:

	Number of pieces
20. Rhythm Runs	04
21. Approach Runs	04
22. Curved Runs	04
23. Pole Runs	04
24. Jumps (Full Approach)	03
25. Jumps (Medium Approach)	02
26. Jumps (Short Approach)	02
27. Gymnastics	02
28. Specific technical exercises	06

Load/Regeneration

To develop the coach's ability to systematically plan the training load during a microcycle, the PUZZLE provides three load components that cover a quantitative estimation of the planned load:

	Number of pieces
◆ High Load	3
◆ Medium Load	4
◆ Low Load	2

- NEURAL eg: Coordination; Speed drills; Plyometrics (SSC)
- METABOLIC eg: Speed Endurance; Event Specific Endurance
- STRUCTURAL eg: LSD; Plyometrics (SSC)

HIGH

<input type="checkbox"/> Neural
<input type="checkbox"/> Metabolic
<input type="checkbox"/> Structural


MEDIUM

<input type="checkbox"/> Neural
<input type="checkbox"/> Metabolic
<input type="checkbox"/> Structural


LOW

<input type="checkbox"/> Neural
<input type="checkbox"/> Metabolic
<input type="checkbox"/> Structural


Regeneration
Recovery



and also have the colour-coded option (by ticking) to identify the appropriate predominant quality or character of the load:

plus 1 blue colour-coded "component" that covers:

- Regeneration / Recovery

Number of pieces: 2

Construction and feedback of Training Session / Microcycle

In a systematically constructed syllabus, the level of difficulty increases progressively:

Planning a training session then planning a microcycle

A prerequisite for an effective training planning workshop is to provide the necessary time for the production of training sessions and microcycles by the participants. It is also necessary to ensure that sufficient modules

and time are allocated for evaluation of the training plans produced and the provision of appropriate feedback.

The earlier maxim, "Don't give fish, teach fishing" is applied to the student coaches:

1. Produce a microcycle
2. Evaluate a microcycle produced by a different group or individual
3. Receive feedback of the produced microcycle by other students, guided by the lecturers

This means that in the recommended five to six days 'Microcycle Workshop' in each of the four training planning modules, the following significant planning phases are included:

1. General Phase
2. Specific Phase
3. Competition Phase
4. Tapering (last ten days prior to peak competition)

⁷ Time-schedules for 5 and 6 days Microcycle WS available (www.iadc.net)

With four workshop groups (optional four event groups or the four events of one event group) each student shall:

- a) Produce one microcycle
- b) Evaluate one different microcycle
- c) Discuss two evaluations of different microcycles produced by other groups or individuals.

Because of the unique design of the PUZZLE, quick changes and corrections of the microcycle plan can be made as they are produced, as they are evaluated or while they are

being discussed.

To provide help and guidance in the complex process of microcycle production, the evaluation by the students utilises the procedures outlined below:

- ◆ "Construction plan for Training Session"
4 stages
- ◆ "Construction plan for Microcycle"
8 stages
- ◆ "Microcycle Check list"
6 questions

Construction plan for Training Session

1. Set the overall goals and objectives

Decide how this practice fits into the big picture of the microcycle and the period of training

2. Set specific goals and objectives

Decide which skills, biomotor abilities and energy systems will be developed

3. Build in the principles of effective practice sessions

4. Design the training session

Decide which activities, and in what order will achieve your goals and objectives

Construction plan for Microcycle

1. Establish a profile of the athlete

2. Determine the period/phase

3. Identify the units to be covered

4. Fix the amount of each unit

5. Design the load distribution

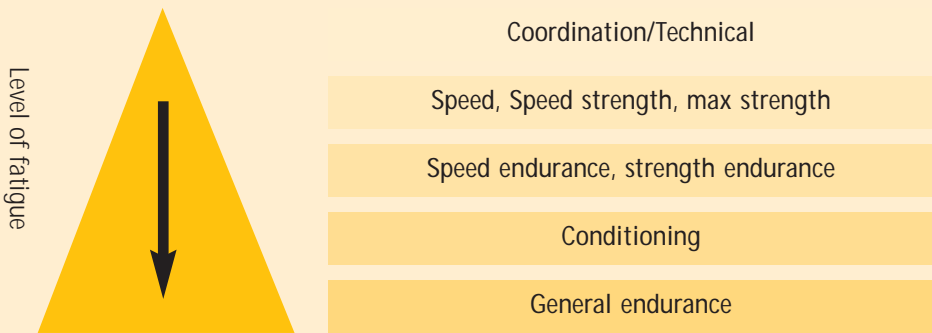
6. Construct the daily sessions

7. Calculate intensities/volume

8. Evaluate using microcycle checklist

Microcycle check list

- Is the content appropriate to the period of training?
- Are the chosen methods correct (intensity) to the goals?
- Are the methods age-related (Games)?
- Is there a balance between training load and recovery (active/passive)
- Principle of variation
- Are the training units and also the training components arranged according to the different demands (preconditions: recovery) of the biomotoric abilities?



Conclusion

"It would be extra bonus if the RDC decided to give away one puzzle for each of us so that we can use all the time. The puzzle is greater than playing monopoly or chess".⁸

The overwhelming enthusiasm of the PUZZLE users and their interest to use this tool in the classroom during our education courses and in their daily work of coaching indicates that the PUZZLE improves the coach's training planning skills and also increases the coaches motivation and self-confidence.

The pedagogical and methodological advantages of the PUZZLE which make it a valuable instrument for the daily and weekly planning/evaluation of training by individual coaches, coaches' councils, and team coaches are that it:

- ◆ Enables the student/coach to enjoyably develop and improve his craftsmanship/skill in the area of training planning in each track and field event
- ◆ Facilitates a dynamic discussion and exchange of experiences
- ◆ Encompasses the stages of planning and evaluation leading to the production of a daily/weekly training plan as a basic systematic and logical guideline

⁸ Dr. Bala (SIN)/Mr. Rangen (SIN)/Mr. Hussain (MLD). Closing speech of participants of IAAF Level II Coaches Course 19.11.2000. In: IAAF RDC Jakarta Bulletin 3/2000 page 35

- ◆ Provides the necessary construction components, "building blocks" for coaches of each event and at different levels as an unique instructive tool for microcycle planning workshops for all event groups
- ◆ Stimulates coaches' creative use/skill to identify and select the appropriate application of content in a training session or microcycle including the selection of the appropriate biomotor abilities and identifying the proper predominant energy systems
- ◆ Uses the means and methods available, appropriate to the training goals and the determination of the resultant neural, metabolic or structural load
- ◆ Counter any of common fundamental errors made in the process of constructing training programmes, eg:
 - a) Choosing the incorrect methods with respect to the goals
 - b) Not establishing the appropriate load and recovery
 - c) Not selecting goals or content that are age-, development- or period-related
- ◆ Monitor the external versus the internal load that the training imposes on the athlete

However, we should not neglect the limitations of this tool.

The Puzzle cannot, nor is intended to:

- ◆ Overcome the student's/coach's lack of basic knowledge or understanding of specific coaching principles (eg the correlation of biomotor abilities and energy system)

The PUZZLE, which is now available in 11 languages: Arabic, Bahasa Indonesia; Chinese; English; French; German; Japanese; Korean; Portuguese; Russian and Spanish; fulfills the needs of the philosophy of coaching as craftsmanship, best expressed by a paraphrase of Aristotle:

"THE WHOLE (TRAINING PLAN)
IS MORE THAN THE SUM
OF ALL ITS (up to 234 PUZZLE) PARTS"



The author providing feedback on a microcycle produced by a student using the PUZZLE