# A Method of Systems Science for Planning Martial Training

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**Abstract**

In this article, it is demonstrated that Systems Science methods, which have been utilized for the development of Information Systems and software engineering applications, can be also applied for planning innovative martial training syllabi. These syllabi can be constructed according to standard processes of System Science, following the systemic concepts of decomposition, recursiveness, input/output and feedback. Their purpose is to meet special training requirements of specific target groups of practitioners or specific MAs. An example of Filipino Martial Arts syllabus is also briefly presented, aiming at the clarification of the described methodology.

**Keywords:** martial syllabus, martial training, systems inquiry, systems science.

## 1. Inroduction

The methodology of training in Martial Arts (henceforth, MAs) is usually incorporated into their particular context of practicing. This incorporation is especially exemplified in many Oriental MA, via the training method of a predefined “shadow-boxing” (like the Chinese forms of Wushu/Kungfu), called differently by different nations: “kata” (Japan), “hyeong/poomsae/teul” (Korea) or “jurus” (Indonesia/Malaysia). An improvised version of forms with weapons are the Filipino “sayaws”, practiced as dance accompanied by “kulintang” music (https://en.wikipedia.org/wiki/Kulintang), or without music (“karenza/carenza”), for particular cultural and historical reasons. Nevertheless, there are exceptions to the previous concept that include:

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| 1.0.1. | The Occidental MAs (Papakitsos, 2017a; 2017b) that prefer more improvised methods of training. |
| 1.0.2. | A significant trend of the Filipino MAs (henceforth, FMAs) that also exhibit a mixed Oriental-Occidental tradition, preferring a more improvised training approach. |
| 1.0.3. | The designing of specialized fighting programmes, like the USA Marine Corps MA Program (MCMAP; see: http://www.whatsafterboot.com/mcmap.asp), usually but not exclusively addressed to military or law-enforcement professionals. |
| 1.0.4. | Self-defense training programmes that are deprived of cultural or traditional aspects of MA. |
| 1.0.5. | Sport/competition training programmes. |
| 1.0.6. | The transformation of MAs training into a subject of academic education or schooling (e.g., of Physical Education) that actually, without being deprived of their traditional training methodology, they are enriched with extra didactic goals (e.g., see: Kwak & Cho, 2017). |

These exceptions require either the modification of an existing training methodology (e.g., 1.0.6) or the designing of a new one (1.0.1-5). Another distinct example of the latter case can be seen in the original development of Jeet Kune Do (henceforth, JKD) and FMAs in Greece (Papakitsos & Katsigiannis, 2015, p. 26):

"This material originated from more than one style/source, and so it was fragmented in terms of conveying a direct teaching progression system. Thus, there was a need for cohesive and scientifically organized training programs, in order to have these martial arts taught in a systematic manner to the interested public. At that time, the lack of such programs was evident world-wide, considering that top instructors had to design their own curricula (see: Magda, 1995) while the Jun Fan JKD Association organized annual meetings in order to define the nature of their art."

In this respect, the usage of robust designing tools may facilitate the process of creating a training methodology, which will be the proper one for the occasion. Systems Inquiry (Banathy & Jenlink, 2003) is such a tool, as it will be demonstrated herein, being the most comprehensive conceptual framework of Systems Science (Foulidi & Papakitsos, 2018, p. 18).

## 2. Context

As a conceptual framework, Systems Inquiry includes three cognitive areas of study (Papakitsos & Mavrakis, 2018, p. 4): Systems Philosophy, Systems Theory and Systems Methodology, having the latter being directly related to applications (Systems Applications). Specifically:

- Systems Philosophy explores theoretical and practical issues of Systems implementation in generally solving problems.
- Systems Theory explores principles and models for the description of phenomena, in an interdisciplinary way, being historically the oldest area of study.
- Systems Methodology explores the discovery of methods, models and techniques for the study of complex systems, along with the methods of knowledge production for systems (Banathy & Jenlink, 2001).

The approach herein will be restricted to the utilization of Systems Methodology that provides models for realizing Systems Science. Such a conceptual model is the Organizational Method for Analyzing Systems (henceforth, OMAS-III; the latest version of OMAS), which is presented in the next subsection (Papakitsos, 2010).

### *2.1. OMAS-III*

OMAS-III was developed from two previous models of Information Systems (Papakitsos, 2013), namely:

- the Structured Analysis and Design Technique (SADT), created by D.T. Ross (1977) and Softech Inc., for commercial purposes;
- the IDEFx family of models, created by the same developers in 1981, after a requirement of the US Air Force for a modelling methodology (Grover & Kettinger, 2000).

In addition, it was enhanced by including concepts of human communication models (Lasswell, 1991; Mantoglou, 2007), for increasing its understandability and usability in human-made systems (vs. natural ones), like Education (perceived as a human-made system). This enhancement of OMAS-III, which is implemented through an inseparable diagrammatic technique (Fig. 1), is based on the seven "journalist's questions" (Papakitsos & Katsigiannis, 2015, p. 27) that express specific concepts of Systems:

2.1.1. the concept of Purpose/Goals (Why?);

2.1.2. the concept of Output/Results (What?) that also includes the notion of Feedback;

2.1.3. the concept of Input/Resources (Which?);

2.1.4. the concept of Rules/Conditions (How?);

2.1.5. the concept of Monitor (Who?);

2.1.6. the concept of Structure that corresponds to the transformation process (from Input to Output) in space (Where?) and time (When?).

Therefore, Systems Inquiry is facilitated in a natural linguistic manner, by using the same words (i.e., the *journalist's questions*) that are daily used for asking about anything we want to learn.

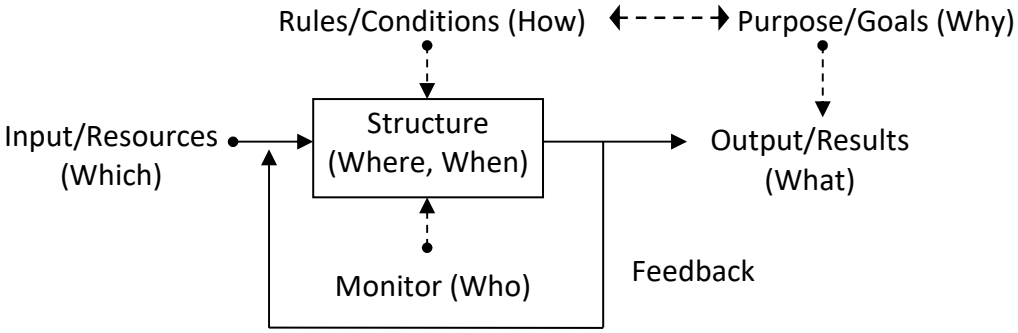


**Figure 1:** The basic diagrammatic technique of OMAS-III.

### *2.2. Applications*

The predecessors of OMAS-III (i.e., SADT/IDEFx) have been applied for designing training syllabi of JKD and FMAs, since 2000 (Papakitsos, 2001; 2003; 2008; 2009), with a very similar conceptual framework, while OMAS-III itself has been applied for the same purpose (Papakitsos, 2015), as well. In addition, this model has been also applied for describing the combat aspects in a systemic manner (Papakitsos & Katsigiannis, 2015). Accordingly, conducting combat is depicted and briefly described in Fig. 2 (modified from Papakitsos & Katsigiannis, 2015, p. 32).

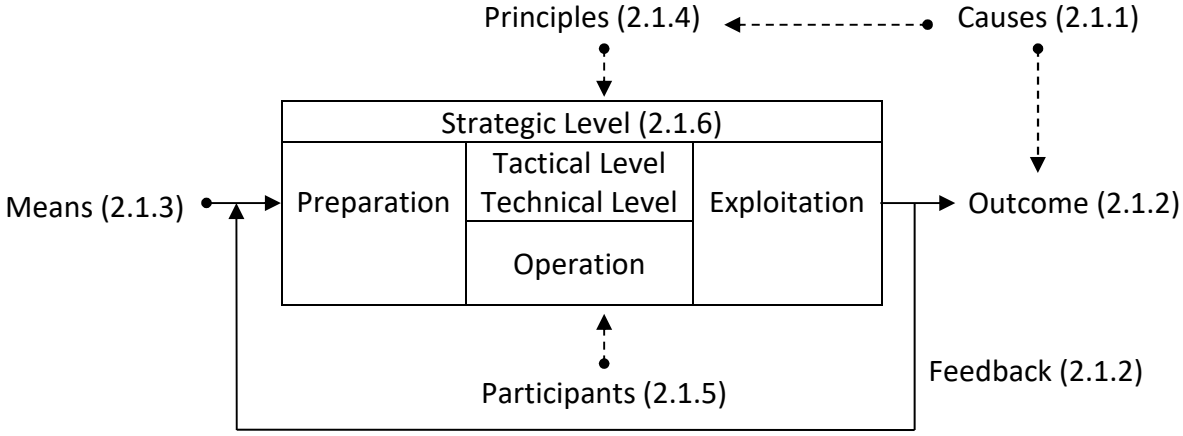


**Figure 2:** Systemic perception of combat aspects.

There are (whatever) Causes (2.1.1) that lead people to participate (2.1.5) in a combat, with various Means (2.1.3) (weaponry). The causes influence the desired or acceptable Outcome (2.1.2) and the selected Principles (2.1.4) of engagement. The outcome always constitutes the Feedback (2.1.2) of the system (i.e., what worked well, what didn't and what should be done about it). Then, this particular system is analyzed in its Structure (2.1.6), considering the aspects of natural/virtual space (Where?) and absolute/relevant time (When?). The natural space is the actual battlefield, along with its features (i.e., the type of terrain), while the virtual space is the levels of combat, as a system (Strategic, Tactical & Technical). These levels realize the main systemic concept of breaking a complex problem (i.e., combat)

into smaller and more manageable parts. The absolute time is the actual time of fighting, during the day (daytime or dark), that affects visibility. The relevant time refers to the progression of combat (Phases), namely what happens before (Preparation), during (Operation) and after (Exploitation) the actual engagement (Papakitsos & Katsigiannis, 2015, pp. 27-31). The conduct activities (Operation) are the main concerns of the Tactical and Technical level (Fig. 2). Yet, their implementation is dictated by the decisions of the Strategic level (above) and the quality of the Preparation phase (before).

Another main systemic concept, besides breaking an initial problem into smaller parts (levels of analysis), is that of *recursiveness* (Heylighen, 1992): Each part/level can be also broken gradually into smaller ones, analyzed through the same systemic manner as subsystems of the main one. The essential activity of the Preparation phase is that of training, which is always based on a syllabus. In this respect, the application of a single systemic model (OMAS-III), for describing both the preparation and the conducting of combat, offers a unified conceptual framework that facilitates the designing of relevant syllabi, as it is demonstrated in the next section.

### *3. Systemic Training*

Initially, the designing of a syllabus, in a systemic manner through OMAS-III, is conceptually applied regardless of the teaching subject (Foulidi et al., 2016; Makrygiannis & Papakitsos, 2015; Papakitsos, 2014; 2016; Papakitsos et al., 2015; 2016). Consequently, the analysis now is focused on the "System of Preparation", which is a subsystem of the previous one (Fig. 2). In its turn, the systemic analysis specifically regards the level (i.e., subsystem) of *training* that is a part of preparation (the Preparation Phase includes also other considerations, like the procurement and maintenance of equipment). The description of the System of Training is facilitated by Fig. 3 (modified from Papakitsos, 2010, p. M-20).

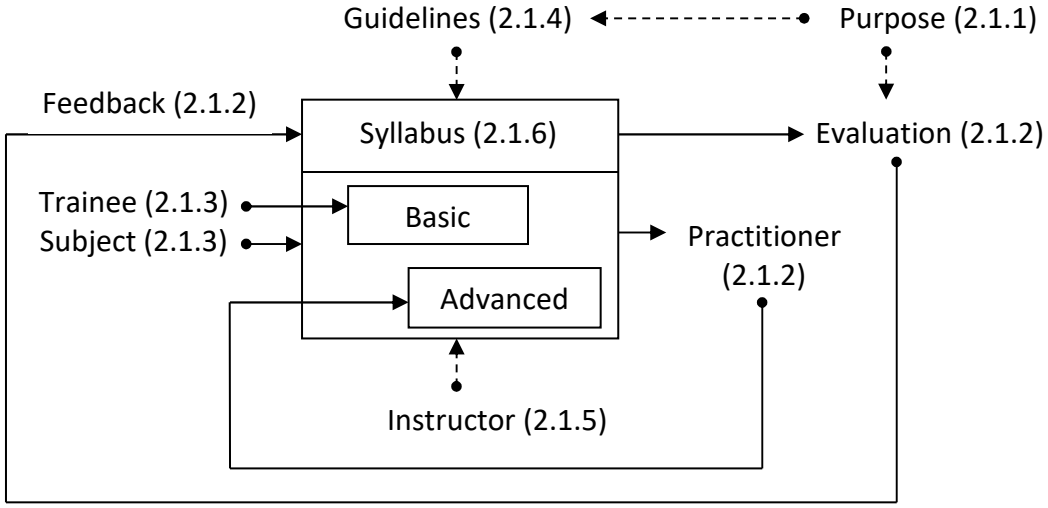


**Figure 3:** The system of training.

### *3.1. Purpose*

The purpose of the system (Fig. 3), namely *why* the training is conducted (2.1.1), has been already determined (1.0.1-6). Obviously depending on the case (1.0.1-6), some elements of the system (2.1.2-4, 2.1.6) should be differentiated or modified, as it is commented in the following subsections.

### *3.2. Output*

In general, *training* is a distinct science and art that aims to achieve a result (2.1.2), according to the demands of all the other sciences and arts, through simple, small, everyday steps, being understandable and practicable by everyone. Its result is learning; a common and composite definition being:

3.2.1. A permanent and steady change in behaviour that finds solutions to problems, through practice, education or experience (Illeris, 2002; Ormrod, 1995).

Considering MAs (Fig. 3), the "changed behaviour" of interest is that of a Practitioner (2.1.2), as a Trainee (2.1.3) gradually becomes a fighter, through the training in a particular MA (Subject (2.1.3)). This is usually called the "graduate's profile" and its determination is necessary for designing any training programme (i.e., Syllabus (2.1.6)). Therefore, the first part of Output is the Practitioner (2.1.2). The second one is the Evaluation (2.1.2) of the training process that transforms a Trainee (2.1.3) to a Practitioner (2.1.2) of a MA (Subject (2.1.3)). The implementation of a syllabus (2.1.6) can reveal weaknesses, compared to the original Guidelines (2.1.4) (that should have been documented), leading to the necessary revision via Feedback (Fig. 3).

### *3.3. Input*

The Input (2.1.3) comprises the Subject (a specific MA or a mixed/selected material) and the Trainees. Whatever constitutes a MA is a topic on its own right that deserves a separate discussion, being beyond the scopes of this paper. Trainees are characterized by certain features that dictate the training approach. These features are roughly:

[A] age (childhood, adolescence and adulthood);

[B] social/economic status (lower-class, middle-class, upper-class);

[C] character (aggressive - hesitant, polite - impolite, introvert - extrovert, etc.);

[D] physical (weight, height, conditioning);

[E] cognitive (knowledge background, perception abilities, intelligence type).

Regarding the cognitive features [E], it is useful to look at the seven (at least) kinds of intelligence (Gardner, 1983):

3.3.1. Language (handling of written and spoken language);

3.3.2. Logical/Mathematical (synthetic-analytical thinking, systemic understanding, mathematical calculations);

3.3.3. Physical/Kinaesthetic (kinetic dexterity);

3.3.4. Optical/Spatial (shape recognition, distance manipulation, mental visualization, sense of orientation);

3.3.5. Musical (sound recognition);

3.3.6. Interpersonal (ability to perceive feelings, motives, moods and intentions of others);

3.3.7. Intrapersonal (self-awareness, self-confidence and self-concentration).

Since MAs practicing requires both physical and mental skills, it is required that a training programme should cultivate to trainees (2.1.3):

- interpersonal and intrapersonal intelligence (3.3.6-7) for the Strategic level of combat (Fig. 2);
- optical/spatial intelligence (3.3.4) for the Tactical level;
- physical/kinaesthetic intelligence (3.3.3) for the Technical level.

In addition, a training programme for Instructors should also cultivate their language intelligence (3.3.1) (Papakitsos, 2010, p. M-9).

### *3.4. Guidelines*

The Guidelines (2.1.4) of a training programme describe the overall manner of its designing and execution (*How*). They can be classified in three categories: Specifications, Learning Principles and Instructional Design. The specifications essentially contain the scope of the training programme (2.1.1) (see subsection 3.1), which in turn is related to the audience (2.1.3) that will be taught to (see subsection 3.3), namely, "who I want to teach and why". Subsequently, the specifications dictate the selection of Learning Principles (henceforth, LPs) to be applied, considering how people learn (generally).

There are general and specific LPs. The former ones originate from many classical and contemporary Teaching/Learning theories and styles that include:

- Authentic Learning (Herrington et al., 2010).
- Behaviourism (David, 2018);
- Case-Based Learning (Ertmer & Russell, 1995);
- Cognitivism (Schunk, 2012);
- Connectivism (Siemens, 2005);
- Constructivism (Duffy & Jonassen, 1992);
- Discovery/Inquiry Learning (Bruner, 1967);
- Experiential Learning (Kolb, 1984);
- Humanism (Huitt, 2001);
- Instructivism (Reeves, 1994);

- Kinaesthetic Learning (Coffield et al., 2004);
- Objectivism (Reeves, 1994);
- Problem-Based Learning (Hmelo-Silver, 2004);
- Scenario-Based Learning (Errington, 2008);
- Situated Learning (McLellan, 1996);

The choice of approach depends on the preferences of instructors and institutions and a presentation of their features is far beyond the scope of this article. Notably though, there have been attempts to integrate learning styles and multiple intelligences (3.3.1-7) (Silver et al., 1997). Nevertheless, it has been also argued that most of teaching/learning theories don't particularly concern MAs training (Papakitsos, 2010, p. M-11), as it is evident by the concerns of contemporary teaching approaches (Mourad & Amaal, 2013). All these theories have been developed during the 20th century, for coping with the deficiencies of the existing world educational approaches, where the teaching process focuses on the development of language and logical/mathematical intelligence (3.3.1-2), ignoring the rest, mainly through lectures in a classroom with desks and much less through experimentation/participation. On the contrary in MAs training, the trainees learn through participation in a physical activity (3.3.3-4) and not merely through observation (audio/visual), therefore learning is experiential (Kolb, 1984) and collaborative (Dillenbourg, 1999) by default.

The specific LPs are related to the features of trainees (2.1.3), most commonly age [A]. Consequently, the relevant categories of teaching/learning are called:

- *Pedagogy*, for educating children and adolescents (Pollard, 2007);
- *Andragogy*, for educating adults (Knowles et al., 2005).

For the former category there have been ten principles formulated, regarding the context/policies (James, 2007), while for the latter one there have been twelve principles (Lieb, 1991). These principles though are more of guidelines for educators about how to behave towards trainees, rather than guidelines for structuring a training programme, while in addition they lack unanimous consent. For practical reasons, six general LPs have been suggested (Murphy, 2011):

3.4.1. *Readiness*, referring to the motivation of trainees for learning, whenever they are emotionally, mentally and physically ready for it.

3.4.2. *Effect* that is based on the emotional reaction of the trainees, regarding their satisfaction from the learning process.

3.4.3. *Intensity*, suggesting that the more intensively a topic is taught, the more it will be remembered.

3.4.4. *Exercise*, suggesting repetition and meaningful practice of the learning topics, followed by a positive feedback; trainees should not learn complex tasks in a single session.

3.4.5. *Primacy*, referring to the strong impression of the first time that something is learned; consequently, topics should be learned correctly the first time that they are taught, step by step in a logical order, following a well-prepared training plan.

3.4.6. *Recency*, stating that the most recent topics are best remembered.

These LPs can be classified in two categories. The first one (3.4.1-3) describes the desirable training "climate" of every single session that should motivate the trainees (3.4.1), being interesting and pleasant (3.4.2), with an intense training programme (3.4.3). The last guideline (3.4.3) could imply realistic drills, engagement scenaria, full-contact applications, sparring, etc. Therefore, this category of LPs (3.4.1-3) is more useful for the implementation of a training programme. The second category (3.4.4-6) is more associated with constructing a MA's training syllabus, as it will be discussed in the last subsection (*3.6. Syllabus*).

### *3.5. Instructor*

The penultimate but most important factor of the training system (Fig. 3) is the Instructor (2.1.5), because he/she must connect the rest of them (2.1.1-4, 2.1.6) to a harmonious whole. Namely, to receive the Input (2.1.3) and transform it to the desired Output (2.1.2), according to the Purpose (2.1.1) and Guidelines (2.1.4) of the training process (2.1.6). An effective instructor (Papakitsos, 2010, p. M-15):

- provides learning motivation (3.4.1);
- encourages with his/her promptings, rewarding the effort of trainees (2.1.3) and their results (3.4.2);
- assists in the assimilation of the subject (2.1.3), with the repetition of exercises (3.4.4), emphasizing those points that the trainees seems to have weaknesses (3.4.3);
- transfers previous knowledge to new conditions (3.4.5-6).

Part of the training of apprentice instructors is also the development of language intelligence (3.3.1), for being able to present or substantiate a view (orally or in writing). Reading books and studying electronic material, in addition to understanding the characteristics of a MA, is also useful for developing the language intelligence (3.3.1) of instructors, which intelligence must be sufficient enough to have them provide a functional training environment and to help them act as:

- teachers for educating their trainees,
- consultants for practicing techniques,
- future supervisors for the training of candidate instructors.

Instructors should be able to adapt the training to the trainees' needs (3.4.1-2), implementing many LPs, concepts and methods. To meet the particular combat needs of a person or a given group (e.g., police officers), they should have the knowledge to modify a

training programme accordingly. This means, to adjust the MA syllabus (2.1.6) for emphasizing the necessary direction. If this is done without the instructors knowing the principles of designing a syllabus, then it is certain that the result will be from poor to even dangerous for the health of trainees. Thus, instructors ought to know all aspects of their training programme, both in terms of its construction and its implementation, even if it is not intended to adapt it to some particular needs.

### *3.6. Syllabus*

According to the present systemic methodology (Fig. 1), the Structure (2.1.6) of the training system refers to its spatial (*Where*) and temporal (*When*) aspects. These aspects are considered both in a natural/absolute manner and in a virtual/relevant one. For the system of training (Fig. 3), the Structure corresponds to Syllabus. The natural space corresponds to the actual place of training that can be indoors or outdoors, depending on the training requirements of the programme (e.g., the MAs training of Special Forces personnel; see 1.0.3). The absolute time corresponds to the actual duration of the training programme (days, weeks, months or years), the number of sessions weekly, the duration of each session and the daily schedule, depending on the circumstances at the institution of training (i.e., a MAs club, a university's department, a military campus, etc.). The virtual space and the relevant time correspond to the structure of the syllabus, regarding where and when each topic will be taught in the training programmes. Obviously, elementary topics are taught first, advanced ones last and intermediate ones respectively.

Subsequently, for a training programme tailored to a specific target group of trainees (1.0.1-6) with a specific training purpose (2.1.1), the instructor/designer (2.1.5) has to determine the minor programme of each stage: elementary, intermediate and advanced one. A standard old practice of software engineering (Pressman, 1987) is to start solving a complex problem by decomposing it to simpler parts (3.4.4-5). In comparison, the decomposition process of training should start by determining the topics of the advanced stage, since they constitute the final result (2.1.2), namely, what the practitioners (2.1.2) should be able to eventually achieve. Therefore, the advanced topics are arranged to compose the programme of the last training stage. The advanced topics have training prerequisites that determine the intermediate topics of the middle stage. The programme of the intermediate stage, in its turn, has as prerequisites the training topics of the elementary stage. Thus, the elementary topics constitute the programme of the initial stage of training, completing so the entire syllabus.

The training process can be additionally analysed in two consecutive phases: a Basic and an Advanced one (Fig. 3: Syllabus (2.1.6)). The Basic phase corresponds to the training of the novice trainees (2.1.3), in the three stages described above, while the Advanced one corresponds to the training of the experienced practitioners (2.1.2). The latter is actually the third and last stage of the former phase that, when periodically repeated (Fig. 3; 3.4.4), aims at enhancing or, at least, retaining the martial skills acquired in the Basic phase by the practitioners, through *recency* (3.4.6).

Focusing now on the three stages (elementary, intermediate and advanced) of the Basic phase of training (Fig. 3), the programme of each stage conforms to the structural levels of combat (Fig. 2):

3.6.1. The advanced level of combat is the Strategic one that dictates the choices and actions of the lower Tactical and Technical levels (Papakitsos & Katsigiannis, 2017). The programme of the Strategic level should develop the interpersonal and intrapersonal intelligence (3.3.6-7) of a trainee, as mentioned before (*3.3. Input*), and prepare a practitioner who will be able to make full employment of his/her martial skills, offensively and defensively. The drills of this stage should allow for minimal predictability (e.g., free-sparring) and the relevant programme should improve the cognitive/mental martial attributes of trainees (termed herein *strategic training*).

3.6.2. The intermediate level of combat is the Tactical one that implements the guidelines of the Strategic level (3.6.1) in time and space, through *manoeuvre* (Papakitsos & Katsigiannis, 2017). The programme of the Tactical level should develop the optical/spatial intelligence (3.3.4) of a trainee, as mentioned before (*3.3. Input*), and his/her defensive techniques and martial skills. Therefore, the drills of this stage should improve the mobility, timing, coordination and countering martial attributes of trainees (termed herein *tactical training*).

3.6.3. The elementary level of combat is the Technical one that deals with the proper usage of weapons/tools and *power management* (Papakitsos & Katsigiannis, 2017). The programme of the Technical level should develop the physical/kinaesthetic intelligence (3.3.3) of a trainee, as mentioned before (*3.3. Input*), and his/her offensive martial skills. Therefore, the drills of this stage should improve the endurance, accuracy, speed and power of a trainee's techniques (termed herein *technical training*).

The specific way of achieving the goals of each stage (3.6.1-3) depends on the "core" MA or MAs that will be selected as the subject of training (2.1.3). Subsequently, each stage can be further analysed, as a training progression, in specific topics that require an estimated duration of practicing (days, weeks, months or semesters) and eventually in sessions. Thus conventionally, at least four levels of system's analysis have been identified so far, from the upper to the lowest one:

3.6.4 Syllabus > stages > topics > sessions.

The analysis of the upper level (Syllabus) to the next one (stages) has been demonstrated herein (Fig. 3) through OMAS-III (Fig. 1). Yet, this systemic methodology can be further utilized to gradually determine the content of all levels, until the last one (for every single session), according to *The Principle of Recursive Systems Construction* (Heylighen, 1992). However, the definition of lower levels can be also conducted in a mixed manner, by applying other methods of instructional design, if desirable. Many of the classical and contemporary Teaching/Learning theories (see *3.4. Guidelines*) include their own set of designing principles:

- Behaviourism (Khadjooi et al., 2011);
- Cognitivism (Gagne, 1985);
- Connectivism (Anderson & Dron, 2011);

- Constructivism (Duffy & Jonassen, 1992);
- Humanism (Rogers, 1983);
- Instructivism (Dick & Carey, 1990);
- Objectivism (Jonassen, 1999).

Another popular method of instructional design is ADDIE, the acronym standing for the proposed phases: Analyse, Design, Develop, Implement and Evaluate (Reiser & Dempsey, 2012). Each method emphasizes different aspects of learning or processing, still, the presentation and comparison of them (if feasible or even meaningful) is beyond the scopes of this article. A brief example of implementing systemic methodology, as presented so far (Fig. 1 & 3), for constructing a martial syllabus is presented in the next subsection.

### *3.7. Implementation*

It was mentioned previously (see section: 1. Introduction) that Systems Science has been utilized for developing training programmes of FMAs in Greece, due to various functional and historical reasons. Such a syllabus will be presented herein (*Filipino Kali*), designed according to the analysis of four levels (3.6.4). It is noted that FMAs are complete, in the sense that their syllabi include training in weaponry and hand-to-hand combat (e.g., see: Somera, 1998). Moreover, the training traditionally starts with weapons (a predominant characteristic of military arts), namely single and double sticks (stick-fighting). This is an essential feature of FMAs, because a novice trainee learns the fundamental fighting principles, concepts and practices (in general) through stick-training. In this respect, the elementary stage is focused on technical training (3.6.3), arranged in five topics, according to the LP of Primacy (3.4.5):

- double-stick, practiced through coordination drills and including training in accuracy and footwork;
- single-stick offensive techniques, introducing speed, distance and power management;
- single and double dagger offensive techniques (although as a rule, knife-fighting is considered advanced and often left for the final stage), practiced according to the concepts of the previous stick-training;
- hand-to-hand striking techniques (punching/kicking), based on stick and especially knife-training;
- hand-to-hand grappling/wrestling, introducing endurance.

These elementary topics are decomposed in a number of sessions, not necessarily equal for each topic (e.g., grappling/wrestling sessions are usually the most numerous), in conformity with the LP of Exercise (3.4.4). Furthermore, conforming to the LP of Recency (3.4.6), previous topics are periodically repeated in each session, after or along with warming-up.

Knowing the offensive actions (*threat*), trainees may start learning how to counter them. Accordingly, the intermediate stage is focused on tactical training (3.6.2) that includes defensive techniques but also and especially defensive actions. The latter consist of distance management (*manoeuvre*) and attacking the limbs of opponents, a predominantly tactical consideration. Consequently, the intermediate stage is arranged in five topics, similar to the elementary ones:

- counters to single-stick attacks that include evasion with counter-attacking, blocks and disarms (the latter requiring skills of elementary grappling), also introducing timing;
- counters to double-stick attacks, based on the previous defensive concepts;
- counters to dagger(s) attacks, based on defensive stick-training;
- counters to empty-hand and kicking attacks, based on the previous defensive concepts;
- counters to grappling/wrestling attacks.

Once again, each topic is decomposed in a number of sessions, with the same rationale like the elementary ones, emphasizing functionality towards the selection of defensive actions.

Finally, the strategic stage is focused on strategic training (3.6.1), considering topics of adaptation, mental preparation, manipulation and deception of opponent, economy and simplicity of fighting approach, combat in groups and other strategic issues (Papakitsos & Katsigiannis, 2017). These topics are also arranged in sessions, as in the former case of adaptation that includes *asymmetrical* offensive/defensive actions with various combinations (e.g., knife vs. stick, empty-hand vs. knife, sword vs. axe, etc., in single and double mode).

Specialized syllabi (e.g., 1.0.3-4) can be devised from the previous one, tailored to specific needs. For example, if there are practitioners of weaponless MAs that would like to be trained in stick/knife-fighting for self-defense purposes, then the related topics from each stage (elementary, intermediate and strategic) can be extracted to form a new syllabus for this task.

## 4. Conclusions

In conclusion, it has been demonstrated herein that software engineering methods, which are utilized for the development of Information Systems (e.g., OMAS-III), have been also applied for planning innovative martial training syllabi. These syllabi can be constructed according to standard processes of System Science and Systems Inquiry, in particular, following the concepts of decomposition, recursiveness, input/output and feedback. Their purpose is to meet special training requirements of specific target groups of practitioners or specific MAs. An example of FMAs syllabi has been presented, along with proposals of modification, intended for practitioners of other martial arts, who might be interested in learning Filipino weaponry for self-defence needs.

## References


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