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Action Regulation Theory

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Abstract

Action Regulation Theory (ART) is a cognitive theory that draws heavily on work by German and Scandinavian researchers. It brings together Levin's Field Theories and the fundamentals of Activity Theory proposed by Leontiev and Vygotsky. However, where Activity Theory looks at activities, which are comprised of sets of goal oriented actions, ART focuses on specific actions: actions coupled with an inherent feedback cycle. This allows for the concept of an action as a pseudo-iterative process. ART can be seen as a part of Activity Theory, which is concerned with the structure of goals and sub-goals that are guided within a hierarchical framework of plans, monitoring, and feedback. These components of actions are regarded as links between mental representations and the material and social environment.

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A practical analogy of action in this context could be a situation where on a film set a recording of baby birds in a nest is being made. As the sound technician requires a clearer sound image, he/she instructs the *boom operator* to move the microphone closer for a clearer audio recording. Referring to Figure 1, the boom operator will *develop the goal* (and decide amongst other competing goals) – **I want to move the microphone closer to the birds' nest**. Next he or she will *orient* him/herself by collecting information about the situation and capturing and analysing relevant environmental signals leading to a probable plan of action: The wind is blowing and the branch is moving. The signals relate to acquired models and knowledge the grip has gained through experience and training. The analysis will then lead to *generation of plans*. While this is usually constructed before the action is executed, it is not always comprehensively conceived; usually it is a simple sub-goal, with various levels of contingency –**I will rest the boom on the upper branch**– *if the branch is too flimsy I will support the weight by readjusting my balance. Decision* is usually a subconscious commitment to execute the plan. It may include an iterative process of Test-Operate-Test-Exit (TOTE), where the process between plan and decision are being continuously fine-tuned. *Execution and monitoring* is the point at which the subject interacts with the object, and both positions are altered. **The boom operator moves the microphone closer to the nest.** *Feedback* completes the action. It provides the subject with information regarding progress toward the goal, and can be extrinsic or intrinsic. The sound technician receives an improved sound level and advises the boom operator that the position is good.

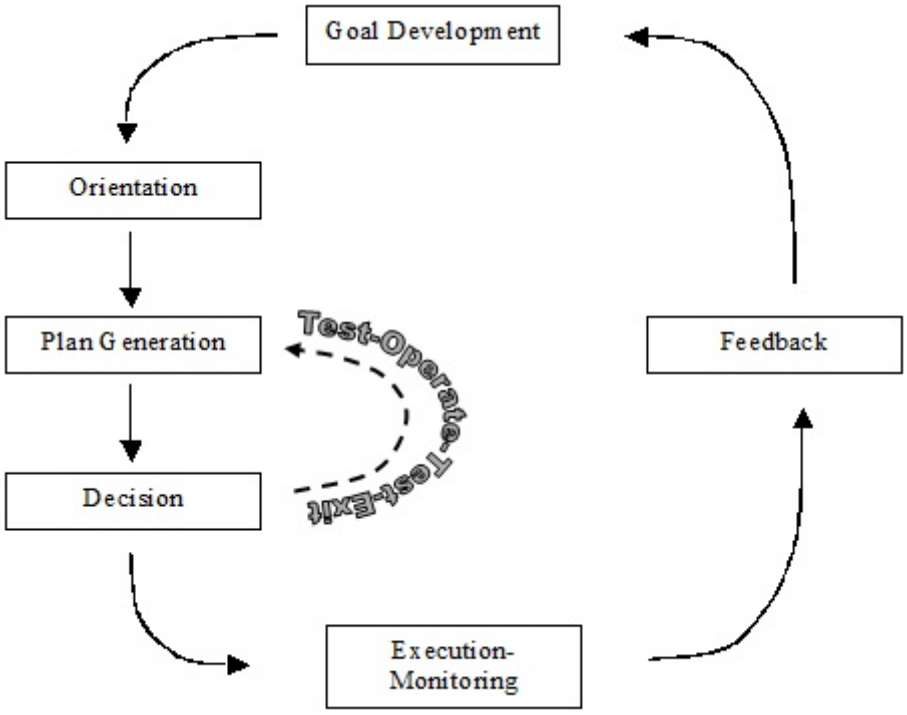

Figure 1.

Put more simply, an action is stimulated by a goal, which motivates the actor toward action, which consequently requires the anticipation of future conditions and results in a need for an action plan. The process is complete with feedback providing a basis for comparison and learning.

While the above describes the 'action' part of ART, 'regulation' comes from the structure of actions and possible alternatives. This is because the actions are structured in a hierarchical system. Figure 2 illustrates the regulation process, taking into account the hierarchic-sequential manner of action regulation. Firstly, a goal is set, then working down, sub-goals are devised, leading to actions. Completion of a set of actions will satisfy a sub-sub-goal or a sub-goal, which will eventually achieve the major goal. A parallel can be made to going from higher levels (the intellectual level) to lower levels (the sensorimotor level) in the human muscular-nervous system.

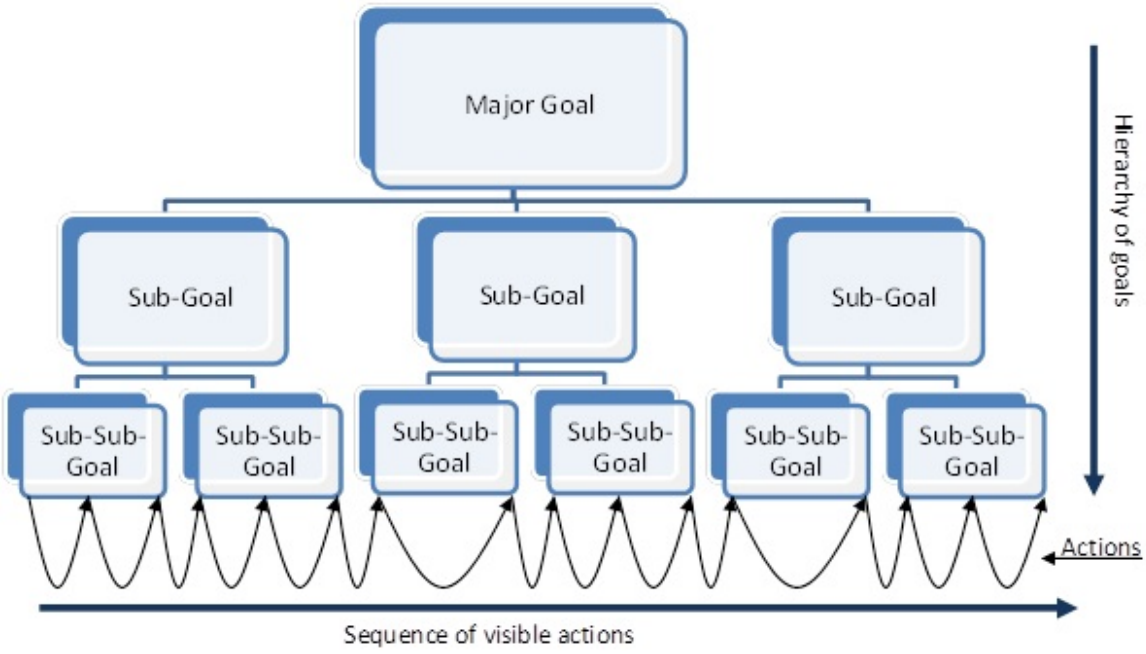

Figure 2.

Through action, ART allows the measurement and understanding of individuals' motivations and self-directed action towards goal completion. Through regulation the theory measures the various learning and cognitive behaviors of individuals in the approach to, and management of, work options. Together, an implementation of ART will measure the efficiency of human-technical interaction in the workplace or organisation by monitoring and reducing work hindrances.

The real value of ART is in its ability to measure stresses or errors in a work system. Assuming that individuals are active and goal oriented, they dynamically engage with their environment. Failure to achieve an achievable goal is due to an error. As human error is avoidable, errors arising through an ART analysis are assumed to be systemic and due to misalignments within the *sociotechnical system*. Such sociotechnical flaws are known as *work hindrances*, as they tend to disrupt stable activity in the average person and result in *stress factors*. These stress factors are characteristics of poor technical or organisational design of the work task and hinder the regulation of the workers' mental processes. In their study of stress in the workplace, Greiner, Ragland, Krause, Syme and Fisher (1997) found four stress factors:

- *Barriers* – the extent to which the work performance is impeded or interrupted because of work obstacles;
- *Time pressures* – the measure of how fast the worker has to work to complete the assigned task under average work conditions, without barriers;
- *Monotonous working conditions* – conditions which demand continuous visual attention, in combination with repetitive movements or information processing for at least 30 consecutive minutes; and,
- *Time binding* – the amount that worker autonomy is modified due to considerations over time and scheduling, regardless of time pressures.

Work characteristics that are highly characteristic of stressors such as these will impede the task at hand, and force workers to try and cope with the situation, and will induce fatigue and poor occupational health and efficiency.

ART addresses organisational analysis from a perspective that treats the organisation as a *system*. A system is a complex arrangement of components which relate, directly or indirectly, in a stable or semi-stable causal network. The two important elements within this arrangement are control and structure (Burrell & Morgan 1979). *Control* requires the change of energy in one activity at one level in order to achieve meaningful activity at a higher level. To achieve this level of interference requires routes of communication that link activities and levels together. Humans are an implicit component in all social and work organisations. They link into the system through knowledge, providing a medium of interaction between the tool and the material being transformed, forming complex human activity systems. *Structure* comprises those elements within the human activity system that are either permanent or which will change slowly or occasionally. As such, structure, in terms of organisation, includes hierarchy, reporting structure, rules and procedures, task design, lines of communication, and physical layout (Bond 2000).

The systems view of organisational design can be metaphorically referred to as organic or organistic, as the system, in a macro sense, is reminiscent of its biological counterpart, both of which comprise systems and subsystems which symbiotically interrelate. However, for the organisation, in an organic design structure, the human element is the natural systemic flaw. As Haberstroh states, humans exhibit 'low channel capacity, lack of reliability, and poor computational ability', but on the other hand humans have some desirable characteristics: 'The strong points of a human element are its large memory capacity, its large repertory of responses, its flexibility in relating these responses to information inputs, and its ability to react creatively when the unexpected is encountered' (Haberstroh 1965, 1976). The challenge therefore is to design the organisational system so that it tolerates human weaknesses, while harnessing human strengths.

Conclusion

Action Regulation Theory provides a basis for measuring and optimising the human-technical interface in the workplace. Taking a systems perspective of organisation, the theory builds on the work of Lewin with his force-field analysis and the work of Vygotski with Activity Theory, as well as the various approaches of Sociotechnical Systems Theory. ART is divided into two complementary approaches to analysis. Firstly, work processes are observed according to their capacity to allow human variation towards task action, and how this action assists or impedes workflow. Secondly, work processes are observed according to their ability to constrain or promote cognitive regulation and creativity, whether workers will learn and innovate their way to more constructive and efficient outputs.

Overall, ART measures work impediments called hindrances and aims, ultimately to reduce these. ART provides a systematic method for analysing organisations based on worker activity and work flow. It is a method that has been largely overlooked in non-European countries, but it is a method which may have merit in other parts of the world.

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