Adaptive Case Management from the Activity Modality Perspective

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Abstract. Adaptive Case Management (ACM) implies a shift from the process centric view in Business Process Management (BPM) to an information centric view. The shift is motivated by the need for organizations to become more responsive to changes. Such a shift should be guided by some kind of framework in order to be manageable. To this end, the construct of the activity modalities is proposed. These modalities – objectivation, contextualization, spatialization, temporalization, stabilization, and transition – stand for innate predispositions that humans employ to coordinate and carry out actions. A central tenet of this position is that all modalities need to be employed in activity. This is used to analyse the Business Process Modeling Notation, the shift from BPM to ACM, and to propose a research road map. Some alternative modelling approaches from the Ericsson telecom company are suggested as forerunners to an integrated modelling suite that supports all activity modalities.

Keywords: Adaptive Case Management, Business Process Management, activity modalities, activity domain, business processes, Ericsson Company.

1. Introduction

Business Process Management (BPM) has to a large extent been focused on the flow of operations – the workflow view. In this view, the data associated with the process is subdued. Evidences are now gathering that the workflow view is too narrow and restricted for coping with emergent enterprise problems such as agility and business-IT alignment. There is a need to move towards a more declarative comprehension of processes based on restrictions and guidelines, rather than on prescriptions as in the workflow view. Adaptive Case Management (ACM) is a case in point, which puts the data up front and the process in the background; thus allegedly leaving room for innovations and the creativity. This move is illustrated in Fig. 1:
This reorientation is in line with a commonly agreed conviction that issues plaguing enterprises today need to be addressed in a wider context where human aspects, organizational structure and technology are considered as a coherent whole. Such a reorientation should be guided by some kind of theoretical framework in order to be manageable, which is the motivation for this contribution. Its purpose is to suggest a reconceptualization of business processes from certain perspective called the activity modalities (AM) [2]. These modalities – objectivation, contextualization, spatialization, temporalization, stabilization, and transition between contexts – stand for innate predispositions that enable us to integrate sensations from various sensory modalities into an actionable percept [9]. In short, motivated by some need we focus our attention on some target (objectivation), form a context around the target (contextualization), attend to relevant things in that context (spatialization), and execute a series of relevant actions towards the target (temporalization; stabilization). Next, we re-focus our attention to another target (transition), and start all over again. This cycle, which we all continuously effectuate in every-day life, may be precluded by neurological deficiencies. For example, a brain lesion in the hippocampal area severely impairs a persons’ spatial navigation, which in turn impedes moving towards a desired target.

The gist of this position is that the activity modalities represent the “preset” frame of mind that we employ in acting. Thus, any means employed in action need to be aligned with the activity modalities if they are to be useful. To take a few examples: maps are designed to reflect spatialization, clocks temporalization, standards and routines stabilization, dictionaries transition, and so on.

In the business process perspective, a workflow model is seen as an expression of the temporalization modality, since it is signifies a temporal ordering of events. In the same manner, an information/data model is an expression of the spatialization modality. Business rules and cooperation agreements between organizations are, in the same manner, expressions of stabilization and transition respectively.

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1 The construct of activity modalities was gradually conceptualized over many years in the Ericsson development practice as a way to make sense of the activity of developing extraordinary complex telecom systems [2]. Ericsson is a well-known telecommunication equipment’s worldwide supplier: http://www.ericsson.com/
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The paper is organized as follows. After this introduction, an overview of the activity modalities and their integrating role in activity is given\(^2\). This framework is used to analyze the Business Process Modeling Notation (BPMN) as the foremost representation of modeling notations for business processes today. A number of inadequacies of BPMN are identified. Next, I discuss some implications for BPM and ACM. In the section that follows I outline a research map for the future based on the AMs. A central task is to find a potent reconceptualization of the “business process” as the “handhold” of all modalities. Moreover, extant modeling practices need to be reconsidered to support all modalities. Some potential solutions from the practice of the Ericsson are described. The conclusion of the paper is that further work in BPM and ACM will benefit from the construct of activity modalities as a guiding framework.

2. The Activity Modalities

In order to illustrate the activity modalities, the mammoth hunt scenery in Fig. 2 may be used:

Fig. 2. Illustration of an activity (Original wood engraving by E Bayard [8]).

When looking at this scenery some salient features can be seen. First, the mammoth is clearly the object in focus for the activity. According to the Russian theory of Activity, actions are always directed towards some tangible or intangible object [3]. There are also several perceivable motives for the hunt: the primary one presumably

\(^2\) “Activity” (German: Tätigkeit; Russian: deyat'nost') as used in this contribution refers to the rather specific meaning it has in Activity Theory [3], meaning roughly “socially organized work”. Thus, it is more precise than every-day English understanding of “activity”.
to get food. Related motives may be to acquire material for clothing, making arrowheads, and the like.

Second, the object and the motive form a center of gravity—a context—around which everything else revolves: hunters, bows, arrows, actions, shouts, gestures, and so on. This context frames the relevance of individual actions. For example, it can be seen in the background of the illustration that some hunters, the beaters, have started a fire and make noises to scare the prey away. The mammoth escapes in a direction where other hunters wait to circumvent the prey and kill it. It is only in the light of the activity as a whole that the beaters’ actions of scaring the prey away make sense.

Third, a sense of what things are relevant in the context must be developed. This enables the actors to orient themselves in the same way as a map does. For example, the river is no doubt relevant since it obstructs the mammoth to escape in that direction. On the other hand, the fishes in the river are irrelevant in this activity (but they are certainly relevant in a fishing activity).

Fourth, actions must be carried out in a certain order. For example, shooting an arrow involves the steps of grasping the arrow, placing it on the bow, stretching the bow, aiming at the target, and releasing the arrow.

Fifth, the archers cannot shoot arrows at random. If shooting in a wrong direction, other hunters may be hit rather than the mammoth. An understanding of how to perform appropriate mammoth hunting will be acquired after many successful (and, presumably, some less successful) mammoth hunts. This provides a sense of the “taking for granted”; rules and norms indicating proper patterns of action that need not be questioned as long as they work.

Sixth, an activity is related to other activities. For example, the prey will most likely be cut into pieces and prepared to eat. This is done in a cooking activity, which in turn has its particular motive—to still hunger—and object, which happens to be the same as for the hunting activity: the mammoth. However, in this activity, other aspects of the mammoth are relevant (as, for example what parts of the mammoth are edible, which means that the context will determine how the object is conceptualized.

Other related activities might be manufacturing weapons and weapon parts from the bones and the tusks of the mammoth. When several activities interact, certain issues must be resolved in the transition between them, such as how to share the prey among hunters and cooks, or decide how many ready-made arrow heads will be returned for a certain amount of food.

The six dimensions outlined above—objectivation, contextualization, spatialization, temporalization, stabilization, and transition between contexts—are denoted activity modalities. These dimensions are found in every activity, regardless of time and place. As stated, they represent inherent predispositions for acting in the world, which humans (and possibly all organisms equipped with a neural system) have developed during their phylogenetic evolution. Thus, conceptualization put forward in this contribution acknowledges our inherent biological capabilities and constraints for acting in the world. Activities thus conceptualized are denoted activity domains in [2].

An inherent part of activity domains is that they are always mediated by means. The hunters make use of bows and arrows, the beaters use some kind of tools to make a fire, the assault of the mammoth is most certainly coordinated by gestures and shouts, and so on. In order to be useful, these means need to be enacted; a process in
which humans and means together become meaningful resources in the domain; they “become one” so to say. The enactment process is framed by the activity modalities.

So, for example, learning how to shoot an arrow in a hunting context requires that you can recognize the prey (objectivation), forming a context around it (contextualization), validate what things are relevant (spatialization), shooting the arrow in an efficient way (temporalization and stabilization).

The end result of enaction is a domain-specific ideology in the sense that certain beliefs develop about what phenomena are “real”, and which actions are regarded as valid. In this way, the activity domain can be regarded as the nexus of human activity, which means that activity cannot meaningfully be further decomposed into yet more fundamental elements.

3. An activity modality analysis of BPMN

The activity domain is meant to capture the basic structure of socially organized work, regardless of when and where such work have emerged during the history of mankind. Thus, the very same structure is valid also for organizations today. In the mammoth hunting activity, the object is clearly visible. This is usually not the case in today’s “hunting activities” when the target to be acted upon is more complex and hard to grasp.

In design situations, where the final outcome does not yet exist, “proxies” for the target, such as models, is the only available option. Moreover, if the design context is not trivial, models need to be employed to grasp the context. A predominant modelling notation today for this purpose is BPMN (Business Process Modelling Notation); illustrated by the example in Fig. 3:

![Diagram of BPMN](image-url)

**Fig. 3.** An example of a business process in BPMN, adapted after Recker et al. [4].

A thorough analysis of BPMN is beyond the scope of this paper. However, the following observations can be made. The main focus is quite naturally
temporalization, as indicated by the flow of tasks from left to right in the model. Pools and Lanes can both be regarded as activity domains. In the example above, these domains are named “Financial Institution” (Pool), “Retailer” (Pool), “Sales” (Lane), and “Distribution” (Lane).

The transition modality occurs in two places: between the Pools “Financial Institution” and “Retailer”, and between the Lanes “Sales” and “Distribution”. However, it is only between Pools (inter-organizational) that an explicit model construct is suggested (“Message Flow” in the form of “Request” and “Response”); there is no corresponding transition construct between Lanes (intra-organizational units), which indicates that interaction between units inside an organization is considered unproblematic. In the AM perspective however, the positions taken is that every transition between activity domains, whether inter- or intra-organizational, is an expression of the transition modality, and, consequently, transition between Pools and Lanes should be treated the same way.

The data consumed and produced in the process is scattered in the model. In the example, data appears as text only: “Payment Method”, “Credit Card”, “Check”, etc. Thus, the spatialization modality is to a large extent subdued. This indicates that only “non-problematic” data structures are attended in BPMN; such structures that are fairly simple, stable and well understood.

Business rules are by definition excluded from BPMN, which means that the stabilization modality is not attended.

The target/object is implicit only in the denotation of the model (“The Payment Process”), which means that objectivation is also subdued. From the AM perspective, this is a remarkable neglect, since the target (and motive) is the driver of the context in which the business process is relevant. Again, this is an indication that BPMN is aiming at unproblematic and stable situations, where explication of the target is not necessary.

Some further observations: The complete BPMN specification defines 53 constructs out of which only a minor subset is used in practice [5]. Thus, it appears that BPMN is over-specified from a practical point of view. The complexity of the modeling notation, and some ambiguities about the meaning of notations [ibid.], aggravates the alignment of individual interpretations, which is a prerequisite for consorted action. Thus, it is likely that the construction of BPMN adds complexity to already complex situations, rather than reducing it. One reason for this may be traced to the lack of a consistent theoretical basis for BPMN.

In summary, from an AM point of view, BPMN is centered on the temporalization modality, and to some extent on transition. The other modalities are missing or only vaguely present. Thus, BPMN lends a poor support for modeling all aspects of activity. Clearly, BPMN could be improved in this sense, but such an effort would probably make BPMN overly complex in addition to an already complex modeling notation.

4. Discussion

In this section, some implications of the AM perspective are discussed.
4.1. Implications for BPM and ACM

The main implication for BPM and ACM is that each is centred on a single modality: BPM on process/temporalization and ACM on data/spatialization. If the trend towards ACM leads to a strong focus on data only, this might result in a flip over situation from BPM: one modality is attended at the expense of the others. From the AM point of view, this would be a severe mistake. Both modalities are equally important (as well as the other modalities). Thus, any future development of ACM (and for that matter BPM) should take this into consideration.

The stabilization modality is of particular interest when moving towards a more declarative comprehension of the process, away from the prescriptive emphasis inherent in the workflow view. Stabilization reflects the balance between chaos and order that is present in every activity, and where “anarchy” and “despotism” might denote two extreme positions. The workflow view aims at the execution of routinized tasks, which indicates a position towards the despotism side. Moving towards a declarative position requires a shift towards the anarchy side. However, the crucial issue for agile and resilient processes boils down to finding a proper balance between anarchy and despotism, something that needs to be constantly monitored and adjusted in practice.

4.2. A tentative research road map

A crucial impediment blocking the further advance in modelling is the ontological stance that models somehow represent the “real world”. One example of this is the well-known Bunge-Wand-Weber (BWW) ontology:

“Bunge-Wand-Weber (BWW) [is a] representation model, which specifies a set of rigorously defined ontological constructs to describe all types of real-world phenomena” [4, p. 503]

The obvious question is: “In which world is the model located, if not in the ‘real’ world?” In the AM perspective, models are as real as anything else. In fact, when developing something that does not exist, a model is the only available “real” aspect of that “something”. Consequently, the representation view of model has to be abolished or re-conceptualized. Models are crucial elements in the integration of activity; something which is strongly emphasized in the integrationist approach to language suggested by the English linguist Roy Harris [6]. A future research task would be to investigate the modeling implications for these two, incommensurable ontological stances.

A management approach based on the AMs – let’s call it AAM (Activity Modality Management) for simplicity – can be outlined as follows. First, all modalities need to be considered. This means that objectivation, contextualization, spatialization, temporalization, stabilization, and transition need to be attended when devising models and modeling notations. Possibly, the only practical way of achieving this is to model each modality separately, while still making sure that the interdependencies between them are maintained. How to achieve this requires further investigations.
Still another research task is to clarify the hitherto rather ill-defined concept of “business process”. On the one hand, “process” is defined in standard dictionaries as “a series of actions, changes, or functions bringing about a result”, which indicates is a clear focus on the temporalization modality. On the other hand, the BPM literature is flooded with expressions like “human-centric BPM”, “data-centric BPM”, “knowledge-driven BPM”, “the process contains data”, and the like. Such expressions are strong indications that extant understanding of “business processes” includes more aspects than the mere “series of actions”. It goes without saying that such ambiguities of the central concept in BPM aggravate further progress.

From the AM perspective the concept of “business process” has become a proxy for several modalities: not only temporalization. Thus, submerging other modalities under one other modality, “compresses” the multi-dimensional character of the AMs into a single dimension. A future research task is to “decompress” this understanding into the full dimensions given by the AMs. The obvious solution is to replace “business process” with “activity domain” and restore the role of “process” to expressing the temporalization modality. This solution might however be unrealistic since “business process” is an established, “sticky” concept. How to navigate this issue is another matter for further research.

4.3. Practical forerunners

Due to pressing practical needs, some models have been devised in the Ericsson development practice, which appear to be aligned with the activity modalities. The first example is the so called system anatomy of a telecom processor shown in Fig. 4:
The system anatomy shows the dependencies between capabilities in the system from start-up to an operational system [7]. The boxes in the figure should be read as capabilities needed in the system. The dependencies (lines) proceed from the bottom to the top of the anatomy. If a certain capability fails in the dependency chain, for example, “Power on” at the bottom of the anatomy, the whole system will fail.

The anatomy is a simple and straightforward chart that aims at aligning disparate meanings among stakeholders about the task at hand. As such, the anatomy provides an integrated view of the whole task where the contribution from and responsibilities for every person in the project can be pointed out. It is the basis for integrating together internal deliveries into a working system, and planning releases to customers.

From a modality point of view, the system anatomy is an expression of objectification. In a sense, the image plays a similar role as the mammoth in the ancient hunting activity; that is, to visualize the target of the activity.

Another example of AM aligned models is the process model shown in Fig. 5.
Fig. 5. A process model from Ericsson.

The layout of this model is such that the activities (expressions of the temporalization modality) are laid out from left to right towards the bottom of the image. The information entities (expressions of the spatialization modality) are shown as horizontal lines, and placed vertically on top of each other to the left. The “network” in the centre of the image shows how these modalities are related to each other. Thus, this model highlights each individual modality as well as their interdependency.

The two models presented are indications of what is needed to devise a suit of models expressing all modalities. It is likely that the structure of such a suit will be such as each model is aligned with one modality, while still connected to models aligned with the other modalities. The final goal of such a suit would be to express the integrative character of the activity modalities.

5. Conclusion

The activity modality construct is proposed as a theoretical framework for making inquiries into BPM and ACM. Since these modalities are seen as innate, human predispositions for action, this construct represents a paradigmatic shift in the view of management and modeling. In order to unleash the full potential this perspective, a research program needs to be established. Some steps in that direction has been taken in some alternative modeling notations emerging from the Ericsson practice.

6. References