Knowledge, Action, and Context: A Process View on Knowledge Management

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Abstract. The relation between knowledge and action is discussed. It is shown that knowledge comprises two aspects, a dynamic one and an expectative one. The former refers to control of individual action, while the latter refers to expectation of success of possible action. Both views ground on success of action as point of reference. In this respect propositional knowledge does not differ from practical knowledge. This view is compared to the analytical characterization of knowledge as justified true belief. Consequences for knowledge management (KM) are discussed.

1 Introduction

The opinions about knowledge generally vary between a static object view and a dynamic process view [1]. The respective attitude influences the way knowledge is managed by means of information technology. Traditionally the static view prevails in KM but recent studies have fostered the dynamic approach [9], closely relating knowledge and action [13]. This paper argues for the relevance of dynamic aspects by philosophical arguments.

Due to Ryle we distinguish practical knowledge (know-how) from propositional knowledge (know-that) [8]. While Ryle stressed the difference between both concepts, Stanley and Williamson see practical knowledge as some kind of propositional knowledge [11], and Hawley points at the structural similarity of both concepts [5]. The present study will show that both concepts are based on the same footing, i.e. action. To this end a pragmatist approach is applied.

Section 2 introduces the used notions, in particular distinguishing dynamic and expectative aspects of knowledge. It relates propositional knowledge to action, referring to action in a subjective, an intersubjective, and an objective sense. This reveals a natural reference of propositional knowledge to context. So far most studies in analytical philosophy have concentrated on propositional knowledge characterized as some variant of justified true belief (JTB) [14]. It will be shown that the JTB description is essentially compatible with the present approach. Section 3 derives some consequences for KM and gives a short discussion.

2 Knowledge and Action

Let us first explicate the notion of (intentional) action used throughout this paper. Primary constituents of action are the acting person or organization, i.e.

the *agent*, the *goal* that the agent wants to achieve, and the agent's physical or mental activity related to the action, i.e. the *execution*. The *context* of an action comprises *all* factors that directly or indirectly influence the action. This kind of context differs from abstract context descriptions that are introduced by defining a *finite* number of constraining conditions. An action can end in three different ways. (1) If the agent realizes that the goal has been achieved, the action is called *successful*. (2) If the agent consciously gives up the intention to bring the action to a successful end, we call it a *failed* action. (3) If the agent forgets to further strive for the goal but might resume it later the action is *unfinished*.

Practical knowledge naturally refers to successful action [5]. A successful action is an action that the agent leads to its intended goal in a *controlled* way. A failure is connected with a loss of control. We consider the example of a surgeon who knows how to perform a certain operation. During the operation an unexpected situation occurs so that the surgeon has to adapt the action accordingly. The control of the action decisively depends on the agent's ability to effectively adapt the execution to the particularities of the context. We call this ability the dynamic aspect of knowledge.

This view of dynamic knowledge contradicts the usual comprehension of knowledge as possession. Let us suppose that a person proves to know how to q at time t_0 and time t_1, performing successful action. Let us now ask for the agent's knowledge at some time t_2 in between. Generally we assume that the person also knows how to q at t_2. This view corresponds to knowledge as a mental state that starts at some time t_0 and ends at some later time t_1. On the other hand, we are also aware that we cannot predict with certainty that a person actually executes q successfully at the time t_2 with $t_0 < t_2 < t_1$. There can always be factors that temporarily prevent an agent from being successful and there is no guarantee that this failure is only temporary. Only if the agent actually executes q successfully we can say that she knows how to q.

If we talk about an agent's knowledge how to q without the agent's successfully q-ing this only describes an expectation. It refers to action that has not (or not yet) taken place. We call this aspect of knowledge expectative. Both aspects depend on each other. We cannot start an action without expectation and our expectations remain mere belief without significant success.

Turning to propositional knowledge we can regard the prototypical example of the proposition "$5+6=11$". Here we find three possible ways of relating it to action. First, a student from primary school performing mental arithmetic might find that 5+6 is actually 11. This action is completely internal. The action success only depends on the agent's judgment. Another example is a student asking what $5+6$ is. She answers "$5+6=11$". Here the success of the action depends on the communication partners who accept or reject the agent's statement. Finally, a person can refer to "$5+6=11$" by handling a vending machine that requires 11 cents. The machine displays a remainder of 6 cents. If an agent inserts 5 cents, the fact that the machine accepts it will be related to her knowledge of "$5+6=11$". Here the success is not related to communication. The examples represent three ways how propositions can be associated with action. (1) In a

subjective sense, an action is successful if (after some reasoning) agents come to the conclusion that the proposition is *coherent* with their other knowledge. (2) In an intersubjective sense, an action is successful if a proposition is accepted by the communication partners, i.e., if *consensus* is achieved. (3) In an objective sense, the associated action does not depend on communication but on external impersonal factors only. We can call it *correspondence* in a pragmatic sense [7].

However, the context must be taken into account. If we regard "$5+6 = 11$" in the hexadecimal instead of the decimal system it is false and no knowledge. The reason why we regard the proposition as true is that we assume a standard context. Nonetheless every situation can stipulate another context. This resembles Wittgenstein's problem of rule-following [15], e.g. regarding the question how a finite sequence of numbers is to be completed. The finite sequence represents the proposition, the completion stands for a concrete action context. Spontaneously we would continue $1, 2, 3$ with 4 in the standard context. However, for every number n we find a rule that describes the sequence $1, 2, 3, n$ as correct continuation. The rule plays a similar role as the context for knowledge. This means that it is not only action that depends on knowledge but also vice versa.

We now compare this view to the analytical JTB characterization of knowledge. We want to answer the question to what extent the action theoretic conception covers the aspects of JTB. First, we regard the belief condition. To believe that p, implies the expectation that p yields the basis of successful action. Therefore the belief condition is expectative. The aim of the justification condition is to exclude accidentally true belief counting as knowledge. Considering the nature of justification we see that it represents an action, in an intersubjective sense if it appears as argumentation or in an objective sense if it consists in demonstration. Therefore justification is dynamic. The truth condition is more sophisticated. On the one hand, it is dynamic since it is necessarily related to action success, i.e., an action cannot fail due to a true proposition p on which the action is based. On the other hand, truth is expectative since it claims validity not only now but also in the future. This dialectical character resembles James' investigation on truth [7], in which he expressed these aspects in terms of verification and verifiability, i.e. referring to action and expectation, respectively.

3 Discussion

Former conceptions of KM saw its core task in the transformation of practical into propositional knowledge and vice versa [6]. Propositional knowledge has been represented by documents that could be stored in document management systems. It is only necessary to make these documents generally available again. However, this concept of KM has never been as satisfactory as expected. This inefficiency originates from a neglect of dynamic aspects, i.e. lacking adaptation to the action context for which the knowledge is required. Today the latter task is mainly left to the user. More dynamic support services are required to close this gap. Such services are to make use of all information about the users and their activities that is available. Some attempts have been made to adapt systems to

individual needs, e.g. by context models [4] or by personalized portals and role concepts [12], but these attempts are only partial.

Two conclusions can be drawn. First, interactive components can be introduced that request information from users because the exploitation of environment parameters is insufficient in this respect. To this end the KM system first has to identify ambiguities of the users' activities that are to be resolved by dialogue. Thus the action context can be determined as explicitly as required. Second, the KM system must make extensive use of relations between all available instances of information, building a topology of information. This topology can be used to find an efficient way to close gaps between information and action.

The same neglect also appears in philosophy where propositional knowledge is mostly regarded in a static way, although reference to action is not new. Thus Craig has already emphasized its relevance for knowledge [3]. A central consequence of the dynamic character of knowledge is the natural context dependency. Context dependency has been recently taken up by epistemic contextualists [10], but this discussion does not sufficiently reflect on the role of individual action. Moreover, the practical aspects of propositional knowledge in the intersubjective sense have been discussed by Brandom [2], who adopted Lewis' idea of score-keeping referring to success of communicative action.

Many points remain open for discussion, e.g. the relation between knowledge and information. Here it is only mentioned that one differentiating factor is the reference. While knowledge mainly focuses on action, information is primarily related to data [13]. Another point left open here is the social character of knowledge which becomes apparent in its communicative aspects.

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