

Continuous Improvement and Its Roots in Pragmatic Philosophy

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Abstract

Continuous Improvement is a central concept in the quality movement. In almost all descriptions of quality initiatives Continuous Improvement is central. Even in ISO 9000:2000 that has been recognised. In this paper we will discuss the role of continuous Improvement within the quality movement, its relation to knowledge management and, especially, its origin in pragmatic philosophy.

1. Introduction

Continuous Improvement is a principle, which permeates most of the readings on Quality. It is central in most Quality Award Criteria as well as in the latest version of ISO 9000, see e.g. Bergman and Klefsjö (2003) and further references cited there. Continuous Improvement is also closely related to the current interest in Knowledge and Knowledge Management. It is the effective exploitation of relevant knowledge that leads to improvement possibilities. Here, it should be emphasised that improvements are not only small step improvements - also innovations should be looked for as emphasised already by Juran (1966) and further discussed by Cole (2001). However, Cole (2001) makes a distinction between Continuous Improvement and Continuous Innovation. As we shall see later, the origin of Continuous Improvement leads to an interpretation, which covers small step improvements as well as innovative improvements or innovations.

It has become increasingly obvious that knowledge, knowledge theory, and knowledge management has become a vital part of company profitability, survivability and longevity in a business world with global competitiveness, changing organisational structures and an increasing dependence on recent scientific results. As knowledge creation becomes closer to knowledge exploitation, both in time and space, it becomes central how knowledge transfer is supported and managed. See e.g. Teece, *et al.*, 1997. However, as emphasised by De Long & Fahey (2000), there is a growing discontent among managers concerning the lacking support in literature how to

handle knowledge and knowledge management in practice. The gap between theory and practice of knowledge management in the literature is discussed by e.g. Liebowitz (1999) and Stacey (2001). A crucial aspect is how the knowledge about creating, sharing and managing knowledge is turned into action, i.e. into Continuous Improvement. As emphasised in Roth (2002), literature offers few examples, experimental research and tools on that. However, Cronemyr (2000) and Roth (2002) give some interesting applications.

As emphasised also by Boisot and MacMillan (2003), this gap between theory and practice is notable considering the age of the interest in knowledge theory. In philosophy, epistemology has been a central issue ever since the days of the ancient Greeks. However, we shall not go into that discourse here. Rather, we shall investigate how the concept of Continuous Improvement became such an important concept in the quality movement. In fact the roots of the Continuous Improvement concept from the pragmatic philosophy makes the above claim of close relation between knowledge theory and continuous improvement quite obvious. It might also shed some light on the observed gap between theory and practice of knowledge theory. Thereby, we would like to revitalise the discourse within the quality movement.

We assume that the reader is familiar with the role of Continuous Improvement in the quality movement and its firm relation to the Deming cycle, or PDSA cycle, which Deming called the Shewhart cycle, see e.g. Kilian (1992). For a further discussion on Continuous Improvement we refer to Bergman and Klefsjö (2003).

In the following we shall first give a short overview of knowledge theory and knowledge management as reflected in the current management discourse. After that we shall discuss the roles, implicitly and explicitly played by knowledge theory and knowledge management within the quality movement via Continuous Improvement. We will trace these roles back to the ideas of a pragmatic philosopher, C. I. Lewis and his influence on Shewhart and Deming. Finally, we reflect on what happens in the Quality Movement. From having been a strong innovator in management and leadership innovation, the quality movement does not take a strong lead in the knowledge management discourse in spite of its long traditions in that area.

2. Knowledge and Knowledge Management

What is knowledge? This is an old question, which interested already the ancient Greeks. As most philosophical concepts there are no simple answers. We sometimes think about truth - "what we really know about the world" and sometimes about experiences and what we know from experiences and acquaintance. The Greeks made distinctions between four forms

of knowledge: *episteme*, *techne*, *phronesis*, and *mètis*, see e.g. Baumard (1999). *Episteme* is universal scientific knowledge. *Techne* refers to the knowledge of applications, and it is the practical side of knowledge applicable to specific practical situations. *Phronesis* corresponds more to what much later was called tacit knowledge by Polanyi, it is gained by experiences and unique to the individual and it is not easy to share. Finally, *Mètis* is conjectural knowledge.

Even though the Greek conceptualisation has influenced the current management discourse we find other concepts. Explicit and tacit knowledge is an important categorisation in the current management discussion. As stated by Polanyi (1962) we know more than we can express - we have tacit knowledge. An important aspect is how tacit knowledge acquired in one situation by some person can be transferred and made actionable by others, perhaps in different situations. This is one of the central themes in Nonaka and Takeuchi (1995), who are specifically interested in the dynamics of knowledge creation. Their approach has received a lot of attention but have been criticised by e.g. Tsoukas (2001) and Stacey (2001) for not being very precise on the relation between individual and organizational knowledge and in explanations how new knowledge is created.

Even though a lot of literature emphasises propositional knowledge, an increasing amount of literature emphasises the role of narratives and what is in Choo (1998) called "instruments of meaning", i.e., myths, symbols, rituals, and stories that manifest shared basic assumptions and common concerns within a specific organization or team. Knowledge is in fact a difficult concept and not easy to catch in a simple definition.

Knowledge and knowledge management concepts are central to this paper. However, we shall not delve further into their meanings and interpretations. For further studies we refer to recent works by e.g. Baumard (1999), Stacey (2001), and Tsoukas (2001). There area is in fact quite problematic - are the two concepts "knowledge" and "management" really possible to joint into one coherent concept "knowledge management"? This problem is the central issue in the thought-provoking book by Styhre (2003) providing a critical review of the knowledge and management concepts as well as its combination based on post-modern thinking. The relation between this type of thinking and that of C.I. Lewis is quite interesting and would be worth its own study. That is, however, out of the scope of this paper.

The need for a new emphasis on knowledge theory and knowledge management, or rather "management in support of actionable knowledge creation, sharing and usage" arises from a number of different sources. In a global economy, where capital is moving much more freely than before, knowledge becomes an important competitive factor. In many nations the

cost of labour is so high that only if the knowledge content of the work is high it is possible to keep it within the country.

The evolution of products goes in the same direction - from simple products created in work with few requirements on the knowledge of the work force to abstract products requiring high skills and very knowledgeable co-workers. Furthermore, these products are produced in value creating networks, where borders between customers and producers become unclear. In short, the work is created in much more complex settings requiring a much better understanding of the local situation - more knowledge both of a situational character and knowledge of more general kinds. An interesting discussion is given in Normann (2000). The changing organisational situation is also driven by the trend towards new organisational forms with less hierarchies and with much more local autonomy. Also this requires a new emphasis on the creation and transfer of actionable knowledge.

Altogether, the work situation and organisations are becoming much more complex putting a lot of new requirements on management. One important dimension of the new type of management is the management in support of actionable knowledge creation, sharing and usage.

3. Knowledge Management in the Quality Movement

In a way, the knowledge concept is central in today's quality movement; it could even be said to play an increasingly more important role. However, that is merely implicit and via requirements on continuous improvement and the PDCA cycle, well known in the quality community, which could be said to be the symbol of continuous improvement and continuous organisational learning. These aspects have become increasingly important not only in the Deming, Juran, and Japan influenced areas of the Quality Movement but also important concepts of the traditional ISO 9000 standard in its modern form ISO 9000:2000. Since this new standard requires structures for continuous improvement of the operations of the company it in fact also requires conscious actions with respect to knowledge management. See e.g. Bergman and Klefsjö (1995). Explicitly, however, we don't find so much reference to knowledge theory in the quality discourse. Researchers trying to apply the Deming's concept of "Profound knowledge" to leadership theory provide some exceptions. Unfortunately, however, this interest does not seem to be as strong any longer as it was in the middle of the nineties.

Deming emphasised knowledge theory in his book from 1993, "New Economics". Deming calls for transformational leadership, necessary for the change processes required for a serious approach to quality and business. He strongly recommended what he called

“Profound Knowledge” as a basis for this transformational leadership. This body of knowledge consists of four elements: Understanding variation, Psychology, Knowledge theory, and Systems Theory. Deming did not expand very much on the content of all these elements but gives this as a challenge to his readers. However, with respect to knowledge theory he referred back to the teaching of Shewhart and to an influential book by C.I. Lewis. Some authors have expanded on his ideas, see e.g. Kearney (1996), Mauro and Mauro (1999), Anjard (1995), McNary (1997), and Neale and Letza (1996). However, not very many attempts to put profound knowledge into practice have been reported in the literature. An exception is Gapp (2000), who reports on experiences of applying these concepts directly as a basis for change initiatives in an organisation.

Let us try to trace the knowledge concept back to its origins in the quality movement and find out what can be learnt. As emphasised in Mauleon and Bergman (2002), we can trace the emphasis on the PDSA cycle back to Shewhart and his interest in the pragmatic philosopher C.I. Lewis knowledge theory. In our attempts to understand Shewhart’s and Deming’s ideas relating to their theory of knowledge we will first introduce the reader to Clarence Irving Lewis and give a short summary version of his outline of a theory of knowledge. In this context we will present C.I. Lewis’ ideas concerning the nature of knowledge and how it is acquired and at all possible. Thereafter we shall compare of C.I. Lewis’, Deming’s and Shewharts’ ideas about a theory of knowledge in order to show the influence of C.I. Lewis in the work of the other two. For a more complete account of these matters we refer to Mauleon and Bergman (2002) from which paper most of the discussion below is excerpted.

4. Lewis’ Conceptual Pragmatism

Clarence Irving Lewis (1883 - 1964), professor in philosophy at Harvard University, called himself a conceptualistic pragmatist belonging to the main school of American Pragmatism (C.I. Lewis, 1929, preface). His theory of conceptualistic pragmatism originated partly from his study of modern logic and partly from the influences of Royce and the classic pragmatists such as W. James, C.S. Peirce, J. Dewey and G.H. Mead, to which the first three mentioned he felt indebted (C.I. Lewis, 1929; Haack, 1999).

Within epistemology, C.I. Lewis’ book “Mind and the World-Order - Outline of a Theory of Knowledge” (1929) is considered his most significant work (Cunningham, 1994). And it is from this book that his influence upon Shewhart and Deming can be traced. Hence, a

further investigation, of C.I. Lewis' ideas about a theory of knowledge as described in "Mind and the World-Order", is both interesting and challenging. In the following paragraphs we will study C.I. Lewis' (1929) "Mind and world-order" and through quotations, which are presented with page numbers within brackets, give examples of his writings.

Knowledge is, according to C.I. Lewis, derived from learning caused by the interaction between the "...a priori..." (272) with its conceptual modes and the sensuously-given in "...experience..." (272) (391). He says that it is "*In this middle ground of trial and error, of expanding experience and the continual shift and modification of conception in our effort to cope with it*" (272) that learning takes place (391). Furthermore, it is the possibility of the choice of the a priori, which, according to C.I. Lewis, represent the pragmatic element in knowledge (272).

To C.I. Lewis, knowledge in general is about experience (34). He says that in all experience as such there is "*...the sensuous- character...*" (48, 49, 66), since our whole world of experience is constructed by thought from sense-data (29, 57). This means that experience in part is a product of our mind (34). C.I. Lewis continues his argument by stating that it is not possible clearly to separate 'mind' from 'experience' (25), since whatever experience may bring, our mind is there and imposes upon it its own a priori in order to structure and interpret experience (89, 230, 275).

In brief, the a priori is simply the instrument, which our mind imposes upon experience in order to interpret it (89, 230, 275). As C.I. Lewis says: "*In experience, mind is confronted with the chaos of the given. In the interest of adaptation and control, it seeks to discover within or impose upon this chaos some kind of stable order /.../. Those patterns of distinction and relationship, which we thus seek to establish, are our concepts.*" (230). And it is our concepts, which give rise to our a priori (preface). Concepts thus represent what our mind brings to experience and the truth that is a priori arises from the concept itself (231).

Since, according to C.I. Lewis, the a priori is created by our mind and since our mind may also alter it, we have a free choice in selecting our a priori (233). However, C.I. Lewis says, the only way we may choose another a priori or change it, is by reflection, as shown in the following statement: "*The a priori is knowable simply through the reflective and critical formulation of our own principles of classification and interpretation. Such legislation can be recognized as our own act because the a priori principle which, is definitive, and not a material truth of the content of experience, has alternatives.*" (232) and he continues by saying that "*...the determination of the a priori is in some sense like free choice and deliberate action*" (232, 233). Through the choice of another a priori, C.I. Lewis

claims that we may not only change our mode of interpreting experience but may also change our behaviour (preface, 90, 230).

It is noteworthy that C.I. Lewis' arguments concerning personal reflection and deliberate action constitute some of his most important explanations of how we may change our behaviour. He says that "...everyone both can and must be his own philosopher..." (2) This is because within philosophy questions such as 'What is good?', 'What is right?', 'What is valid?' are investigated. And given that the final responsibility for ones life and actions rests on oneself, it is as single individuals that we too have the answers to these questions; it is not possible to ask for answers from someone else (2). Therefore, according to C.I. Lewis, we both can and need to be our own philosophers since "...in philosophy we investigate what we already know." (2).

When we investigate what we already know, so C.I. Lewis argues, we have the possibility of changing our conceptual modes. This is because concepts, according to C.I. Lewis, are not stable but may over time be subject to change (257) as "... everything which has a name is to be identified with certainty only over some stretch of time." (257). In order further to explain the changeability of concepts C.I. Lewis talks about the categorical system by means of which we classify experience (272).

"All Knowledge is /.../ interpretive." (166). Interpretation is seen as an activity of the mind, which reflects the character of past experience; and without interpretation knowledge is not possible (195). Thus knowledge of empirical truth arises through conceptual interpretation of the given (37), which therefore, according to C.I. Lewis, results in making empirical knowledge probable only (37). In terms of probability, C.I. Lewis illustrates his pragmatic approach to knowledge by saying that: "...pragmatism is inductive: the given experience of the moment of knowing is the basis of a probability judgement concerning the experience /.../ which would verify, and in terms of which the real nature of the object is expressible." (C.I. Lewis, 1934, p. 133). This argument supports the understanding expressed in his well-known statement (referred to by Shewhart in "Statistical Method" (1939)): "...knowing begins and ends in experience; but it does not end in the experience in which it begins." (C.I. Lewis, 1934, p. 134). And with this statement C.I. Lewis' ideas about the temporal nature of the knowledge process is clearly shown (C.I. Lewis, 1934, p. 134).

Another important characteristic of knowledge is that it is predictive (44). C.I. Lewis states that: "... it is impossible to escape the fact that knowledge has, in some fashion and to some degree, the significance of prediction." (44). Knowledge, as valid interpretation, concerns the relation between an experience A and another future experience B which we seek to anticipate with the help of A (165). Unless we make this anticipation of future

experience we cannot have knowledge of external reality, and so cannot plan future action (195, 391). This anticipation of the future may be seen as intentional, since an intention relates to something that transcends immediate experience. And, in our interpretation, C.I. Lewis considers this kind of anticipation of the future to be essential and crucial for meaning and any theory of knowledge (C.I. Lewis, 1934, p. 130-131). Thus empirical knowledge entails both actual observation and a correct anticipation of further possible experience (C.I. Lewis, 1934, p. 136). But this raises the question whether we must ascribe a deterministic understanding to C.I. Lewis on the ground that for him true knowledge is really true only if future experience is exactly identical with what was predicted? However the answer to this question is: no. C.I. Lewis sees prediction in terms of probability, meaning that all interpretations of experience, and therefore all empirical knowledge, is probable only, however high the degree of its probability. This is because no verification could ever be absolutely complete (281). *“Every such judgment about the real external world remains forever at the mercy of future possible experiences.”* (281). All empirical knowledge is therefore probable only and can due to its character never be exhaustive (37, 281).

To sum up, we may illustrate C.I. Lewis’ ideas about his theory of knowledge with his final statement in “Mind and the World Order” (1929): *“The mind will always be capable of discovering that order which requisite to knowledge, because a mind such as ours, set down in any chaos that can be conjured up, would proceed to elicit significance by abstraction, analysis and organisation, to introduce order by conceptual classification and categorical delimitation of the real and would, through learning from accumulated experience, anticipate the future in ways which increasingly satisfy its practical intent (391)”*

5. The Influence of Lewis on Shewhart and Deming

Walter A. Shewhart is sometimes seen as the father of the quality movement (Petersen, 1999). And by being Deming’s mentor he is said to have had the greatest single influence upon him (Blankenship & Petersen, 1999). The two met at the end of 1927 and thereafter became close friends and colleagues (Kilian, 1992). The following remark by Deming acknowledges his everlasting debt to Shewhart: *“One can say that the content of my seminars /.../ and the content of my books, ‘Quality, Productivity and Competitive Position’ and ‘Out of the crisis’ are based in large part on my understanding of Dr. Shewhart’s teaching.”* (Deming in Kilian, 1992, p. 176-177).

As a result of Deming’s and Shewhart’s collaboration Deming became the editor of

Shewhart's (1939) book "Statistical Method - from the viewpoint of quality control", which is based on a series of four lectures given by Shewhart at the Graduate School of the Department of Agriculture in Washington. In reading this book one will find a number of references to publications by C.I. Lewis. And the attentive reader will find the same references in Deming's books "The New Economics" (1994) and "Out of the crisis" (1986). In Deming's sub-chapter 'Theory of knowledge' in "The new Economics" his ideas are based on C.I. Lewis' book "Mind and the world order- outline of a theory of knowledge" (1929). Here Deming advises the reader who wants to get a better understanding of his theory of knowledge to read the chapters 6, 7 or 8 in "Mind and the World-Order" by C.I. Lewis.

"There is no knowledge without interpretation." (C.I. Lewis, 1929, p. 195) is a fundamental statement made by C.I. Lewis and one, which both Deming and Shewhart refer to in their works. And C.I. Lewis' (1929) explanation of how our mind imposes the a priori upon experience in order to interpret it, is by Deming and Shewhart rephrased as theory, as clearly shown in Shewhart's book "Statistical Method" where he writes, *"...we can not have facts without some theory."* (Shewhart, 1939, p. 88). And in connection with this statement, Deming, as editor, writes in a footnote *"...if there is to be any knowledge at all, some knowledge must be a priori."* referring to C.I. Lewis (1929, p. 196).

Deming (1994) is clear on the issue that without theory experience has no meaning. For he says that it is the possession of a theory, which enables us to ask questions and learn. Paraphrasing his argument in more practical terms he also says that: *"...to copy an example of success, without understanding it in the light of a theory may lead to disaster."* (Deming, 1994, p. 103). Shewhart (1939) also argues for the importance of a theory in as much as he claims that without a theory we cannot have facts. But where Deming (1994) connects his statement to management, Shewhart (1939) connects it to statistics. The incorporation of C.I. Lewis' ideas in their writings both about management and statistics indicated in what ways Shewhart and Deming found C.I. Lewis' ideas helpful.

In line with C.I. Lewis' arguing, *"...knowledge has, in some fashion and to some degree, the significance of prediction..."* (C.I. Lewis, 1929, p. 44), Deming (1994) also relates theory to prediction, as one enabling the other. He states *"...rational prediction requires theory and builds knowledge through systematic revision and extension of theory based on comparison of prediction with observation."* (Deming, 1993, p. 105) and he adds that every plan is based upon *"...prediction concerning conditions, behaviour, performance of people, procedures, equipment or materials."* (Deming, 1993, p. 106). Without prediction, experience and examples teach nothing and without prediction management would not be possible since *"Management is prediction"* (Deming 1993, p. 104).

However, all prediction is probable only (Deming, 1994). And, as if quoting C.I. Lewis' argument that knowledge is probable only since "*there is no knowledge of external reality without the anticipation of future experience*" (C.I. Lewis, 1929, p. 195), Deming continues: "*No matter how strong our degree of belief, we must always bear in mind that statistical evidence is never complete.*" (Deming, 1986, p. 133; compare C.I. Lewis, 1934). It is also possible that he was inspired by Shewhart who came to the conclusion that "*...any model is always an incomplete though useful picture of the conceived physical thing...*" (Shewhart, 1939, p. 19). These citations are closely connected to the three components, which, according to Shewhart (1939), constitute knowledge. See the following figure.

The interaction between the three components of knowledge seen in figure 1 also shows clear connections between Deming, C.I. Lewis and Shewhart. Since Deming's statement, that "*...rational prediction requires theory and builds knowledge through systematic revision and extension of theory based on comparison of prediction with observation.*" (Deming, 1994, p. 105), is almost exactly the same as the one to be found in Shewhart's: "*Knowledge begins in the original data and ends in the data predicted, these future data constituting the operationally verifiable meaning of the original data*" (Shewhart, 1939, p. 85). And in C.I. Lewis' words this means: "*...knowing begins and ends in experience, but it does not end in the experience in which it began*" (C.I. Lewis, 1929, p. 134). Simply said; the observant reader may find that, the similarities shown in these examples of statements by Deming, C.I. Lewis, and Shewhart, lie in their claims of the importance of interpretation, reflection and prediction of experience.

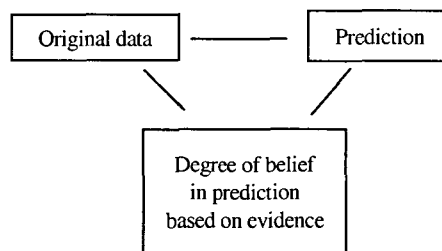


Figure 1. A schematical illustration of knowledge components (Shewhart, 1939, p. 86).

Shewhart also connects his comment "*...knowledge begins and ends in experimental data...*" (Shewhart, 1939, p. 85) to his illustration (see fig.1) of the three components, which to his mind constitute knowledge. The dynamic dimension of the knowledge process, seen in fig 1, is by Shewhart related to his Specification- Production-Inspection cycle (SPI-or Shewhart- cycle). He says: "*The three steps in fig.10 (which show the Shewhart- cycle) correspond to the three steps in a dynamic scientific process of acquiring knowledge.*" (Shewhart, 1939, p. 45).

It is interesting to notice that the Shewhart- cycle is the origin of Deming's Plan-Do-Study-Act cycle (PDSA- cycle). However Deming added the action part to the original SPI-cycle, which was published in the 1950's when he was invited to hold seminars in Japan. According to a private conversation between Brian Joiner and Deming, Deming exclaimed, when the Japanese talked about the Specification-, Production- and Inspection stages, that they must not forget action. "Action is the most important part", he said (Brian Joiner in a conversation with Bo Bergman). Thus, the Plan-Do-Study-Act(ion) cycle was born.

Already in the writings of C.I. Lewis the action part was emphasized, since he said that "*The ruling interest in knowledge is the practical interest of action*" (85). Indeed, C.I. Lewis developed this further in the statement: "*The significance of conception is for knowledge. The significance of knowledge is for possible action. And the significance of common conception is for community of action*" (C.I. Lewis, 1929, p. 90). C.I. Lewis' emphasis on a common conception of social processes, as a condition of community action, can also be found in Deming's work on the PDSA-cycle since the same is not only for individual learning, but also for the use of organisational learning.

It is therefore tempting to draw the conclusion that C.I. Lewis may have inspired both Shewhart and Deming and formed their understanding of the importance of the learning- or experience cycles (SPI-, PDSA- cycles) for organisations. Furthermore, it is from his work with the PDSA-cycle that Deming (1994) proceeded to develop his theory of 'Profound Knowledge'.

6. Conclusions And Reflection

While working with this article it has become increasingly clear that many of the profound insights of Shewhart and Deming regarding the quality movement have gone missing over the years. Thus, we have felt the need to rediscover their insights in an attempt to get a better understanding of the philosophy underlying important areas of the quality movement. In order to understand from where some of the ideas within the quality movements originate we have taken Sir William Naipauls advice and have in this article attempted to create, if not a profound analysis of Demings and Shewharts original ideas and contributions to the quality movement, at least an introductory exposition promoting a better understanding of the historical background of the movement. Our work also follows the of C.I. Lewis' advice that "*...everyone both can and must be his own philosopher.*" (C.I. Lewis, 1929, p. 2). For what we have tried to do in this article is precisely to reflect upon our understanding of the

quality movement in order to understand how we ourselves and how others perceive and work with the ideas of this movement.

As we have seen, knowledge theory, the creation of knowledge, and the importance of knowledge for our (common) conceptualisation of the world around us and for the creation of a community for action was at the core of the Quality Movement already from the very beginning. It still lives strongly in the conceptualisation of continuous improvement as symbolised by the PDSA cycle. However, many observers looking at the contexts and results of the application of PDSA cycle does not recognise its knowledge theory origin. Many observers classify the improvements rather as what Argyris and Schon called single loop learning, i.e. learning which takes place without a changed mental model, i.e. without a change of the *a priori* as Lewis would have said. This is a regrettable development. The very essence of the original meaning of the concepts behind the development of the PDSA cycle was very different.

Might be we can find a clue to the problems many organisations have had when trying to apply the progressive concepts of the quality movement. If no changes are made in the mental models based on the experiences gained we would not expect any dramatic results.

Another reflection is that we should, just like Shewhart and Deming, be open to what happens in philosophy and in science. Just as Shewhart was inspired and learnt from the ideas of his time, it should be a hallmark for the Quality Movement to continue that tradition. It has not always been in that way. Today, there certainly is a lot of knowledge creation in other branches of the scientific world. We should learn from that. Let us test new concepts in order better to create actionable knowledge! Continuous improvement also n how we understand and take action on the ideas developed in the quality movement. We have a lot to learn from philosophy!

Interestingly, the current discourse on knowledge management has, at least within some parts of it, come to similar conclusions. As discussed by Boisot and MacMillan (2003) the epistemological foundation of *Knowledge and Knowledge Management is far from secure*, which makes the systematisation of the area difficult. Further discussions on the philosophical aspects on knowledge and knowledge management in the current discourse can be found in Styhre (2003), Küpers (2003), Wyssusek and Totzke (2003) and in references cited in these papers. See also Mauléon and Bergman (2003).

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