Chapter 53
Knowledge Management in 2016:
A Newer Delphi With Applications

Ronald John Lofaro
Embry-Riddle Aeronautical University, USA

ABSTRACT

This article will very briefly indicate some current topics and developments in the field of cognitive engineering (CE), knowledge engineering (KE) and knowledge management (KM). From there, it will present an extensive look at the development and usage of new Delphi model, starting with its origin in the 1980's and later, its successful usages with modifications into the early 2000's. An effort will be made to show how that new Delphi, called the small-group Delphi paradigm (SGDP), can now be again modified to take advantage of expansions in the field of KE/KM and of the great strides in communication and computer technology. Next, an example of how such an up-dated, modified SGDP could be applied to a current, serious problem in aviation, as well as an indication of other issues for which this new Delphi also could provide useful results.

INTRODUCTION

In 2016, one finds an expansion in the field called cognitive/knowledge engineering (CE/KE) has occurred and is still in progress. It seems that KE now stands alone and has some five to seven Journals dealing with KE research, models, applications. In fact, KE is now an enormous field and endeavor; there is even another Journal with the same title as this one (International Journal of Knowledge Engineering, albeit put out by Bioinfo Publications). There is a new emphasis on a related discipline: knowledge management (KM). Knowledge management (KM) has been defined as "...the practice of selectively applying knowledge from previous experiences of decision making activities with the express purpose of improving the organization's effectiveness." (Jannex, 2014) The main difference between KM and KE

seems to be that the (knowledge) manager establishes the direction the process should take, where the (knowledge) engineer develops the means to accomplish that direction. The author posits that what this article will present hews to that definition of KM. Further, the author has many articles (e.g., Lofaro & Smith 1999; 2000; 2001; 2012) and a book chapter (Lofaro & Smith, 2011) in print on decision making in the unforgiving aeronautical environment.

[[[[It must be said up front that the author was not, is not and most probably will not be an expert on today's expanse of KE/KM efforts]]]]. As to why this article was written: It really began in 1986 with a modified Delphi as will be shown; this modification was termed a small-group Delphi paradigm (SGDP) (Lofaro, 1992a) using intact, face-to-face groups of subject matter experts (SME's) to work on specified tasks. Circa 2010, the author realized that this 1986 SGDP would now be called a KE effort. Secondly, the author found out that, some 20 plus years after the original SGDP effort, that mini-Delphi/ETE was now "acceptable" and in the literature. At this point, the author believed that he could sketch out some ideas about use of the SDGP as a part of an ETE (Lofaro, 2015). The author is here attempting a similar effort to show how such an SGDP/ETE amalgam with a modified Real Time Delphi (RTD) could be used on some specific problems, as well as adding in the use of a mini-Pareto as a start point. All done in the hopes that such efforts might be seen and be of some interest, even be of some help by the practitioners and professionals, for lack of a better word, in KE and/or KM. All that having been said, let us begin with knowledge engineering and knowledge management.

KE was defined in 1983 by Edward Feigenbaum and Pamela McCorduck as follows: "KE is an engineering discipline that involves integrating knowledge into computer systems in order to solve complex problems normally requiring a high level of human expertise." Currently, the KM aspect of KE has become a multidisciplinary field, bringing in concepts and methods from several computer science domains such as artificial intelligence (AI), databases, expert systems, decision support systems and geographic information systems.

There is also a somewhat new emphasis in the KE/KM fields on ontology, a term that comes from philosophy. In philosophy, it is the study of the nature of being, becoming, existence, or reality, as well as the basic categories of being and their relations; it often deals with how entities may be grouped, related within a hierarchy, and subdivided according to similarities and differences.

In KE/KM, an ontology is a formal naming and definition of the types, properties, and interrelationships of the entities that really or fundamentally exist for a particular domain of discourse. It is thus a practical application of philosophical ontology, with a taxonomy (see later in article). A KE/KM ontology compartmentalizes the variables needed for some set of computations and establishes the relationships between them; thus, an ontology is used to limit complexity and to organize and structure information. It has now found practical applications in AI, information science and technology. In short: in much of KM and KE.

For a more complete overview and discussion on KE, differing views and uses, the reader is referred to Studer, Benjamins and Fensel (1998). For works on KM, Amazon's web site has 50 or more, including the ubiquitous The Complete Idiot's Guide to Knowledge Management (Rumizen, 2001). At this point, the author believes that readers of this Journal, as they are and have been in these field for years, need no further citations.

It is hoped to bring some or all of the above together as article moves on. To that end, one more term followed by look back in history.

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