



Qualitative Knowledge Management and Reuse in Software Engineering Environment

Dr Om Kumar Harsh and Rainu Banga
Amritsar College of Engineering & Technology,
Amritsar, India

Abstract: A proposal for the improvement in the quality of knowledge including software knowledge, its reuse and management has been analyzed in the context of Quality knowledge management model by extending well known model of quality management in higher education so called ADRI model. Our present work suggests that quality of knowledge and its management require varieties of knowledge processes and tools. Software managers have been working intensively for cheaper solutions to involve managing and reusing components by adopting and adapting existing components by compromising quality to some extent.

Keywords: Software Management, Software Reuse, Knowledge reuse, Software Components, Software Quality and ADRI model.

I. INTRODUCTION

Quality is a foremost factor for the knowledge and its related software engineering environments. Software knowledge quality is greatly affected by software and knowledge processes. In the competitive environments, growth of knowledge assets and related components has vital role in the changing software quality trends. Management of knowledge components as well as its reuse is not an easy task in changing electronic age. Management and reuse of components should be appropriately integrated into the existing system in order to sustain the quality of the system.

If we want to develop and reuse software knowledge in order to overcome [1] associated difficulties and to realize best solution then we need to furnish a sensible model in a knowledge environment. We need to monitor a continuous process of quality management by adopting a meaningful quality model which should be acceptable to larger number of quality experts. We have to create a structure which allows [2] effectiveness of facts which are helpful in managing and reusing quality knowledge in varieties of different circumstances.

II. KNOWLEDGE VIEWPOINT AND REUSABILITY

Software knowledge environment is a complex one because it is very tedious [8] to control, integrate and reuse software components in changing technological situations. It is desired to appreciate knowledge management and related reuse of components in the software engineering environment.

Thomas Davenport and Laurence Prusak [3, 8] demonstrated the importance of knowledge in the organizations. They mentioned that "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knower's. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms." [3,8]. They also submitted that in all types of the processes of any organization knowledge always involve not only in the documents or repositories but also during practices, procedures, and models.

In the knowledge intensive software environment, important feature is that how to access the knowledge [4]? Means how the knowledge can be applied in a particular situation? Once we are able to pertain the knowledge, then it becomes feasible to create a base for the formation of additional facts. Thus it is clear that without a proper model of quality of knowledge development, reuse, accessing and sharing we cannot undertake the study of the knowledge quality.

In fact building the quality of knowledge and its reuse is continuous process which requires how to approach, develop, research and make improvements? Particularly components based system or software needs more maneuvering and flexibility to adopt and adapt the components. Thus it needs a comprehensive and deeper insight

into the knowledge (and its related software) analysis strategies which could be applicable to most available situations. Thus the issue of processes involved during the knowledge management becomes more vital at this stage.

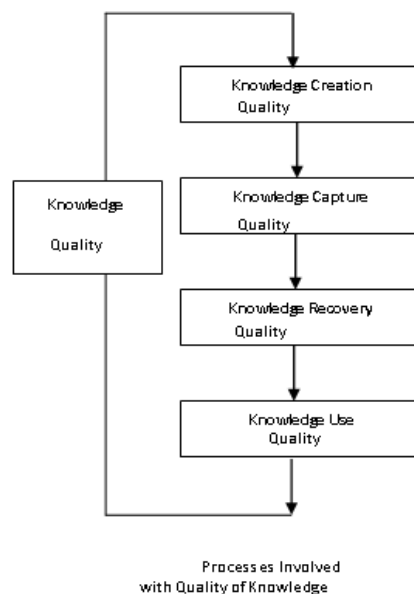
III. QUALITY KNOWLEDGE MANAGEMENT AND REUSE

We will have to adopt various processes for any knowledge management system in order to manage knowledge effectively. These are creation, capture, recovery, use and reuse of knowledge. In Figure 1, Quality Knowledge Processes are shown after modification from the work of Wiig [4].

In the Fig 1, it is shown that quality of each process is required to be maintained as per the requirement of the organization. The computer accessible [4, 8] "knowledge can be created as formal and informal knowledge".

Similarly for the quality of reusable knowledge, we can adopt similar processes as mentioned in the Fig 1. According to authors [5], during software lifecycle, our management system should be integrated to all required processes in the software environment. This type of system is useful to identify the reusable qualitative knowledge for the given system. Present work suggests [6, 8] that reusable knowledge is an important and necessary aspect not only in creating a quality knowledge but also for the management of the knowledge.

Figure 1: Quality Knowledge Processes



To understand above idea in better details, a proposal based on ADRI model (Approach, Deployment, Result, and Improvement) is being suggested which is renowned for the quality assurance and enhancement control. It is significant to cite that ADRI model is a universal instrument for evaluation and improvement [13] in numerous ways. Present authors have already been involved on ADRI model in explaining the various aspects of Knowledge Management [14, 15].

According to Jantti [16] there are four approaches of ADRI model (Figure 2) as:

- i. —Approach – Related to imagination and mapping
- ii. —Deployment - Related to execution and performance
- iii. —Results - Related to observation and assessment
- iv. —Improvement - Related to studying and adjusting

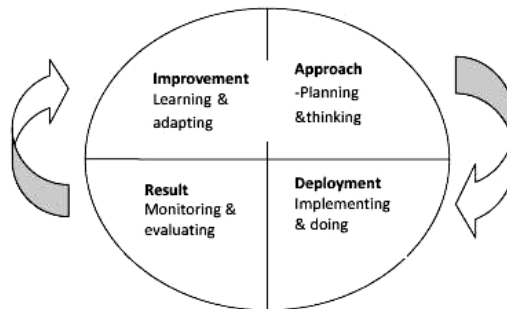


Figure: 2. ADRI model

The first phase in the ADRI model is Approach which normally comprises imagining and planning jobs. It usually provides growth of objectives, policies, purposes, results, plan and aims. Planning of knowledge and its reuse should evidently indentify qualitative and quantitative objectives and should point out footsteps to accomplish the goals [13].

The second phase is Deployment which offers a podium to perform or realize missions. It is significant that apparent understanding as well as footsteps to accomplish objectives of knowledge management and reuse should be set. Therefore it is obvious that appropriate arrangement should make certain at the primary step to realize objectives of knowledge management and reuse [13].

The third phase is the consequence or Result, which represent yield or verdict as a result of the first and second phases of knowledge management and reuse as mentioned above. We should not forget that significant tip is that output (result stage) and goal (approach stage) should be linked together. Result phase offers evaluation between expected yield and accomplished yield. This stage can provide us a chance to examine yield (output) and illustrate conclusions.

The fourth and final phase is Improvement which demonstrates the conclusions obtained from the results and analysis phases. This phase suggests that what requires getting improvement [17]? As discussed earlier, ADRI model is an incessant sequence of improvements; so the method of further improvement in knowledge management and reuse rests with the next accomplishment of the ADRI cycle.

IV. KNOWLEDGE MANAGEMENT & REUSE AND SOFTWARE ENGINEERING ENVIRONMENTS

Knowledge Management [4, 8] can also be applied to bear developers with the software procedure. By means of a Knowledge Management and reuse steps, knowledge can be generated as a result of software processes (that are able to be captured, reused and stored) which help us in getting a better quality and productivity of knowledge. Thus knowledge Management and reuse can be realized to improve running management actions.

Software engineering Companies (engaged in making information systems), was not successful in learning [10] whenever they come across the knowledge management. It was suggested that knowledge management could resolve these issues since software development is affected by knowledge management. Knowledge management methods differ because of type of knowledge or methodology which rest on this fact that what type of knowledge (whether explicit or tacit) and methodology (For example Agile) is involved [11].

An important question in software engineering is that how can we lean a software organizations? According to Feldmann and Althoff a “learning software organization” always “create a culture that promotes continuous learning and fosters the exchange of experience” [9,18].

According to some authors [7, 8], knowledge is a function of time. As time changes knowledge also alters [12]. Question is that how the appropriate knowledge can take place or what processes are involved in creating such knowledge? We can realize that every time (during a knowledge process) it becomes more challengeable or crucial [5] to enhance the viable knowledge.

Our assumption is that use of ADRI model along with the concept of reuse of components not only increases viability of the knowledge while also boosts the quality of usable knowledge as well as. Thus it is possible in the present work to define viable knowledge management processes through an acceptable model which already being used in the higher educational environment.

Emphasis on reuse should not exceed the limit of adjustable scarification of requirements to some extent. Figure 1 illustrates the processes involved in creating quality knowledge while Figure 2 demonstrates the entire processes

involved in getting final result as well as improvements.

The present research helps in the deployability of the reusable qualitative components within not only in the higher educational environment while also in the any knowledge oriented software engineering environments. We can also infer that proper continuous improvement in the quality of components can not only create a quality knowledge environment while at the same it can also enhance the knowledge in the exact way at the exact moment.

V. CONCLUSION

In the present work first time an analytical model for the quality of software knowledge management and its reuse is being proposed in terms of the existing well known processes in the organizations. Present work helps us not only in the improvement of quality of knowledge management and knowledge reuse in software engineering environments while it also throws light on the continuous processes being involved in the knowledge improvement. Quality of knowledge management and knowledge reuse also determines the quality of software activities as well as software itself. Processes involved in ADRI model are not only always having the chances of improvement in the software knowledge activities while the knowledge of reuse substantially helps in the quality management due to repetition or reuse of processes as well as due to confidence in reuse. Improvements in reusing software and software processes not only boosts the confidence of the developers while at the same time it gives an opportunity to learn more for broadening their existing software knowledge experiences in the rigorous software engineering environments.

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