3. Objective(s) of the Present Work

The ability to conduct research in an area requires deep knowledge in that area, knowledge about related areas, and the experience of working on research problems, i.e. problems whose outcomes are not known. To develop these critical abilities, my PhD programs have three components in them – some course work to provide the breadth of knowledge, some methods to develop the depth of knowledge in the chosen area of study, and a thesis that provides the experience of working on research problems. Through these components a PhD candidate should expect to develop the following abilities, which form the foundation of a career in research:

- Breadth in the discipline – provided through courses.
- Expertise in a vertical area in which the PhD candidate can say “I am an expert in this”. i.e. an area in which I have full knowledge of what is known, what is missing, etc. Developing this expertise requires ability to search for relevant work done in an area, as well as the ability to critically read and understand research synopsis, reports, and monographs and appreciate the subtle or complex issues that may be involved.

- Ability to identify research problems. This is one of the most important abilities for a researcher. This ability requires a good knowledge of the recent developments in the area, and the ability to create a bigger picture and see how the different work fit and what might be missing. Formulating a problem properly is half the research done. In fact, most PhD candidates spend much of their time in defining the problem. This skill is strengthened as the person develops the subjective ability of judging results and problems. This skill is also needed by a PhD person as a member of the research community where one is called upon to review other peoples work.

- Ability to actually do the research. Behind every research there is some new idea, some hypothesis, which forms the foundation of the research work. But doing research is much more than getting an idea. The idea has to be developed using the established paradigms of scientific research, through which the researcher shows the value of the idea. Spending time grappling with research issues, actually doing research, and studying research work of others can help in developing this ability. That is the main reason is why doing independent research is always a part of a PhD program.

- Ability to write and present the results. This is very important and very difficult. Not only are issues of communication involved, but one has to convince a group of peers (who review it and later read it, if published) that the work is worthy of their time, the results have been put in context, the value is clearly articulated, etc. Publishing the results of research has been the time honored tradition and benchmark, and perhaps the only reliable method to subject a research work to scrutiny as well as use by others. Developing these abilities should be the objective of a PhD program. Note that these abilities do not discuss the actual research results. Those are the
outcome of developing these abilities. A PhD degree should result in some research results, which should be peer reviewed and published. Without this, there is no effective method to demonstrate that the ability to do research and communicate the results has been developed. However, in the overall research career, it possesses these abilities that are more important, particularly if one wants to work in industry where the needs may change and problems that a researcher works on may be quite different from the ones chosen in PhD. For a career in academics, however, the actual results are equally important as the evaluative processes often focus on the quality and quantity of research work that has been done during the PhD.

All of these abilities are important to become a competent researcher. As should be clear many of these skills cannot really be taught but are learned largely through commitment, dedication, and perseverance. This makes PhD a mostly self-driven and self-taught degree with the PhD program and the supervisor gently aiding the process. The program and supervisor help mostly in creating an atmosphere and environment in which the scholar gets motivated to excel. Hence, while doing a PhD, the scholar should be self-motivated and committed, and willing to work hard and long on problems. Research is often a lonely business (except in disciplines where group activity is more common) and PhD is a preparation for a career in it. Research is tough career, but with development of these skills by doing a PhD, it can become easier and more satisfying.

The interoperation of heterogeneous databases is a pressing need today as organizations attempt to share data stored in legacy databases. These databases are independently developed and maintained to each serve the needs of a single organization. Many sophisticated computer applications could be significantly simplified if they are built on top of a general-purpose distributed database management system. In spite of much research on distributed database management systems there are only a few homogenous distributed database system architectures, which have reached the development stage. The situation with heterogeneous multi database systems, which connect a number of possibly incompatible pre-existing database systems, is even less satisfactory.

In 'Distributed Database Management System' I propose a heterogeneous multi database system architecture which solves some of the inherent problems of heterogeneity such as reliability, semantic integrity, and protection. The heterogeneous multi database system environment that has been considered involves a connection of pre-existing database systems, with a possibility of adding new database systems at any time during system lifetime. Accessing and managing data from several existing independent databases pose complex problems that can be classified into platform, location and semantic levels. This Distributed Database management System describes a methodology and environment intended to address the problem of providing users and programmers with an abstract interface to independent heterogeneous and distributed databases.
Many businesses are using distributed databases and with critical and sensitive amount of data being transferred across the network it is imperative that some form of security be implemented to secure the integrity and confidentiality of the system. General database security concerns must satisfy the following requirements: Physical integrity which is the protection from data loss; Logical integrity is the protection of the logical structure of the database; Elemental integrity is ensuring accurate data; Easy Availability; Access control to some degree depending on the sensitivity of the data; User authentication to ensure that a user is who they say they are. “The goal of these requirements is to guarantee that data stored in the DDBMS is protected from unauthorized modification, and inaccurate updates.” Some security threats involve: data tampering, eavesdropping and data theft, falsifying user identity, and administering too many passwords as well as others. Security can be provided for distributed databases by providing access control, user authentication, location transparency, and view transparency.

For future work I plan to examine more security issues for distributed databases. Also research more on how to implement some of the security measures that were listed above. Finally I want to track and record results as it could lead to future endeavours.