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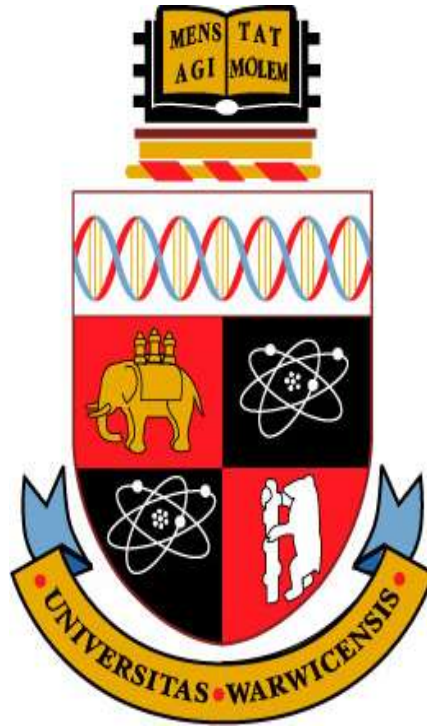
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A Pedagogical Framework for Enhancing Skills of References and Citations

by

Saba Khalil Toor

A thesis submitted in partial fulfillment of
the requirements for the degree of

**Doctor of Philosophy
in Computer Science**

Department of Computer Science
January 2015

THE UNIVERSITY OF
WARWICK

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Acknowledgments

First of all I would like to thank God Almighty for providing me everything during this journey of life and for letting me pursue my goal.

I am most grateful to my supervisor, Dr. Mike Joy for his unyielding support and guidance. His inspiring and encouraging supervision has led to the completion of this thesis. I am also grateful to Dr. Jane Sinclair, my advisor, for her feedback and advice. My special thanks to Prof. Erkki Sutinen for agreeing to be my external examiner.

I would also like to express my gratitude to the staff members of Warwick University library, especially Stuart Hunt (Data Services Manager) and to Sian Prosser (Manager, Academic Services Development), for their guidance, help and support during the time I was trying to access digital libraries and next generation catalogs.

Furthermore, support from my friends and family has been a pillar of strength for me, and I am truly grateful to them. Special thanks to my mother who stood by me during this period and supported me, encouraged me and prayed for me.

Declaration

This thesis is presented in accordance with the regulations for the degree of Doctor of Philosophy. It has been composed by myself and has not been submitted in any previous application for any degree. The work described in this thesis has been undertaken by me except where otherwise stated.

Abstract

References and citations form a basis for scientific research and creation/discovery of knowledge. However literature reviews had indicated that many errors are present in scholarly papers published in journals and conferences as well as in books and articles. Furthermore, course works of students studying in higher education institutions contain mistakes in references lists and in-text citations. Problems that stem from these inaccuracies are multifarious and range from the act of plagiarism, not acknowledging the source, problems in information access and retrieval as well as causing inaccuracies in ranking articles and journals, thus hindering the growth of knowledge. Based on the importance of this global issue this research was initiated. The first objective of our research was to determine root causes for the presence of mistakes and inadequacies in references and citations within the academic arena. We chose the academic arena because they are the training grounds for education and scientific research. Furthermore, through this research we sought a unique practical solution for this issue.

In order to conduct a thorough and comprehensive investigation into the above mentioned problems, and to achieve the aim of proposing a suitable solution, we divided our research work into three main phases. First phase was the *investigative phase*. During this phase a thorough literature review was conducted. As a result of this review, research questions were formed. Both quantitative and qualitative methods were adopted to investigate the causes of erroneous references and citations. Triangulation research methodology was used to get reliable and comprehensive information. Data received through these methods were analyzed and core issues such as inadequate feedback and training in referencing task were highlighted

In the second phase, termed as *solution phase*, a pedagogical framework was proposed to resolve issues that were reported during the *investigative phase*. A conceptual framework was built on the principles of Learning theories and spaced repetition theory. To evaluate this framework experiments were conducted. This was done in the third and final phase of the research which was termed as *evaluation phase*. Two types of experiments were conducted, first type was in a traditional classroom environment and the second type of experiment was with students who chose to work independently (without tutors). Data were collected and analyzed from these experiments using both quantitative methods and qualitative methods and were analyzed.

This research provides insight into causes of errors within referencing tasks of students in higher education. It indicates that reform in the pedagogy for teaching this skill is needed. Furthermore a unique pedagogy is presented. Results from experiments have indicated that through the proposed operational model improvements of referencing skills have been seen.

Chapter 1

Introduction

1.1. Research Background and Motivation

Sir Isaac Newton said “If I have seen further it is by standing on the shoulders of giants.” (Newton, 1676). This is the essence of scientific research. Scholars and researchers build knowledge on existing work. Researchers desire to get information from the best articles published in recognized journals. The question that arises is “how do scholars know which articles and journals are the best source of information for their subject of interest?”. Which articles will provide them with solid knowledge and ground to stand on? With the advent of fields such as library sciences and information systems, researchers were introduced to bibliometric methods. These methods allow researchers to determine the influence of an article (or articles) in a journal for any given subject. Articles and journals with a higher level of influence have a higher ranking, and the information within the article can therefore be trusted, allowing researchers to build on the knowledge of other researchers (Ingwersen, 2012). An interesting exercise based on the data from SCI (Science Citation Index) conducted in 1967 predicted the names of two scientists who received Noble prize in 1969 (Garfield, 1970).

The above mentioned information shows the impact and benefit of using methods of bibliometrics. The most commonly known methods of bibliometrics are citation analysis and publication counts. These methods have been utilized to gauge the influence of academic documents within the sphere of science and social sciences (Diodato and Gellatly, 2013). The advent of information technology and the introduction of citation databases and indexes has introduced several new ways of organizing and ranking the influence of articles and journals.

These new “citation tools” include Citation Maps, Citation Reports, Citation Trackers and h-index. These tools show the relationship between citations as well as the tracking and reporting of them (Kear and Danielle, 2011). Furthermore, for the ranking and influence of knowledge, tools and methods are incorporated within these databases, these journal tools include: Article Influence Score, Eigenfactor Score, Impact Factor, SNIP (Source Normalized Impact per Paper). These tools allow users to view higher ranking journals and articles based on their influence and usage in research. All these tools use the number of citations of the articles and journals over a given period of time, and use various statistical measures to numerically identify the rank of a journal (Kear and Danielle, 2011).

These methods and tools depend on the number of times articles and journals have been cited (Moed, 2006). Thus citations and references form a basic and important aspect in determining the ranks of journals, thereby paving the path for the correct direction of research and creation of new knowledge. It can therefore be stated that correct references and citations lay foundation blocks for future research. Errors in citing and developing erroneous references and bibliographies lead to unreliable and inaccurate rankings, which in turn may be considered as a serious hindrance to the quest for scientific research and knowledge.

However, the reviews of the current and the past literature have indicated that despite the importance of correct references and citations, numerous errors exist (Harinarayana, Chikkamanju and Vasantha, 2011; Lee *et al.*, 2007; Harzing, 2002). The existence of erroneous references and bibliographies has been present in the past, as well as in the current work of scholars and researchers (See Chapter 2). It has been found that articles published in high ranking (high impact factor) peer reviewed journals have errors in their reference lists (Al-Benna *et al.*, 2009). There have been cases in the past (Garfield, 1972) where due to an incorrect

author name the original discoverer of the diarrhea virus remained unknown for 32 years. Furthermore errors in references and citations are not specific to a certain domain of knowledge or the geographical location of researchers. This has been identified through our literature review as being a global issue.

1.2. Statement of Problem and Research Questions

A scientific paper does not stand alone; it is embedded in the “literature” of the subject (Ziman, 1968). References and citations allow scientific research to be connected to the work documented in the literature. A problem arises when this link is broken due to errors and omissions in the references. Omissions in references lead to plagiarism, while errors in referencing cause issues in the tracking and retrieval of data. As stated above, this issue in turn leads to incorrect rankings of articles and journals, in addition to the failure to acknowledge the source from which inspiration and support are taken.

The advent of software and hardware technologies has provided many tools to minimize such errors – for instance through the introduction of reference management systems and citation databases. However, erroneous references and bibliographies still exist – not only in journal articles but in books and other academic documents. Such errors are also found in the final thesis submissions by PhD and Masters level student projects (details are available in chapter 2). This fact directed our research towards academic institutions. The purpose of academic institutions (e.g., schools, colleges and universities) is to produce skilled individuals, who should be equipped with all the necessary knowledge and practice to face challenges in their practical life (Bowen and Schwartz, 2005; Ryan and Cooper, 2010). With this concept in mind, we have focused our research on the academic arena – particularly universities and other

higher education institutes – and looked at the reasons for erroneous references and citations within students' coursework such as assignments, final reports, dissertations and theses. The aim of this research was to determine the reasons for the persistence of errors in references lists and bibliographies within the coursework of students at higher education institutes, especially students studying the subject of Computer Science, and to try to find practical solutions for such issues. The reason for focusing more on students of Computer Science than on others is to avoid generalization of the problem; however, during our research we have collected and analyzed data from students of other domains such as *sciences*, *management sciences* and *social sciences*. To initiate this research two major research questions were formalized. Each research question was further categorized into sub-questions. The first and foremost question was:

RQ1: Why do errors creep into citations and bibliographies/reference lists of higher education students' coursework, especially in the coursework of *computer science* students?

This is the fundamental question. Since teachers and students are the two major stakeholders involved in this activity, we directed our inquiry and research toward them. We wanted to know about the perception of the students regarding the task of referencing and citation, how this knowledge is imparted to the students and how they practice it. Furthermore we were interested in obtaining teachers' view point about teaching this skill and their perceptions regarding students understanding and behavior toward referencing. Since software tools and services are integral parts of education, we wanted to know if software tools and services are being utilized to help in teaching and learning this skill. It should be noted at this point that whenever the word "student" is mentioned it is taken to imply a student in a higher education institute, especially in the domain of computer science (unless stated otherwise). Similarly

whenever the word “staff” or “teacher” or “tutor” is mentioned, it implies a staff/teacher/tutor in a higher education institute.

The following sub questions were devised, and responses to these sub-questions provided a comprehensive answer to our first major research question. The sub-questions are as follows.

RQ1.1: How do students perceive and practice the referencing and citation activity?

RQ1.2: What are tutors’ perceptions about students’ citing and reference exercises?

RQ1.3: Is technology – such as automated solutions – available to facilitate tutors to provide education to students about referencing and citation tasks?

These questions aimed to find out why there are errors in references. Next we wanted to find a solution to the problem. Thus, the second major research question was the following.

RQ2: How can errors in references and citations be minimized within the educational arena?

To gain a comprehensive answer to this research question three sub-questions were asked.

RQ2.1: Can a change in the pedagogy of teaching references and citations reduce errors in references and citations?

RQ2.2: Will the introduction of an automated solution for providing education to students about the referencing task reduce the number of errors in references and citations?

RQ2.3: Can the introduction of an automated solution for educating students about references and citations assist tutors?

These research questions formed the basis and center-point for this thesis. The following chapters explain how these research questions were resolved to produce a viable solution for the problem stated at the beginning of this section. During this thesis, we will be referring to these research questions as **RQ1**, **RQ2** and so on.

1.3. Scope and Limitations

The problem of references and citation is global and widespread (Section 1.1). Errors in references affect professional scholars, students, and publishers of books and journals, and may raise questions about the ethics of scientific research. Issues of errors in references that are cited are not related to one subject or geographical location, and are beyond geographical and domain of knowledge boundaries. The fields of scientometrics and bibliometrics depend on correct references being made both by the authors of academic documents as well as by citation databases and digital library catalogs. This provides a very wide field for referencing related research.

For the purposes of this research, the scope is limited to the educational arena. The reason for focusing on this area is that educational institutes are the training ground for students. Once trained for various disciplines, students enter into their professional life and practice all that they were trained for and learned. To reach the core of the issue, it was decided to start our research from the establishments that teach students to perform and practice norms of scientific research in various disciplines, such as Computer Science, and to seek to investigate how this task is being taught.

Within higher educational establishments, the scope of research was broadened to encompass all levels of education. By levels of education we mean undergraduate level and postgraduate level. Hence our research has endeavored to explore and investigate reasons for erroneous references and citations among students from these levels of education and to propose viable solutions to the problem.

The scope of the research was further extended to include the two main stakeholders of educational institutions. As indicated in a study conducted by Mainardes (Mainardes, Alves and Raposo, 2010), the two main stakeholders in a university are students and teachers. A stakeholder may be defined as an individual or group of individuals who are either impacted upon or are able to impact on the achievement of objectives (Freeman, 1994). Hence for a viable and comprehensive study and investigation it was imperative to take these stakeholders into consideration.

1.4. Research Approach

To conduct scientific research, it is imperative to know the methods that will be employed, methodologies that govern these methods, the theoretical perspectives on which the methodology is based and finally the epistemology grounded in our theoretical perspectives (Crotty, 1998). These are briefly explained as follows:

Methods in research imply the tools, techniques and procedure to collect and analyze data that are gathered to answer our research question. Examples of research methods include questionnaires, interviews, and case studies.

Methodologies mean the plans of action taken or strategies followed to use the *methods* in order to achieve research outcomes. Examples of methodologies include experimental research, quantitative research, qualitative research and design science research.

Theoretical perspectives provide philosophical grounds on which methodologies are based; examples include positivism/post positivism, Interpretivism and pragmatism.

Epistemology is the theory of knowledge embedded in a theoretical perspective, for example objectivism, subjectivism and constructionism.

In the literature, various approaches and paradigms are highlighted. Creswell (2014) defines his approach as a “*World View*”, Crotty (1998) calls these approaches “*Epistemologies and Ontologies*”, Neuman (2014) refers to them as “*broadly conceived research methodologies*” and Cohen (2007) has termed them as *paradigms*. According to Cohen (2007) several approaches or paradigms have evolved to highlight and investigate social realities and for conducting scientific research, these include: *scientific research and positivist, naturalistic and Interpretive, critical theory and feminist educational research*. Creswell (2014) identified his world views as *positivism, constructivism, transformative and pragmatism*. Simon (1996) on the other hand introduced the *design science* approach to cater for engineering and the science of artificial. Offermann *et al.* (2009) provided a scheme to extend the design science approach to the realm of information systems. It is worth noting that the science of artificial and social realities are interlinked (Gregor and Baskerville, 2012), and their fusion provides a better understanding of the universe.

Based on the research scheme by Offermann *et al.* (2009), Cresswell (2014) and Crotty (1998) and by considering the definitions of objective and subjective approaches we designed our research activity.

The current research was based on the philosophy of realism, and thus the epistemology embedded in this research work is that of *objectivism* (Cohen, Morian and Morrison, 2007). The theoretical perspective for our research work, adopted from the work of Cresswell, is *pragmatism*. The Pragmatism approach is problem-centered and real world practice oriented. This theoretical perspective provides the freedom to use various research methodologies for conducting research. Since answers to our research questions aimed to create frameworks and artifacts such as software solutions to serve human purposes (Peppers *et al.*, 2007), the research methodology adopted for this research was mainly the *design science* research methodology. Furthermore, a mixed methodology was also adopted to gather and analyze data. The advantage of using a mixed methodology was that *triangulation* may be performed to get a better understanding and verification of the data gathered.

Tools used to conduct research were questionnaires, interviews and analyses of documents. These tools were utilized to acquire data from surveys and experimentations (Chapter 3 and Chapter 6). The research approach undertaken for this research is presented in Figure 1.1.

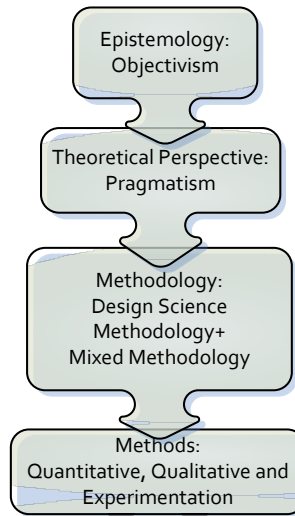


Figure 1.1 Philosophical Approach of the Current Research

Figure 1.1 illustrates the philosophical standing of this research work. *Design science research in information technology* has been placed in the theoretical perspective of pragmatism, as discussed by Goldkuhi (2012). Moreover a mixed methodology has also been highlighted as an approach for pragmatism (Creswell, 2014). We will now briefly discuss the *design science* research process proposed by Offermann *et al.* (2009) and the mixed methodology approach, because these two methodologies are the foundation blocks for the research methodology adopted in this research.

Design Science Research Methodology

This methodology is extended to be utilized, not only in the domain of engineering but also in the field of information systems. Offermann *et al.* (2009) presented a research process for design science research in information technology. In this methodology the research process is divided into three phases; the first phase is called *Problem Identification*, the second phase is termed *Solution Design*, and the third phase is called *Evaluation*. This process is illustrated in Figure 1.2. Solid arrows in this figure indicate the essential interaction of each process in a phase

and between phases. Dashed line arrows indicate that researchers may revisit earlier process or phases in case of ambiguities.

The *problem Identification phase* identifies the problem at hand, and ensures that the problems and the resulting solutions are of a practical nature. During this phase the literature is reviewed, problem(s) are identified and their relevance to the contribution in resolving practical issues are determined.

The *solution design phase* designs and develop artefacts in the light of second *literature research*. During this stage, problems identified during the *Problem Identification Phase* may be revisited to help in the understanding.

The Evaluation phase is the final phase in design science research. Case study/action research, laboratory experiments and expert feedback in the form of surveys are conducted for evaluation. Before the start of this activity, hypotheses are refined (if required). Furthermore even during this phase researcher can revisit the design phase and problem identification phase.

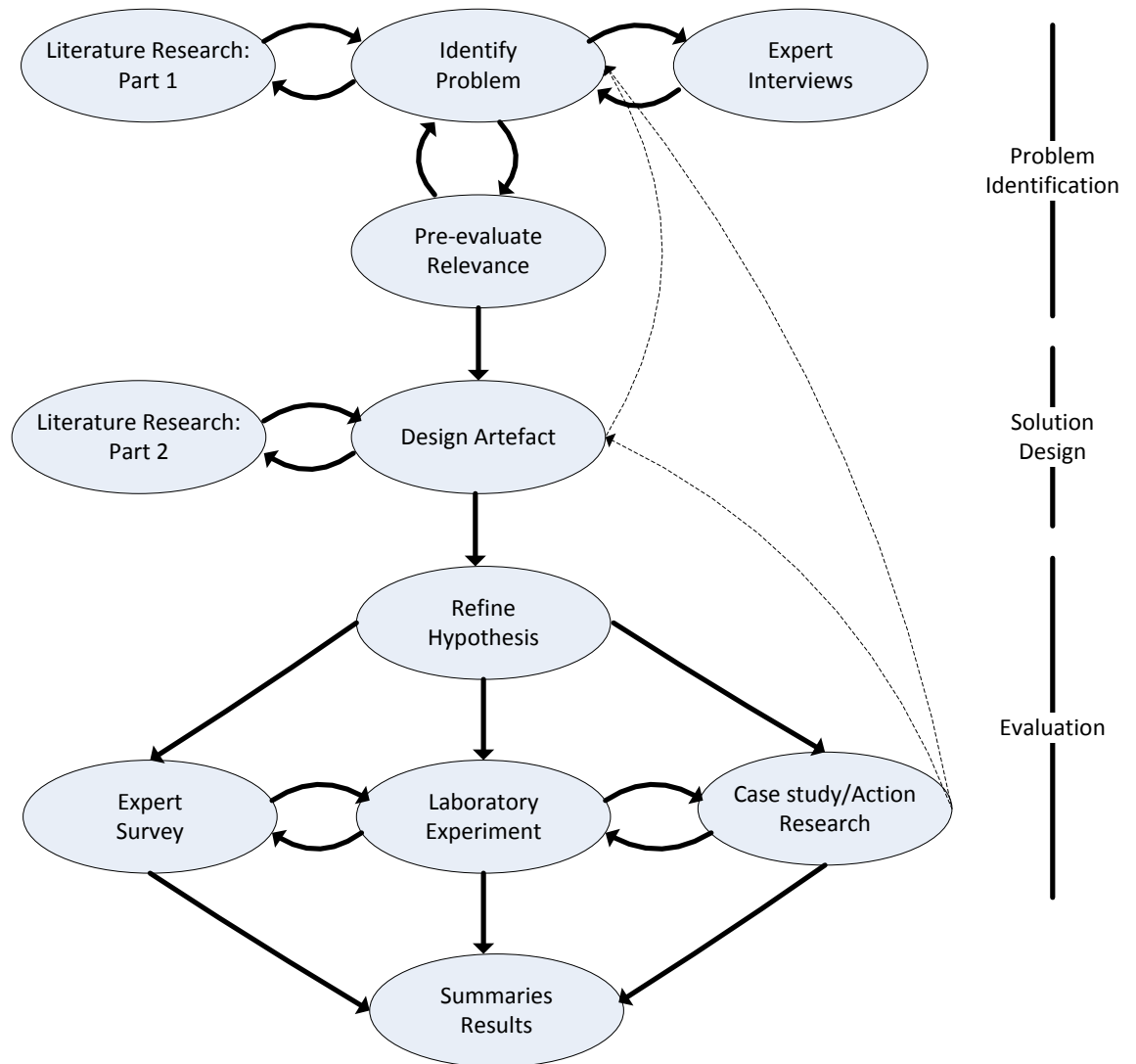


Figure 1.2 Design Science Research Process (Offermann *et al.*, 2009)

Since current research is embedded in the realm of information technology, design science methodology was chosen. Not all the components in Figure 1.2 are mandatory, and are modified based on our research needs.

Mixed Methodology

Mixed methodology encompasses quantitative and qualitative research approaches. A benefit of using mixed methodology is to gain an in depth understanding of reality. Furthermore the deficiencies of one approach are covered by another. Triangulation of data obtained is also

done through this approach. This methodology is adopted as a secondary methodology. It is applied in the first and the last phase of the design science research process.

Various approaches to mixed methodology are provided in the literature (Creswell, 2014). These include *Convergent Parallel Design*, *Embedded Design*, *Sequential designs* such as *explanatory design* and *exploratory design*. *Convergent parallel design* is illustrated in the Figure 1.3.

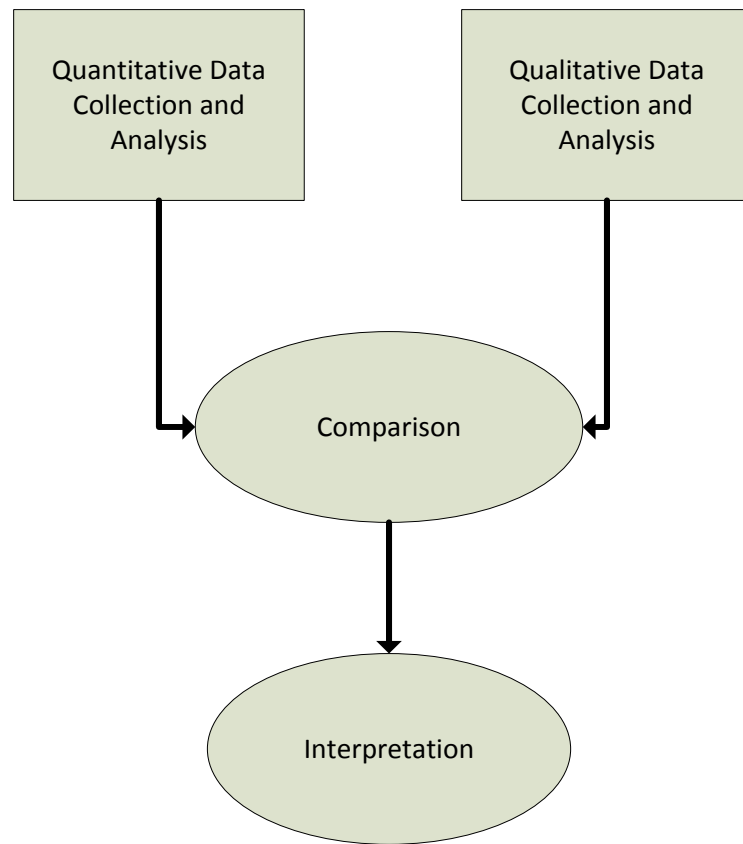


Figure 1.3: Convergent Parallel Mixed Methodology

The advantages of using convergent parallel mixed methodology are: better understanding of reality as data is collected from two sets of sources, corroboration of results from two different methods and comparing more than one level within a system.

Another category of mixed methodology is that of an explanatory approach. This methodology uses qualitative data to explain quantitative data. Figure 1.4 explains the process for this methodology.

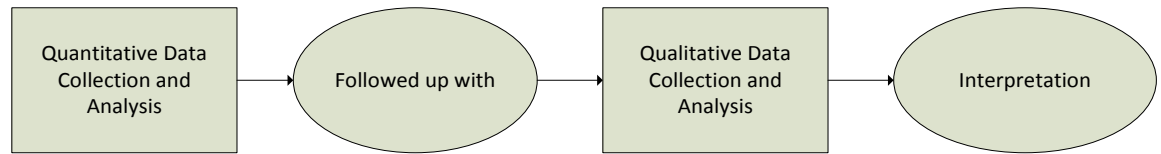


Figure 1.4: Explanatory Mixed Methodology

Thus, keeping in line with the design science research process and mixed methodology approaches, this research was divided into three main phases. Each phase achieved a milestone and helped in answering one of the two research questions (**RQ1–RQ2**). However care was taken to revisit previous phases if required. The first phase was the *problem identification phase*, the second phase was termed as the *solution design phase* and the third phase was the *evaluation phase* in accordance with the design science process indicated in Figure 1.2. Figure 1.5 explains these phases.

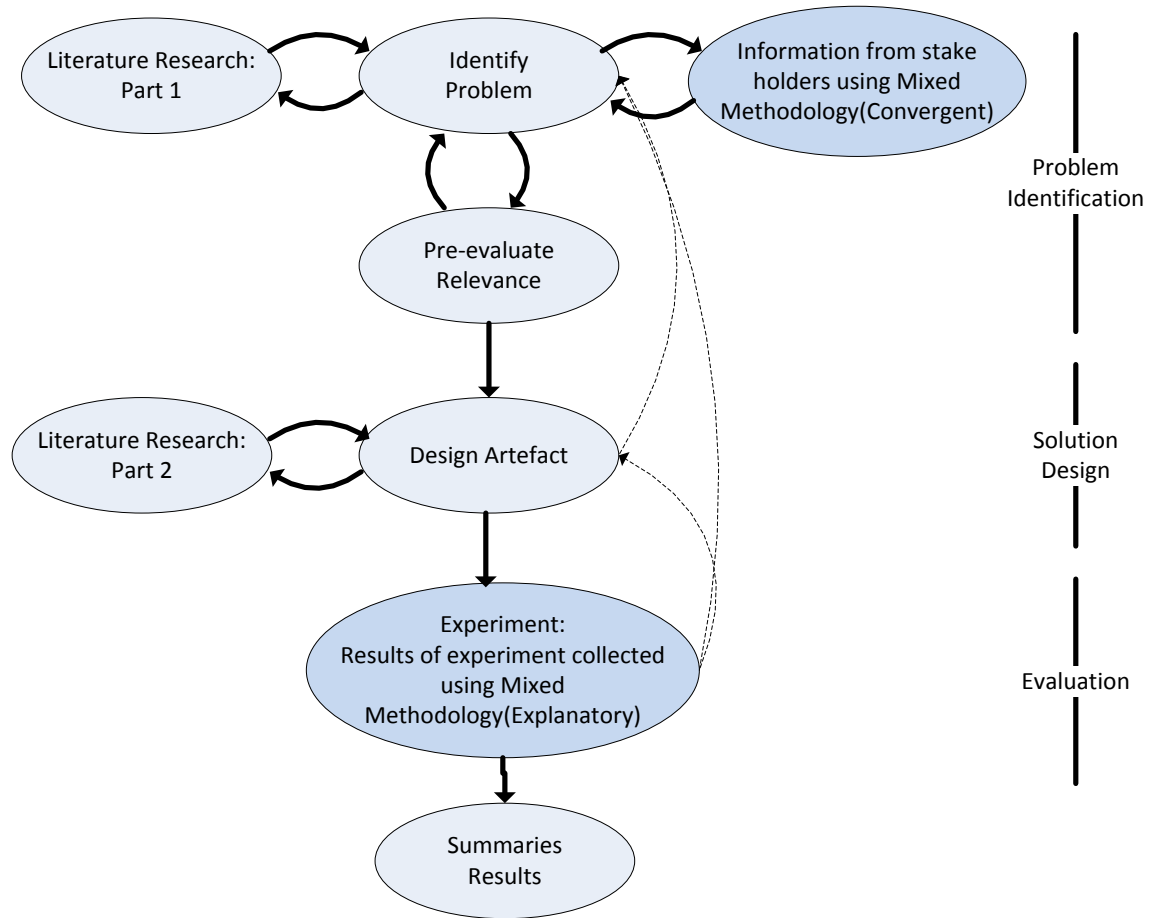


Figure 1.5: Research Methodology

A comparison of Figure 1.2 and Figure 1.5 indicates that the research methodology adopted for the current research has embedded mixed methodology approaches during the first phase and the third phase of research. In the first phase, data were collected from the two stakeholders, i.e. students and teachers, this data was then verified using triangulation. In the third phase a comprehensive experiment was conducted to determine the effect of intervention designed in phase 2. During this experiment, an explanatory approach of mixed methodology was adopted to explain further the results of quantitative data obtained at pre and post tests as well as during the experiment.

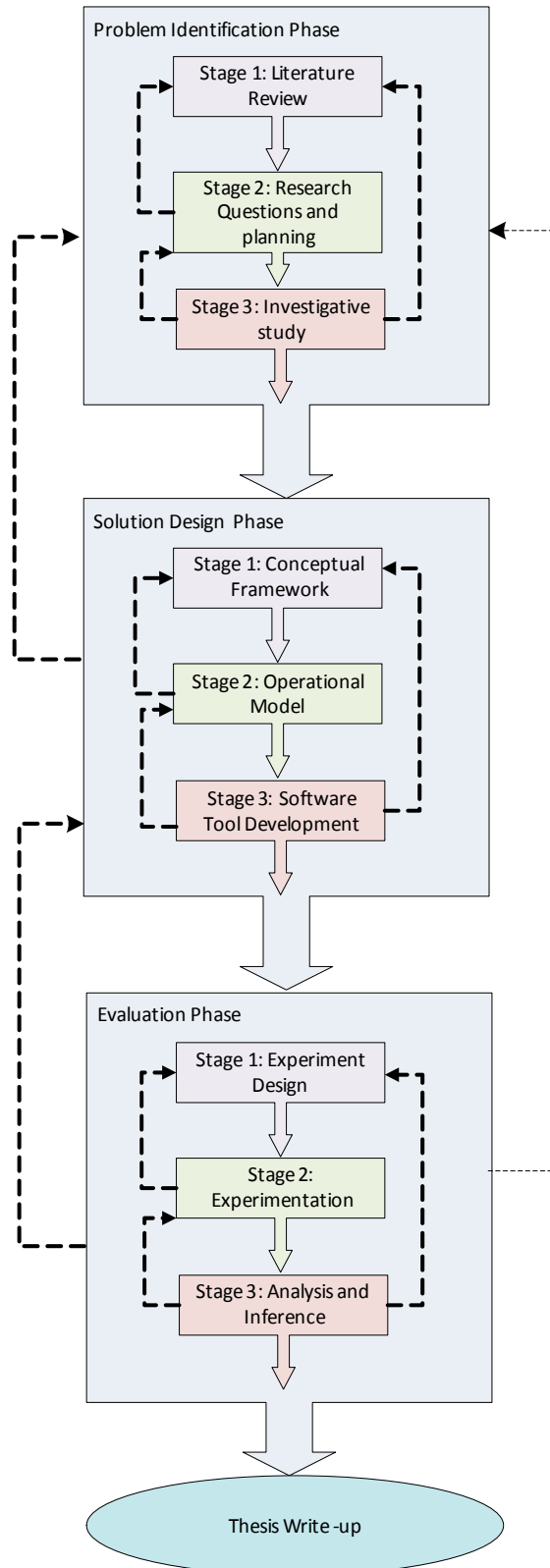


Figure 1.6: Research Phases

Figure 1.6 further illustrates the three phases (as mentioned in Figure 1.2. and Figure 1.5.) and divides them into stages within each phase. The dotted arrow lines in this figure (Figure 1.6) highlights the fact that each phase and stage is revisited to remove ambiguities, if found, before proceeding to the next stage or phase.

We will discuss each of these phases and their stages in the following sections.

1.4.1. Problem Identification Phase

This phase was divided into three stages, the literature review stage, the research questions planning stage and the investigative stage. Each stage is described as follows.

In the *first stage*, the existing literature was reviewed. As stated by Boote and Beile “A substantive, thorough, sophisticated literature review is a pre-condition for doing substantive, thorough, sophisticated research.” (Boote and Beile, 2005). The purpose for this review of the literature was to become acquainted with the domain of bibliometrics and with the practices of referencing around the world – i.e., a broad context of study (Boote and Beile, 2005). Through this process, problems related to this topic were identified. Several papers have previously been written that emphasize the existence of errors in references and citations within academic documents, thereby highlighting the issue (Al-Benna, *et al.* 2009; Shanmugam, 2009; Singh, 2009; Schiess, 2002). Hence the review of the literature formed the basis of our investigative study. It provided us with the directions to form our research questions, and thus led to the next stage.

In the second stage, the research questions were formulated, as indicated in section 1.2 (Figure 1.5). The formulation of research questions is a fundamental step in theory development, and is considered to be the most crucial part of any research study (Alvesson and

Sandberg, 2013). Once the research questions were identified and formulated, a plan for conducting research to acquire the answers to research questions was developed (Figure 1.5 and Figure 1.6). It was during this stage that three phases in the development of the thesis were decided upon. The decision for the planning of stages was based on the research methodology chosen and the processes highlighted in the design science approach.

In the third stage, the primary sources (data from students and teachers at higher education) were used to determine the root causes of errors in references and citations. The primary sources (as identified above) were the main stakeholders of the university. Methods used to get information from these primary sources included both quantitative methods as well as qualitative methods. The convergent approach of mixed methodology was adopted here (Figure 1.3 and Figure 1.5.). This information was then used to find solutions and to inform further research. As shown in Figure 1.6 previous stages were revisited to clarify and to remove ambiguities.

For the quantitative research, questionnaire and document analysis was used as the appropriate tool. All the standard norms and practices – including ethical requirements – were adopted whilst developing the questionnaire, as well as during the acquisition and analysis of the documents. Devising and pilot testing were conducted at Warwick University before questionnaires were distributed to the stakeholders. Furthermore, document analysis was also conducted – this is discussed in detail in chapter 3. Qualitative research tools, such as interviews, were used with both types of stakeholder. Semi-structured interviews were designed and conducted. All the standard procedures for conducting interviews were followed, including taking care of ethical requirements.

After the completion of quantitative and qualitative data collection processes, each set of data was analyzed. Statistical tests were applied to the quantitative data to determine if the relevant hypothesis was accepted or rejected (Chapter 3). Reference lists from the documents were extracted and analyzed by counting the frequency of references and the frequency of errors in referencing. Interviews were scripted and coded to identify categories of data as per the practices of analyzing scripts. During this phase the practical relevancy of resolving this issue of errors in referencing and citations for the educational and the professional scenario was identified as per the process in the first phase (Figure 1.5).

1.4.2. Solution Design Phase

Data collected and analyzed during the *problem identification phase* highlighted some common problems and issues encountered by students while practicing the skills of references and citation. Based on these findings a conceptual framework was developed (See Chapter 4) and the relationship between these components was established and justified. Prior to the development of the framework relevant literature was reviewed, and it was found that a framework to resolve this issue does not exist. Once the design of the conceptual framework was completed, its operational model was developed. The conceptual framework was a very important stage of the research, since this was the solution proposed for the problems that were highlighted in the *problem identification phase* of the research.

To implement the operational model, a software prototype was developed. While developing the software prototype the software development methodology *Rapid Application Development* methodology was adopted. Care was taken to include all necessary functionalities to prove the concept of the proposed conceptual framework. Furthermore, as and when

required, we revisited previous phases for the development of framework, operational model and the software prototype to ensure accuracy of the research.

1.4.3. Evaluation Phase

The evaluation phase was designed to evaluate the proposed framework (Chapter 4) (Figure 1.5 and Figure 1.6). As there were two stakeholders, two similar experiments were designed and conducted. In each of the experiments, a pre-test and a post-test were conducted to determine the effect of the intervention. Furthermore, data such as academic documents (including assignments) and corresponding reports were collected for analysis.

Data collected through these experiments were analyzed. Pre-tests and post-tests were conducted using quantitative as well as qualitative methods. Questionnaires were put to the students involved in the experiments. The questionnaires were designed and delivered according to the standard procedures for this activity. Furthermore, interviews were conducted with both tutors and students following the standard practices for interviews i.e. explanatory approach for mixed methodology was used here. Assignments and academic documents were analyzed to determine the effect of the interventions on the way that references and citations are practiced by students. Finally, conclusions were drawn and are presented in chapter 7.

1.5. Outline of Thesis

The methodology described in section 1.4 was designed to address the research questions mentioned in section 1.2. The entire thesis is built around these research questions and their answers were sought using this given methodology. In this section, we outline the organization of the thesis.

Chapter 2 presents a historical background of references and citations, such as why and how they were started and how they evolved to the current state. This chapter further indicates some of the major efforts and facilities that are provided to researchers using the new technologies of software and cyberspace for the research and development of references. At the end of this chapter, a few research studies are discussed to indicate the gravity of the problem of erroneous references.

Chapter 3 explains the investigative study conducted during the first phase of this research. The details of the process of data gathering – through questionnaires, interviews and document analysis – are presented. A discussion on the results of this analysis is also given in this chapter.

Chapter 4 presents a conceptual framework to overcome the problems stated in the problem statements. This framework utilizes three important features of education. One of these features ('spaced repetition') has never been used in this manner. The relationship between these components and the importance of each component in the framework is also highlighted. Furthermore, an operational model for the conceptual framework is introduced. This model incorporates all components of the framework. The chapter also describes how the framework can be implemented through an automated solution.

Chapter 5 further discusses this automated software solution and indicates the modules of the operational model that require an automated software solution. It further indicates the software development methodology adopted to build the required software. Requirements for the development of the software are extracted from the operational model proposed in this study. An overview of the analysis, design and implementation of the software is also provided.

Chapter 6 provides a description of and conclusions from the third and last phase of this research study. It indicates how the experiments were conducted to evaluate our proposed framework. This further provides analysis of the data received from these experiments. The chapter also presents a discussion and the conclusions reached in from the evaluation of the framework.

The final chapter (chapter 7) concludes the thesis. It indicates how each of our research questions was answered and the results of the evaluation process. The contributions of the research are highlighted in this chapter and some directions for future work are described.

1.6. Summary

This chapter has introduced the reader to the thesis. It has provided a map of the research work and indicated the research questions. The scope of the research was identified, indicating that this research will focus on the academic arena. Within the academic arena, the focus will be on university education especially for the domain of computer science. Hence, both, undergraduate and postgraduate levels of university education will be encompassed. In this chapter the overall methodology for conducting this research work was presented. All three phases of the research study were shown and discussed. These three phases of study collectively answer our research questions (**RQ1 –RQ2**). Finally an outline of the thesis was provided.

Chapter 2

References and Citations: Past and Present

2.1. Introduction

According to Peter Ingwersen (2012) “References (and thus citations) can be seen as footprints of information interaction, because of the behavioral conventions built in to the scientific communication and publication process. They are manifestations of degrees of utility of methods, results and ideas made earlier on by other scientists”. This definition encompasses the entire philosophy of references and citations and emphasizes its importance for scientific endeavours. It is therefore imperative to cite references in scholarly documents such as journal papers, books and articles. References provide a sound base for research work and increase its credibility. At the same time references acknowledge the authors for their contribution to the existing realm of knowledge (Moed, 2006). The importance of references has increased many fold during current electronic and cyberspace era due to the capability of electronically linking text to the reference. Hence if references are not cited properly, they are not linked and accessed by the readers of current document (Meyer, 2008).

However, several studies have indicated that while developing references, authors tend to make a number of errors (Davids, *et al.*, 2010; Eichorn and Yankauer, 1987; Garfield, 1990). This chapter aims to provide insight into the practices of references and citations adopted by scientists and researchers both past and present. Here we discuss briefly how and why libraries came into existence and how eminent scholars of the past perceived the concept of referencing and citation and adopted it, and we present an overview of the evolution of reference styles.

Present day technologies that assist researchers are presented, including digital libraries and next generation catalogs. Reference management software is discussed, and some views about it are presented. An overview of the types of tutorials used to aid students in referencing is also included here. Finally some examples of errors present in books and academic papers are highlighted, and research on understanding these errors is surveyed.

2.2. Historical Background

To understand the root cause of a problem, it is recommended to trace its history. Since this research work aims to find reasons for erroneous referencing practices and for proposing mechanism for improving this, it is vital to understand how these practices began and what their current state is. In this section we describe some evolutionary phases through which we have reached the current state of referencing. This section also highlights efforts made to facilitate researchers and bring them together to serve the cause of scientific research.

To understand how and when the concept of consulting the work done by others started, we first look at the inception of libraries. Libraries are the mode of storage of information and allow its retrieval when required,. The importance of libraries or similar storage mechanisms for preserving and accessing knowledge was understood millennia ago. Initially, factual documents and administrative information were stored. The purpose of storing this information was that it could be referenced later (Casson, 2002). Slowly, creative material such as books and creative writing were added to these storage areas or archive rooms. Excavations near southern Mesopotamia have revealed a group of tablets from third millennium BCE. These tablets have lists of geographical locations, lists of gods, hymns, etc., and it appears that they were for some school. These tablets were stored so that they can be referred to or “consulted” as and when required. These storage places can be termed as libraries (Casson, 2002). In 1980

archeologists found a large scale collection of clay tablets at the city of Elba (Syria). This collection was located in a large archive room of the palace dating back to 2250 BCE (Wellisch, 1981), and nearly 2000 books and administrative documents were found inscribed on clay tablets. Several historic libraries in Europe and elsewhere have existed (Casson, 2002) including the great library of Alexandria in Egypt (3rd Century BCE), the Library of Ugarit in Syria (1200 BCE), the Library of Ashurbanipal near Iraq (668 BCE), and the Library of Pergamum in Turkey (3rd Century BCE) (Philips, 2010). The existence of these and many other magnificent libraries of the past indicates that the need to refer to and to learn from others' work has always been significant.

The magnitude and scale of the libraries mentioned above also indicates the desire to add and build knowledge. Books and other data material are read and referred to by the scholars of the past, just as those of today. The evolution of the process of referencing can be seen from historical documents. As elaborated by Small (2010), a rough form of referencing can already be seen in the ancient documents. Although there was no reference list at the end or footnotes, authors were referred to within the text by their name, but the location of knowledge was rarely mentioned. Thus the "who" and "what" was mentioned as reference, but not the "where" part of referencing (Small, 2010). A study was conducted by Allen *et al.* (1994) in which the evolution of referencing was traced for papers in the scientific journal, named "Philosophical Transactions of the Royal Society". Sample papers published from 1665 to 1990 were chosen and reference styles within these papers were analyzed. It was found that prior to the 19th century references were embedded in the text. During the mid 19th century, these began to evolve as foot notes and finally in the 20th century they started to appear at the end as end notes or as a reference list.

2.2.1. Practice and Perception about Referencing in the Ancient and Classical Eras

It is of great interest to scholars and researchers to understand how scientists and scholars of the ancient and classical eras practiced and perceived the activity of referencing. The following is a short discussion on the practices followed by eminent scholars in the past.

Aristotle

Aristotle, born 385 BCE, is considered by many as the father of modern science as he introduced scientific methods, and has had a great influence on how we perceive science even in this century (Sarton, 1952). Therefore, it is worth knowing what his perspective was about referencing and how he practiced it. He wrote about 40 books containing in total more than 2000 pages. He referenced generously, and on average had 0.5 references per page. The interesting thing seen in his references is that there is a large amount of self-referencing, i.e. he referred to his own work, either within the document or elsewhere. As Small (2010) states, “it is interesting to speculate whether the impetus to cite oneself is not somehow the origin and prototype of all citations”. The references were made within the text, and contained mostly the name of the author and what he said, however there have been some examples of referencing in his documents where he mentions the “where” part of the reference e.g. ‘Plato in the Timaeus says that matter and space are the same; for the “participant” and space are identical’ (Barnes, 1985), thus laying the foundation for current reference styles.

Newton

One of the most prominent scientists in the 17th century was Isaac Newton (born 1642 CE). He applied mathematics to natural sciences and came up with the theories and laws about

motion and gravity. Furthermore he wrote many papers and articles on other subjects including optics. His papers can be seen in the early journals of Philosophical Transactions (Small, 2010). By viewing three of his books on Mathematical Principles of Natural Philosophy (the *Principia*) it may be seen that on average, he had 0.4 references per page (Small, 2010). This indicates that he has been referencing abundantly. Similar to Aristotle, while referencing, Newton mentioned the names of the authors and their work within the text of the document, but rarely mentioned the location of the reference. However, while referencing the ancient writers such as Euclid, Apollonius, Archimedes, Aristotle, and Hipparchus, he mentioned the locations as well. It is interesting to note that amount of self-citing by Newton has been quite small.

Darwin

Charles Darwin (born 1809 CE) was another prominent scientist. His theory of evolution had a great impact on the realm of natural sciences. By the time Darwin started publishing his work, the practices of referencing had become more advanced. Now, not just the name of the author was mentioned but the place of the cited author's work was also mentioned. References were being placed in the footnotes. However when viewing the first book by Darwin named *The Origin of Species* published in 1859, not a single footnote was present (Darwin, 1950). The reason provided by Darwin for the omission of footnotes was that a Mr. Wallace sent him a memoir on the same topic, which "arrived at almost exactly the same general conclusions" (ibid: 1), therefore he had to publish his work in haste as he wanted to get the credit for his research work. This issue of getting the credit for his work has also been seen with Isaac Newton, who had unpleasant experiences in this regard and at one time, left the Royal Society of London due to this issue, i.e. the issue of priority or of being first to present the idea. The next books by Darwin indicated that he was in great favour of referencing and considered it to be of prime

importance. As in the case of Aristotle, Darwin had self-cited many times. This factor is shown in Table 2.1.

Einstein

Another eminent and celebrated scientist is Albert Einstein (born 1879 CE). His theory of relativity has changed the way physics and astronomy are perceived. His theory was, however not easily accepted by the community of scientists, as it altered many known laws and explained certain physical phenomena. This was one reason for delayed acceptance of his theory. The other reason maybe that he was not very generous in referencing, at least not at the start of career as a scientist. His first book, named *Theory of Relativity* (1905), published in the *Annalen der Physik*, had no references at all. Although as stated by Small (2010,) there were quite a few places where he could have mentioned the author, such as “references to Lorentz’s 1904 paper on what became known as the Lorentz contraction; the Michelson–Morley paper establishing the constancy of the speed of light with respect to the ether”. After two years, Einstein wrote another paper on the theory of relativity and gave references very generously. Einstein was an independent thinker and apparently, did not rely too much on the work of his predecessors (Holton, 1973). Therefore, the numbers of references found in his work are less than expected. He had several self-citations though as scientist before him did.

Discussion

Thus we can see from the references and citations practices by the scientists of the world who changed the course of thought by their ingenuity and intelligence, that references and citations are indeed a “footprint” of the evolution of knowledge. Aristotle cited the work of his mentor Plato, as well as other colleagues. Scientists in the classical era such as Newton cited

work by Eudid, Archimedes, Aristotle as well as counterparts from same period, thus highlighting the path taken by certain theories and philosophies to reach a logical conclusion.

Author #	Aristotle (revised Oxford translation of Aristotle's works (1985))		Newton (cited in <i>Principia</i>)		Darwin (cited in <i>Origins</i>)		Einstein (Cited during 1902 - 1909)	
	Author Name	Number of Times	Author Name	Number of Times	Author Name	Number of Times	Author Name	Number of Times
1	Aristotle	121	Halley	15	Darwin	137	Einstein	32
2	Plato	120	Huygens	8	Gartner	116	Planck	15
3	Homer	100	Flamsteed	8	Hooker	63	Boltzmann	4
4	Empedocles	97	Galileo	7	Herbert	57	Lenard	4
5	Anaxagoras	64	Pound	6	Kölreuter	48	Stark	4

Table 2.1: Top Five Authors Cited (Small, 2010)

Table 2.1 provides interesting information about citation trends and practices by the scientists. This table provides information about the top five authors cited by the four scientists. It also highlights the number of times these authors are cited by the scientists in their books, scientific journal papers and articles. Interesting trend seen by these scientists is that the amount of self-citing has been the largest for the majority of them, i.e. three scientists out of the four cited their own work more than the other authors. Newton is the only scientist who did not excessively cite himself. The issue of ownership is prevalent for Newton, Darwin and Einstein, and probably more glaringly for Darwin and Einstein, since both did not cite any reference in their first books. However Darwin was aware of the importance of referencing (Darwin, 1950) and later, cited abundantly. Einstein on the other hand was not very well acquainted with the works of others and hence did not often mention their names (Holton, 1973). This indicates that scientists in the classical and early modern eras were driven by competition and wanted to establish their priority, even if that meant not providing complete

documentation. Aristotle, a student of Plato, on the other hand, was less concerned about it and cited the maximum number of references as shown in table 2.1. He was quite generous about referencing, perhaps the teaching of Plato played a role in it since his quotes such as “A house that has a library in it has a soul”, indicate his love of knowledge and libraries.

2.2.2. Progress of Scientific Culture during Classical Era

The 17th century has often been described as the era of scientific revolution in Europe. The advent of this century saw enormous progress in the domain of science, and many science journals and societies were formed. A first scholarly journal published in Europe was called *Journal des Scavans*. It was published on 5th January 1665 in France by French writer Jean-Denis de Sallo (1626-1669) (Boyer, 1894). It was followed closely by the scientific journal *Philosophical Transactions of the Royal Society* which was published on 6th March 1665 by The Royal Society of London, which is the longest running scientific journal to date (Philosophical Transactions, 2010). Several scientists of that era published their papers in these scientific journals to let others know about their discoveries and inventions. Formation of several scientific societies and journals gave an enormous boost to the creation of new knowledge and inventions. At the same time there was the race for the priority and ownership of inventions.

This scientific knowledge experienced exponential growth both in volume and quality. Scientists and researchers had to study and synthesize greater quantity of text to establish their point. It was realized as early as 18th century that scholars face enormous problems while trying to research as it was difficult to know about all the relevant journals and articles for their area of research. This led to the development of citation indices (Parrott, 2001), several of which have been developed by different societies and organization. This was a manual process hence very time consuming and prone to multifarious errors.

Early Citation Indices and Catalogs

A *citation index* or *reference index* is a document that indexes published journals (Garfield, 1955). These documents contain references to the journals, as well as the articles that are published in these journals. Citation indices provide very good data about the journals in a given domain as well as the list of articles for each of them. The main advantage of such documents is that the researchers can easily find the articles of their interest and can pursue them in the given journal (Garfield, 1955). As stated above the earliest reference indices were generated as early as 1800 by Jeremias David Reuss, and 16 volumes of these indices were published, as shown in Table 2.2 below (Parrott, 2001).

Volume #	Contents	Date Published
1	Natural History, General and Zoology.	1801
2	Botany and Mineralogy.	1802
3	Chemistry and Metallurgy.	1803
4	Physics.	1805
5	Astronomy.	1804
6	Economics (including agriculture).	1806
7	Mathematics; Mechanics; Hydrostatics; Hydraulics; Hydrotechnology; Aerostatics, Pneumatics; Technology; Civil Architecture; Naval Science; Military Science.	1808
8	History; Historical Aids; (Geography; Chronology; Monuments of Ancient Peoples; Inscriptions; Coins and Numismatology; Diplomatic Arts; Heraldry); Universal History; History of the Human Way; History of Mythology; Special history; Asia; Africa; America; Europe; Ecclesiastical History; Literary History.	1810
9	Philology; Languages; Greek Writing; Latin Writing; Fine Writing; Poetry; Rhetoric; Ancient Art; Painting; Music.	1810
10	MEDICAL AND SURGICAL SCIENCE AND ART.	1813

	Preliminaries; Anatomy and Physiology; Hygiene or Dietetics; Pathology or General Classification of Diseases; Diagnosis.	
11	MEDICAL AND SURGICAL SCIENCE AND ART. 2. Pharmacology; Pharmaceutics.	1816
12	MEDICAL AND SURGICAL SCIENCE AND ART. 3. General and Specific Therapy. Part 1. Containing A. B. C.	1817
13	MEDICAL AND SURGICAL SCIENCE AND ART. 3. General and Specific Therapy. Part 2. Containing D. E. F. G. H.	1818
14	MEDICAL AND SURGICAL SCIENCE AND ART. 3. General and Specific Therapy. Part 3. Containing I. - S.	1820
15	MEDICAL AND SURGICAL SCIENCE AND ART. 3. General and Specific Therapy. Part 4. Containing T.- Z.	1820
16	MEDICAL AND SURGICAL SCIENCE AND ART. Part 1. Obstetric Arts. Part 2. Veterinary Arts.	1821

Table 2.2: Citation Index

As seen in the above table, all the domains in the realm of science have been covered and their catalogues or indices are generated. The process of generating these catalogues was halted due to Reuss’ death.

The Royal Society of London started working on the indexing of scientific journals in the middle of the 19th century (Beaver, 1972), however Beaver claims that this idea was originated by a young Lieutenant in the United States Army Corps of Engineers, Edward Bissell Hunt. These indices were called the *Catalogue of Scientific Papers*, 19 volumes were published, and the work was completed in 1925. Another index of citations was developed by the Royal Society of London in collaboration with several other societies and was called the *International Catalogue of Scientific Papers*. This was a much more complex venture, and indexing of journals from 1901 to 1914 was done. The work was halted due to World War 1. Apart from the Royal Society of

London, many other societies also developed domain specific indices (Parrott, 2001). In 1898 the Institution of Electrical Engineers (IEE) and the Physical Society of London started publishing a citation index called *Science Abstracts*. During 1907 American Chemical Society (ACS) started *Chemical Abstracts*. In 1927, the Union of American Biological Societies started *Biological Abstracts*, and in 1940 *Mathematical Reviews* was started by a collaboration of the American Mathematical Society (AMS), the Mathematical Association of America (MAA), the Academia Nacional de Ciencias Exactas Físicas y Naturales in Lima, the Koninklijk Wiskundig Genootschap in Amsterdam, and the London Mathematical Society (LMS).

2.3. Facilities for Researchers in the Modern Era

The advent of computers and digitization of data have revolutionized the way research is conducted now. Principles and scientific methods are primarily the same; however the mode of acquiring knowledge has changed. Scholars as well as students now are exposed to huge amount of information. The access method for getting this information has become easy, and the time taken to find information on a required subject and topic has reduced phenomenally, thus increasing the speed of creation and dissemination of new knowledge. The following subsections highlight some of the work that has been done in this regard.

2.3.1. Modern Citation Indices

As mentioned above, indices or catalogues have historically been developed and assembled manually. An enormous amount of work was performed by various societies to consolidate the work done by researchers and to facilitate them. However since this work was done manually many errors were introduced, furthermore this process was very slow and time consuming, leading to delays in publishing (Garfield, 1955). Most of these indices were domain specific; thus, if a researcher wanted to undertake cross disciplinary research it was very

cumbersome (Garfield, 1955). After World War 2 the government of the USA released funds for research and thus research activity in America increased manifold making it increasingly difficult to manage and publish journals and citation indices (Thomson Reuter, 2010).

During the 1950s, when computers were coming into the picture, it was felt that automation would be the solution for massive amounts of data storage and retrieval, and Eugene Garfield started working on the projects to develop citation indices and to store them on computer. Thus it can be said that he is the pioneer in electronic citation indices (Thomson Reuter, 2010).

The first automated citation index was the *Science Citation Index* (SCI), developed by Garfield at the Institute of Scientific Information (ISI) in 1960. After the generation of this index, another index called the *Social Science Citation Index* (SSCI) was developed in the 1970s followed by the *Arts and Humanities Citation Index* (AHCI). ISI was later taken over by Thomas Reuter (Yancey, 2005; Gupta, Jha and Mishra, 2004).

These indices are the prime source of knowledge acquisition (Gupta, Jha and Mishra, 2004) and as stated by Garfield this was an attempt to materialize H.G. Wells' vision of a "World Brain" i.e. World information center (Garfield, 1964). SCI has data on about 3700 published journals covering about 100 disciplines of science (Gupta, Jha and Mishra, 2004). SSCI, which was built upon SCI, covers about 1700 journals covering 50 disciplines (Gupta, Jha, Mishra, 2004). AHCI contains data on about 135 journals pertaining to the knowledge of Arts and Humanities. These indices are available on line through Web of sciences and Web of knowledge sites (Reuter, 2010).

Apart from the above mentioned indices, several other indices are available online, and can be accessed, either freely, or by subscription. These online indices include:

- CiteSeer (<http://citeseerx.ist.psu.edu/>)
- Google Scholar (<http://scholar.google.co.uk/>)
- PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>)
- IEEE Xplore (<http://ieeexplore.ieee.org/Xplore/guesthome.jsp?reload=true>)

With the help of these and similar indices, it is now possible to access the relevant articles and to know the number of times a particular article has been cited.

2. 3.2. Digital Library Catalogs

In addition to the computerization of citation indices, library catalogs have also been digitized. Small scale development and coding for the digital catalogs began during the 1960s; however, the large scale catalogs were developed during 1970's. Ohio State University developed the first large scale online catalog in 1975, and in 1978 Dallas Public Library developed its first online catalog system. Initially, these catalogs were available to users through telnet, but users used to wait in line to access these digital catalogs in libraries to search books and journal for their domain of interest (Altman, 2006). This was the period from the 1980s to the mid 1990s. One popular library system that provided the access to catalogs for users was *Dynix* (Krieger, 1991). This was developed by private enterprise, was first installed in 1983 in the Public Library of South Carolina, and it soon became a popular product. It was in maximum use by the mid to end nineties, when about 5000 libraries used this system, which was about 80% of the market share. With the introduction and popularity of the Internet, library catalogs were published online (OPAC). Now, researchers could search for the material of their interest from the comfort of their room (Christensen, 2013).

An interesting change of popularity for library catalogs has been seen with the introduction of search engines (Markey, 2007). Research on the shift of choice by the user from library catalogs to search engines has revealed that search engines are user friendly, and provide a better mechanism of finding the appropriate information (Markey, 2007). This information led to the development of the next generation catalogs. These catalogs have become increasingly popular, providing vast information instantly, incorporating all the requirements mentioned by users through surveys including text of the papers and books. The catalogs are now being incorporated by libraries, as well as the private companies that offer services regarding cataloging. Some examples of next generation library catalogs are WorldCat Local OCLC available at <http://odc.org/support/services/worldcat-local.en.html> and <http://www.oclc.org/worldcat-local.en.html>, Encore at <http://encoreforlibraries.com/tag/encore-synergy/> and Bibliocommons at <http://www.bibliocommons.com/>.

2.3.3. Digital Libraries

Although libraries in their physical form exist, the digital form of libraries is becoming more popular because of its accessibility and ease of use over the internet. The concept of digital libraries was presented as early as 1938 by Bush (Altman, 2006); however his idea only materialized during the 1990s. Large projects were initiated during that time and several documents and books were digitized. They were made available through CD-ROMs for researchers and general users. As the web became popular, digital libraries shifted to cyber space. By now, millions of books, articles, images, videos etc., are available on these digital libraries. Users from any geographical location can access these libraries and get the data. Many libraries and private corporations are establishing digital libraries, thus increasing the scope of

access of knowledge to users across the globe and at any time. Examples of digital libraries include the World Digital Library (Library of Congress) and Readme.cc (European Commission). A list of digital library projects is available at Harvard library (Harvard Library, 2013).

2.3.4. Reference Citation Formats

At this point, we would also like to mention some reference styles adopted by scholars in various domains during this era. References are being cited in all the scholarly works in numerous journals, e-journal, book, e-Books, reports and theses. Scholarly work is spread over many disciplines within the sciences, arts, social sciences, engineering, medicine and law.. (Garfield, 1990), and furthermore, research work is continuing in nearly all the parts of the world, as can be seen by the case studies presented in section 2.4. Each scholarly domain and each geographical region has its own preferences on how to refer their cited work (Smith, 2007). For this reason, several citation formats are being used worldwide, some of them are listed below (Yale College, 2009; WriteCheck, 2010).

Category	Reference style 1	Reference style 2	Reference style 3	Reference style 4	Reference style 5	Reference style 6
Sciences	ACS (American Chemical Society)	AMA (American Medical Society)	AIP (American Institution of Physics)	CBE (Council of Biology Editors)	IEEE (Institute of Electrical and Electronics Engineers)	Vancouver (Biological Sciences)
Humanities	ASA (American Sociological Association)	Chicago (CMOS)	MLA (Modern Language Association)	Turabian	Harvard	MHRA (Modern Humanities Research Association)
Social Sciences	AAA (American Anthropological)	APA (American Psychological)	APSA (American Political Science)			

	Association)	Associati- on)	Associati- on)			
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Table 2.3: Reference Style

Column labeled *Category* in Table 2.3 indicates the domain of knowledge such as sciences, humanities and social sciences. For each category, various reference styles are being practiced, some are listed in the corresponding columns. As stated by Smith (2007), those who are new to the field should be made aware of the purpose and importance of the styles, and this responsibility falls on the shoulders of academics and librarians. Smith further noted that by following these styles, there is a very good chance that researchers’ papers will not only be published, but will be widely understood and accepted.

2.4. Problems Identified in the References and Citation for Current Scholars

Discussions in this chapter this far have established existence of deep roots of referencing practices within the community of scholars and scientific researchers, thus establishing its importance. However, important as it is, this task is not exactly easy, and gets quite cumbersome at times. Furthermore, according to Garfield(1990), errors are introduced as authors may hear about a reference in a conference and jot down the details incorrectly due to problem in hearing from a distance. Another important source for erroneous references and bibliographies is a collection of reference data from a database that has erroneous entries, since data in these databases are entered by humans. Other common reasons for errors stem from lack of interest by the authors or low importance level for developing reference list. Thus, authors may not verify any reference from the actual papers/artides/books, or do not read the contents that are referred in the given document. In the worst case scenario, authors may even make up a fake reference (Garfield, 1990).

Due to the reasons stated above, many errors are introduced into an academic paper, and common errors have been highlighted (Waytowich, Onwuegbuzie and Jiao, 2006; Kendall, 2005; Sweetland, 1989; Wright and Armstrong, 2008). These errors may be categorized into three main categories: inconsistent, incorrect and missing. Table 2.4 below indicates the types of errors that fall into these three categories.

Error #	Category: Inconsistency	Category: Incorrect	Category: Missing
1	Citation present in the text but not mentioned in the reference list	Incorrect spelling for author names and title	Missing one or more author names
2	Citation present in the reference list, but does not exist in the text	Incorrect author name/s	Missing an author's middle name
3	The reference cited in the text is inconsistent with that cited in reference list, such as the name and date etc.	Incorrect date	Missing date
4	The reference cited is not consistent with the topic or opposes the point that it is supposed to support	Incorrect volume number	Missing volume number
5	Inconsistent formatting style	Incorrect page number	Missing issue number
6		Incorrect ISBN, DOI etc.	Missing publisher
7		Incorrect citation format	Missing editors
8		Incorrect web site addresses	
9		Incorrect formatting style	

Table 2.4: Errors Highlighted in Referencing and Citations

In addition to the errors mentioned in Table 2.4, there have been incidents reported in which citation of non-existent references has occurred.

Several studies have been conducted in this regard over many years. Citation errors in journals like Journal of Anesthesia have been up to 42% (Kahoru, N. *et al.*, 1995), in the nursing journals it has been up to 45.8% (Taylor, 1998; Suk *et al.*, 2008) and more than 83% of errors in the Indian journals of surgery (Mohta and Mohta, 2003) . Respected journals in science and arts also have up to 9.4% errors (Garfield, 1990). The rate of citation errors is evident in all fields of study (Garfield, 1990; Davies, 2012; Azadeh and Vaez, 2013; Lopresti, 2010; Siebers, 2001), and it is also evident from such studies that there is lack of education in this regard. A study was conducted to determine the amount of awareness and use of accurate citation of references by PhD students (Waytowich, Onwuegbuzie and Jiao, 2006). Some of the research performed in this area will be discussed further in the coming sections of this chapter.

2.5. Work Done to Facilitate the Citation Practice

The problem of citing references is not new, therefore efforts have been made to help authors in this respect, and various approaches to address this issue have been tried. Firstly, instructions, guidelines and manuals have been developed to guide researchers about the styles of referencing. Second, and most important, support is provided to scholars through reference management software. These tools help researchers to organize and embed references in their documents. Both modes for helping researchers are discussed below.

2.5.1. Instructions, Guides, Manuals and Tutorials

Guides, manuals and instructions are available in libraries, and are updated periodically for the benefit of scholars. The reason is that new standards are being developed for each

reference style and thus these manuals are updated periodically so that the researchers remain up to date. These manuals are also made available online to facilitate the users. Apart from the reference style manuals, several guides and electronic tutorials are available; these are generally uploaded by the libraries of universities, and students are asked to access them. Table 2.5 below lists examples of these documents provided by one large US university (University of California Berkley Library, 2010).

Serial #	Handbooks and online instruction sets	Tutorials
1	APA Style <i>Publication Manual of the American Psychological Association</i> . 6th ed. Washington	Citation Quiz: when one should cite work? Web-ready Citation Practice: another chance to drag the components into place and check your work
2	MLA Style <i>MLA Handbook for Writers of Research Papers</i> . 7 th ed. New York: Modern Language Association of America	Practice MLA Citation: each citation has an error; can you find it?
3	<i>MLA Style Manual and Guide to Scholarly Publishing</i> . 3 rd ed. New York: Modern Language Association of America	MLA Citation Game: drag the components into place and check your work
4	Chicago Style <i>the Chicago Manual of Style</i> . 15th ed. Chicago: University of Chicago Press	New Online Tutorial on Chicago-Style Citations: The tutorial includes a link to the Chicago-Style Citation Quick Guide.
5	Website for the handbooks of various styles:(MLA, APA, Chicago ...) http://writing.wisc.edu/Handbook/Documentation.html	Practice Quiz for Citations and Reference Pages: choose the correct citation from a group of examples
6	IEEE Citation Reference : http://www.ieee.org/documents/ieeecitationref.pdf	APA Reference Citation Practice: read each example and determine if it (in)correct
7	Turabian: http://www.press.uchicago.edu/books/turabian/turabian_citationguide.html	MLA Citation Game: drag the components into place and check your work.
8	Harvard:	Harvard Referencing Tutorial: Has

	http://www.lib.monash.edu.au/tutorials/citing/harvard.html	information about reference style.. https://ilrb.cf.ac.uk/citingreferences/tutorial/index.html
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Table 2.5: Examples for Handbooks and Tutorials

These and many other sites are hosted and maintained to provide the necessary information and guidelines for the students as well as the authors of scholarly papers and books.

In addition to instruction manuals and guides for the citation of references, many online tutorials have also been developed. These tutorials allow users to practice and assess their citation skills online. Some sites such as <http://www.classroomtech.org/copyright/onlinepractice.htm> compile tutorials and are thus available with ease.

Apart from these sites, many universities and institutions have also uploaded tutorials for citing and referencing activity, for example as Manchester Metropolitan University (<http://www.learnhigher.mmu.ac.uk/resources/citing-proficiency/>).

These and many other tutorials are aimed to make the users proficient in citing references.

2.5.2. Reference Management Software (RMS)

All the above mentioned technological advances indicate the effort put to facilitate research work for scholars of all subject, levels of experience and ages. In the context of our research, however, the most relevant and useful facilities provided to the researcher are the tools and techniques for helping them cite and generate reference lists. Several reference management systems and tools have been introduced since 1980. During 1980s, these tools were available on floppy disk, they were copied onto a PC and used by researchers to help them

develop better reference list. By “better reference list” we mean well formatted and accurate. As with other tools and software mentioned above, the Internet and the web have allowed these systems to be hosted online.

Traditional reference management systems, or the RMS developed prior to the web era, had three major functionalities, and these are embedded into the RMs of today (Markey, 2007; University of Birmingham, 2008; Shapland, 1999): developing personal reference library, embedding the references in the given text, writing these references using the given citation standards. Now we may also expect functionalities such as the following identified by Gilmour and Cobus-Kuo (2011):

1. Import citations from bibliographic databases and websites
2. Gather metadata from PDF files
3. Allow organization of citations within the RM database
4. Allow annotation of citations
5. Allow sharing of the RM database or portions thereof with colleagues
6. Allow data interchange with other RM products through standard metadata formats (e.g., RIS, BibTeX)
7. Produce formatted citations in a variety of styles
8. Work with word processing software to facilitate in-text citation

As stated by Gilmour and Cobus-Kuo (2011), not every RMS has all the above functionalities. The RMS of today are being tailored to the needs of the user. The experience with digital catalogs has emphasized the fact that user requirements need to be met in order to retain and attract users. New RMS have added interactivity, socialization and collaboration into the research as one of their features. For example, users can share their libraries with other

people, i.e. public and private groups. Furthermore users can access libraries similar to their own, thus increasing their access to data and probably to other users (Gilmour, and Cobus-Kuo, 2011).

Several Reference Management software products are available in market. Some of the commonly used ones are Endnote (<http://www.endnote.com>), RefWorks (<http://www.RefWorks.com>), Mendeley (<http://www.mendeley.com/>), Zotero (<http://www.zotero.org/>) and CiteULike (<http://www.citeulike.org/>). The following is a brief discussion of these reference management software (RMS).

EndNote

Endnote was developed during late 1980s by Thompson Reuters. It has a desktop version as well as web-version, and operates on Windows and Macintosh operating systems. Endnote gets online citations from online catalogs, databases, and generates customizable citation styles, bibliographies, and reports. It has the features of socializations and collaboration. It has good documentation and support.

RefWorks

RefWorks was developed in 2001 by a business unit of ProQuest. It is a web-based RMS and acquires data from various online catalogs, and generates customizable bibliographies and citations. It works with Windows, Linux and Macintosh operating systems and through browsers.

Mendeley

Mendeley was developed in 2008 by a Web 2.0 team. As with Endnote, it has both a desktop and web version, giving users access to social features such as sharing references with

other users. Mendeley offers a free package with the option to upgrade for more individual and shared storage space. As noted by Gilmore (2011), Mendeley was modeled after Last.fm. Like the social networking music site, it provides recommendations based on one's interests (Fenner, 2008).

Zotero

George Mason University's Center for History and New Media (CHNM) developed a free, open source plug-in for the Firefox browser called Zotero. It was developed in 2006 and was soon sued by Thompson Reuters in 2008 for reverse engineering of Endnote. However the case was settled in 2011. Zotero is installed once by users. Later, they just click on an icon in the address bar to save the citation information in their library without moving away from the web page. Zotero also has a desktop application that works with Windows, Macintosh and Linux.

CiteULike

CiteULike was developed by Richard Cameron in November 2004 and sponsored by Springer Science and Business Media in 2006. It is a free online RM and bookmarker. CiteULike acts as a social networking tool by letting users search for related articles or helping users to connect with researchers who have similar interests. User can directly mark database catalogs from the browser and import data from there.

Although Fitzgibbons and Meert (2010) state that the use of such software is well established among researchers and students, a study undertaken by Martin (2009) reveals that most course instructors do not promote these products and rarely use them for their own research. It further highlights the point that instructors deduce the marks of the students that have errors in their citation due to the error in the databases utilized by these software

products. This study indicates that despite the fact that the number of such software products has increased, their utilization is not widespread.

2.6. Research Highlighting the Problem in Citing References

Over the years a number of surveys and research projects have been conducted to determine reference citation practices and to highlight and resolve the issues that arise during such practices (Garfield, 1990; Davies, 2012; Azadeh and Vaez, 2013; Loperesti, 2010; Siebers, 2001). These have gathered data from professional authors as well as those that are passing through the phase of learning in academic institutes. In this section, five such works are mentioned. It is to be noted that several research studies on similar grounds have been done for various disciplines and levels (Harinarayana, Chikkamanju and Vasantha, 2011; Lee, *et al.*, 2007; Harzing, 2002). Furthermore, the following cases are reported to highlight the global nature of the issues encountered by authors during citing their references, thus cases from Malaysia, India, UK and USA are presented here.

2.6.1. Citation Practices amongst Trainee Teachers as Reflected in Their Project Papers

This research activity (Shanmugam, 2009) aimed to identify citation and referencing errors of postgraduate student teachers. Final term papers of 154 student teachers from a teacher education institute in East Malaysia were analyzed. It was found that from the above group only 62.24% of the participants developed reference lists. Of the references cited by these 62.24% of teacher students, only 12.67% were correctly cited. Tables 2.6 and 2.7 below summarize the results obtained from this study.

Citations	Analysis	Frequency	Percentage
Accuracy of Citation Styles	Correct use of MLA format	52	10.63
	Correct use of APA format	10	2.04
	Incorrect citation style	427	87.32
Total			100

Table 2.6: Analysis on Accuracy of Citation Styles

	Analysis	Frequency	Percentage
Major citation errors. (excluding web sources)	Capitalization	251	57.30
	Italicizations omitted	174	39.72
	Incorrect placement of place of publication	181	41.32
	Incorrect placement of publisher	190	43.37
	Errors in stating author	71	16.01
	Place of publication missing	89	20.31
	Year of publication missing	28	6.39
	Publisher missing	25	5.70
	Author missing	11	2.51
Total (excluding web sources)		438	100

Table 2.7: Citation Errors

As can be seen from these tables, the rate of errors is quite high. The participants blame this high rate of errors on the teachers and state that the lecturers did not emphasize the importance of this activity and that they did not have sufficient knowledge about citation styles and referencing as well as insufficient resources for acquiring this information (Shanmugam, 2009).

2.6.2. Accuracy of references cited in articles published in Indian Journal of Dermatology, Venereology and Leprology: A pilot study

The aim of this study (Singh and Chaudhary, 2009) was to analyze the reference citing practices in articles published in Indian Journal of Dermatology, Venereology and Leprology to determine the quality of referending in these artides.

For this study, fifty cited references were taken randomly from the journals of May-June 2008. After analysis it was found that:

1. thirteen cited references (28.3%) were error-free;
2. three citations from books were not verified;
3. twenty-eight citations (59.6%) contained citation errors;
4. twenty (43.5%) quotation errors occurred.

This study indicates that papers published in journals in India have a high percentage of errors, and as stated by Singha and Chaudhary (2009) it is not a new finding, and so far improvements have not been seen, thus concluding that concrete measures should be taken to overcome this problem.

2.6.3. Accuracy of references in Burns journals

The aim of this study (Al-Benna, S., *et al.*, 2009) is to highlight occurrences of errors in the articles published in two Jounals, *Burns* and *Journal of Burn Care and Research*. From these articles, 120 references were randomly selected. Out of these 120 references, 117 were in English and an analysis revealed:

1. 4 articles could not be retrieved due to fatal citation errors (3.3%);
2. 12 citation errors were observed giving a total citation error rate of 13.3%;

3. The quotation error rate was 13.7%.

As stated by Al-Benna *et al.* (2009), the major errors detected were spelling mistakes in the names of cited authors and the partial omission of the titles of the articles cited. The error rates reported are thus substantial, and need the attention of the authors, publishers and peer reviewers in order to ensure quality and integrity of the articles and journals.

2.6.4. Characteristics of doctoral students who commit citation errors

This is an interesting research endeavour, as it aims to study the ‘level of perfectionism in students’ personality’ and its effect on errors committed while citing references. This research work was conducted in a large southeastern university in the United States (Waytowich, Onwuegbuzie and Jiao, 2006).

The method adopted to perform this research was as follows:

1. 64 doctoral students from various disciplines were enrolled in a graduate-level, dissertation preparatory course;
2. the duration of this courses was 16 weeks, once a week for 4 hours;
3. during the course each student had to prepare a “mixed-methodological dissertation research proposal” (Waytowich, Onwuegbuzie and Jiao, 2006).

After analysis of the results obtained it was found that:

- the dissertation proposals, on average, contained more than 12 missing or inconsistent citations;
- every third reference cited had errors.

This study highlighted a disturbing aspect, namely that the students chosen were mostly from their final year of their doctoral program, indicating that they have been committing such errors in their prior work. Thus, the authors concluded that a more formal and conscious effort should be put in by the instructors to highlight the importance of this activity.

2.6.5. Tackling Student Referencing Errors Through an Online Tutorial

This research project (Kendall, 2005) aimed to study the impact of online tutorials in reducing the errors made while citing references by the undergraduate as well as post graduate students. The methodology adopted was essentially action research, which was divided into three stages.

First stage:

Course work of 116 undergraduate students and 56 post graduate students was analyzed for the possible errors in citing and referencing of books and other documents. The following result was obtained by this analysis (Table 2.8).

Format	Undergraduate: Errors in referencing		Postgraduates: Errors in referencing	
	Total errors/Total Ref.	% of errors	Total errors/Total Ref.	% of errors
Books	114/184	62%	168/379	44%
E-documents	142/167	85%	98/122	80%

Table 2.8: Format Analysis. First Stage

As indicated in the above table the percentage of errors is substantial. This result led the researchers to conclude that improvement is required in pursuing students to adopt error free mechanism of citing references in their course work.

Second stage:

The following activities were performed.

1. A WebCT based online tutorial was designed, it is called *Citing Proficiency Test*.
2. Undergraduate and postgraduate students were introduced to this tutorial.

3. This tutorial had quizzes in addition to the contents. The quizzes were graded, 10/150 marks were allocated to these quizzes, and the students could take each quiz as many times as desired.
4. The work of 20 postgraduates and all the undergraduates were analyzed. Following results were obtained (Table 2.9).

Format	Undergraduate Errors in referencing		Postgraduates Errors in referencing	
	Total errors/Total Ref.	% of errors	Total errors/Total Ref.	% of errors
Books	277/313	88%	119/367	48%
E-documents	193/213	91%	125/269	46%
Printed Journal articles	8/13	61%	45/171	26%

Table 2.9: Format Analysis. Second Stage

As shown in the above table (Table 2.9), the results for undergraduate students were disappointing; however, some improvement in the result for postgraduates were visible. This deterioration as stated by Kendall (2005) could be due to the change in the guidelines in which it is required to strictly follow the **British Standard** BS ISO 690:2010 for citing references. Nevertheless it was evident that further study and changes should be made to get better results.

Third Stage:

Thus the changes made in the third stage were essentially the policies in teaching the citation norms to the students. Some of these changes were as follows:

- Providing a check list of errors that can be made by students to the instructors;
- Providing small laminated cards to the students containing examples of reference styles;
- All new students were shown how to use these tutorials, i.e. 96 undergraduates and 49 post graduate students;
- The second year students were asked to revise their concepts by visiting these tutorials.

The result obtained after the above mentioned changes are summarized in Table 2.10 below.

Format	Undergraduate: Errors in referencing		Postgraduates: Errors in referencing	
	Total errors/Total Ref.	% of errors	Total errors/Total Ref.	% of errors
Books	185/386	48%	33/230	14%
E-documents	89/305	29%	12/219	5.5%
Printed Journal articles	9/20	45%	11/130	8.5%

Table 2.10: Format Analysis. Third Stage

In the above table, some of the results obtain are indicated, as can be seen from this research study. These results show that after several changes in the policies and methodologies in imparting knowledge about citing and referencing, improvements have been achieved. However, these results do not identify reasons for errors and indicate that further study and research needs to be done to improve this practice, especially for undergraduate students.

2.6.6. Discussion about the above Cases

As is evident from the above mentioned cases, the problem of citing references is substantial. Although ample support has been provided to the authors, both at professional as well as at the student level, the effect has not been substantial, and the percentage of errors has not been eliminated over the years even after the introduction of various reference citation software and online tutorials. This inference suggests the need to tackle this issue from another angle.

During this review, we have encountered statements by students (Shanmugam, 2009) that teachers did not emphasize this activity, or studies such as that of Martin (2009) that highlight the fact that teachers do not encourage students to use resources such as reference

management systems. Another factor that is encountered is teachers do not have sufficient time to verify each reference cited by students (Kendall, 2005).

Thus, the other angle that we need to research is how to facilitate instructors in promoting awareness about this activity and in providing feedback as well as knowledge to the learner in such a way that the knowledge imparted is sustained by the learner over the years.

2.7. Conclusion

In conclusion, we can state that the need for consulting earlier documents in ones documents led to the development of archive storage areas, which were later termed as libraries (Casson, 2002). The phenomenal growth of libraries indicates the success of this approach of consulting previously developed documents. The inquisitive and creative minds of humans have stored their thoughts, experiences, important events, discoveries and innovations in accessible places. The desire was to collect as much knowledge as possible, and after learning from these documents new knowledge was created. However, while referencng many errors were found in the work of scholars, both in classical as well as in modern era. To resolve such issues, reference management software has been developed. This software provides scholars with the ability to digitally arrange their bibliographies in an organized manner and facilitate them in developing reference indices and bibliographies. It has however been observed that in spite of the above mentioned support for research and development of scientific data, numerous errors exist in the reference lists and bibliographies of today's scholarly work. Several types of errors are common among scholars belonging to all regions of the world and for all fields of study, and thus doctors, engineers, scientists and social scientists develop erroneous bibliographies. The existence of errors causes problems of retrieval of cited information and

may even lead to accusations of plagiarism. These errors cause serious issues of retrieval pertaining to the new environment of digital world where linking to the cited work is done.

Several studies have been conducted to highlight this issue. Such issues are present in the articles presented in peer-reviewed high impact factor journals, as well as in the books and work done by students of both undergraduate and post graduate level. This is a grave situation, since scholars are now exposed to such sophisticated and effective ways to conduct searches for their research and for citing references, thus prompting us to begin our research in determining where the problem really lies and whether there is any way to improve it.

Chapter 3

Investigative Study about Erroneous References and Bibliographies in Academia

3.1. Introduction

The literature review (Chapter 2) provided insights into the past, as well as current practices of referencing and citations among scholars and students, and highlighted presence of errors in it. It was found that these problems are not confined to professional scholars but also exist among students at both undergraduate and postgraduate level. There have been few studies on finding solutions to this problem (Kendall, 2005); however, research has rarely been conducted to determine the root cause of this enormous and far reaching issue. The focus of this investigation is to find the reasons for erroneous references and citation practices among Computer Science students at higher educational institutes.

The current chapter aims to elaborate on how the methodology discussed in Chapter 1 for the investigative stage is implemented, and highlights the main tools used to find answers to our research questions. Here we analyze and discuss the data received through the tools and come up with the answer to our first research question. Hence the next section, Section 3.2, describes the methodology for the third stage of first phase of the research (Chapter 1). The third section (Section 3.3) analyzes the data obtained through quantitative and qualitative analysis. A discussion is conducted in the fourth section (Section 3.4) of this chapter, and finally, conclusions are drawn in the last section (Section 3.5).

3.2. Research Methods for Investigative Study

The third stage of the first phase of our research is the investigation and in-depth probe as to why references and citations have errors (Figure 1.5 and Figure 1.6). This provides answer to our first major research question i.e. **RQ1** (See Chapter 1), and paves the way for the coming phases of our research. Hence, it is of prime importance that the methods chosen are pertinent to our requirement and produce accurate and reliable results. A mixed methodology approach is adopted (Chapter 1), and hence we used Quantitative research methods and Qualitative research methods to collect data, compare it and analyze it.

Quantitative research methods aim to provide numerical statistics to highlight a concept or establish a hypothesis (Cohen, Morian and Morrison, 2007; Snap Surveys, 2011). The aim of using this type of method is to get statistical data about the problems related to erroneous bibliographies/references. The use of a quantitative method has provided a generic picture of issues related to erroneous references and citations and has helped us gauge the spectrum of reasons for the introduction of errors in references and citations within students course work. Therefore we used a quantitative research approach to highlight the current trends in citation and referencing errors of undergraduate and postgraduate students.

Qualitative research methods are used to acquire an understanding of the underlying reasons and motivations for the occurrence of certain phenomena or problems (Cohen, Morian and Morrison, 2007; Snap Surveys, 2011). For this research work we employed qualitative research methods to get an in-depth understanding of this problem and to corroborate data received through quantitative methods. Furthermore qualitative research methods helped to find answers to some of the questions that were either not resolved using a quantitative analysis or required further understanding of the problem. Hence the triangulation technique is

adopted (Cohen, Morian and Morrison, 2007; Chapter 1). Ethical consent for all these research activities has been obtained as per the policy of the Department of Computer Science (dated 2/6/2010).

3.2.1. Tool Used For Quantitative Research

There are several standard tools for quantitative research methods, such as experiments, observations of events, getting data from information systems and surveys/questionnaires. A questionnaire is one of the instruments that can be used to gather facts, attitudes and opinions in a measurable manner (Radhakrishna, 2007; Cohen, Morian and Morrison, 2007). Since we needed to find facts about why references and citations have errors within students' course work, we decided to collect data for our investigation using a questionnaire.

Since an educational institution is involved in this research, we have to consider its two major components i.e. students and staff members (Mainardes, Alves and Raposo, 2010). Hence two questionnaires were developed and deployed. The first questionnaire was used to gather information from students and the second questionnaire aimed to collect information from the staff members. These questionnaires were distributed mainly to staff members and students at the University of Warwick and the Virtual University of Pakistan. However, to gain a better understanding of the issues, staff members from other universities in the UK were also invited to participate.

The next tool used was the content analysis of documents. Content analysis of the documents has been defined as "a method of studying and analyzing communication in a systematic, objective, and quantitative manner for the purpose of measuring variables." (Kerlinger, 1986). Documents are valuable, as they provide the insight into the habits, trends

and patterns of addressing a problem. Since we are interested in verifying claims made by several authors regarding erroneous references and citations within students' coursework (Chapter 2) and to determine the trends and patterns of errors in references within these documents by the students, we chose it as one of our tools.

Method Adopted For the Development and Deployment of the Questionnaires

To develop and disseminate questionnaires, standard questionnaire development methods were adopted (Radhakrishna, 2007; Cohen, Morian and Morrison, 2007). The objectives for the development of the questionnaires were clearly laid down and the questions were developed to achieve those objectives. This was crucial, since answers to these questions were going to lay the foundation for our entire research endeavor (i.e. for the first, second and third phases of this research, as stated in Chapter 1). Thus, the impact of the answers on our questionnaires was far reaching.

26 questions were devised for the students' questionnaire. Responses were received using Likert-type scales. 33 questions were developed for the staff questionnaire (Appendix A), out of these 33 questions 31 questions needed responses on a Likert-type scale whereas two questions were open ended (Appendix A). After developing the questionnaires, it was piloted for fine tuning in terms of respondents' understanding of the contents of the question, i.e. for clarity of questions. Feedback received from the participants was reviewed and the questionnaires were updated accordingly. Consent forms were also developed to meet the ethical obligations of the research. These questionnaires were hosted on the University of Warwick's web site. Emails were then sent to the department of Computer Science and other departments of the University of Warwick and the Virtual University of Pakistan. For staff questionnaire requests were also sent to University of Derby, University of London and

University of Strathclyde. These emails were sent to request that the relevant authorities pass our email to students and staff. These emails also contained the instructions on accessing the questionnaire. Those who responded to staff questionnaire were from the Virtual University of Pakistan, University of Warwick and a few others (University of London, University of Derby and University of Strathclyde) within the UK.

Document Gathering

To start this activity, ethical consent was obtained from the department. Students or their departments were contacted and were requested to give their academic documents for research work. A total of 14 documents were collected, but students and/or their departments were reluctant to hand them over. We collected 6 documents from undergraduate students and 8 documents from postgraduate students. These documents comprised final year reports, class assignments, chapters and papers for conferences. 10 of them contained references and citations, and the frequency of these references varied from document to document.

3.2.2. Tools Used For Qualitative Research

Interviews are the prime tools for acquiring a thorough understanding of a problem (Cohen, Morian and Morrison, 2007), and the numbers of participants for this purpose are generally small, especially for the scenarios where the data is collected through more than one tool (Baker and Edwards, 2012). A study by Mason (2010) indicates that the number of participants in PhD research has been as low as 1 interviewee or as many as hundreds (Mason, 2010). There are three types of interview that are conducted by researchers, namely structured interviews, semi-structured interviews and unstructured interviews. In semi-structured interviews the researcher has the flexibility to vary questions according to the responses of the interviewee (Drever, 1995); however, a theme for this interaction is pre-planned. For our

research work we have adopted semi-structured interviews as the mode of interaction and investigation.

Interviews

Interviews were conducted with students and teachers according to the standard procedure of scientific research methods (Appendix B). Ethical consent for this activity was obtained from the department. Objectives for the interviews were clearly laid down, and questions for the semi-structured interviews were devised. Students and teachers were contacted and were requested to participate in the research by sparing some time for the interviews. Upon their agreement for the participation, dates and venues were finalized. These interviews were conducted with students and teachers at the University of Warwick. The number of students and teachers interviewed were 11 (9 students and 2 teachers) These interviews were aimed at addressing research question number one i.e. **RQ1** (See Chapter 1).

3.3. Analysis

In the following sub-sections we present analysis conducted on the information collected through quantitative and qualitative research methods.

3.3.1. Analysis of Quantitative Data

Data collected through tools such as questionnaires were analyzed using SPSS software. Before using SPSS, the questionnaire data was downloaded from the Warwick University web server. After downloading the data, it was coded (in numeric form) to provide accurate results. Since the focus of this research is on the referencing practices by students, especially those in Computer Science, therefore data from the students and teachers of Computer Science were

analyzed. At the same time, another group of students and teachers was analyzed for the purpose of comparison.

We will now present the analysis of each questionnaire and the results obtained. Further, we will determine whether the results obtained answer our research questions appropriately or not.

Analysis of Students Questionnaire

The objective for gathering of data from students through the questionnaire was to gain answers to some of the issues stated within the first sub question of the first main research question (**RQ 1.1** in Chapter 1). Thus we aimed to get answers to the following points.

1. Do students understand the purpose of citation and referencing?
2. Do students consider citation and referencing as an important activity?
3. Do students attend technical writing skill courses to know and understand citation and referencing skills?
4. From the students' perspective, are the teachers/instructors providing feedback about the citation and referencing effort put in by the students?
5. Are students aware of referencing style?
6. Do students use reference management tools?

Participants

A total of 699 students responded to our questionnaire, of which 23% were female and 77% respondents were male. The age limits of the respondents were between 18 and 64; however, the majority of students were aged between 18 and 33 years, as indicated in Figure 3.1.

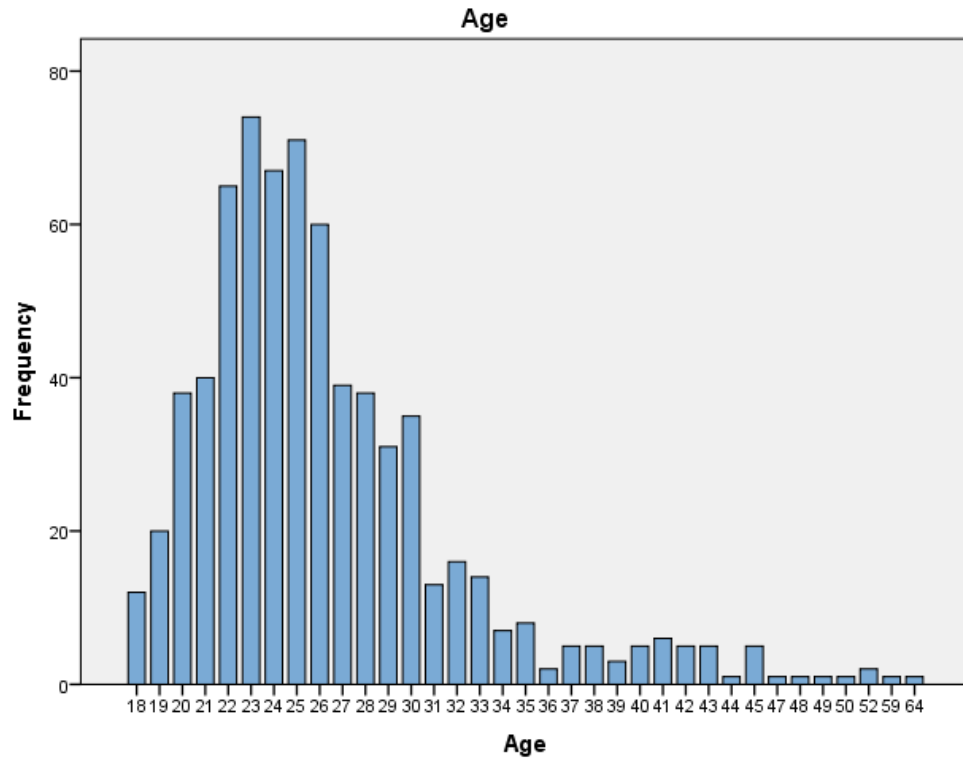


Figure 3.1: Age Distribution of Students

The majority of students who responded were from Management Sciences and Computer Science, followed by Finance students. The remaining students were from other disciplines, as indicated in Figure 3.2. This figure (Figure 3.2) further illustrates the distribution of students by discipline. Of the 699 respondents, 245 were from the domain of Computer Science domain, and 275 students were from the domain of Management Sciences

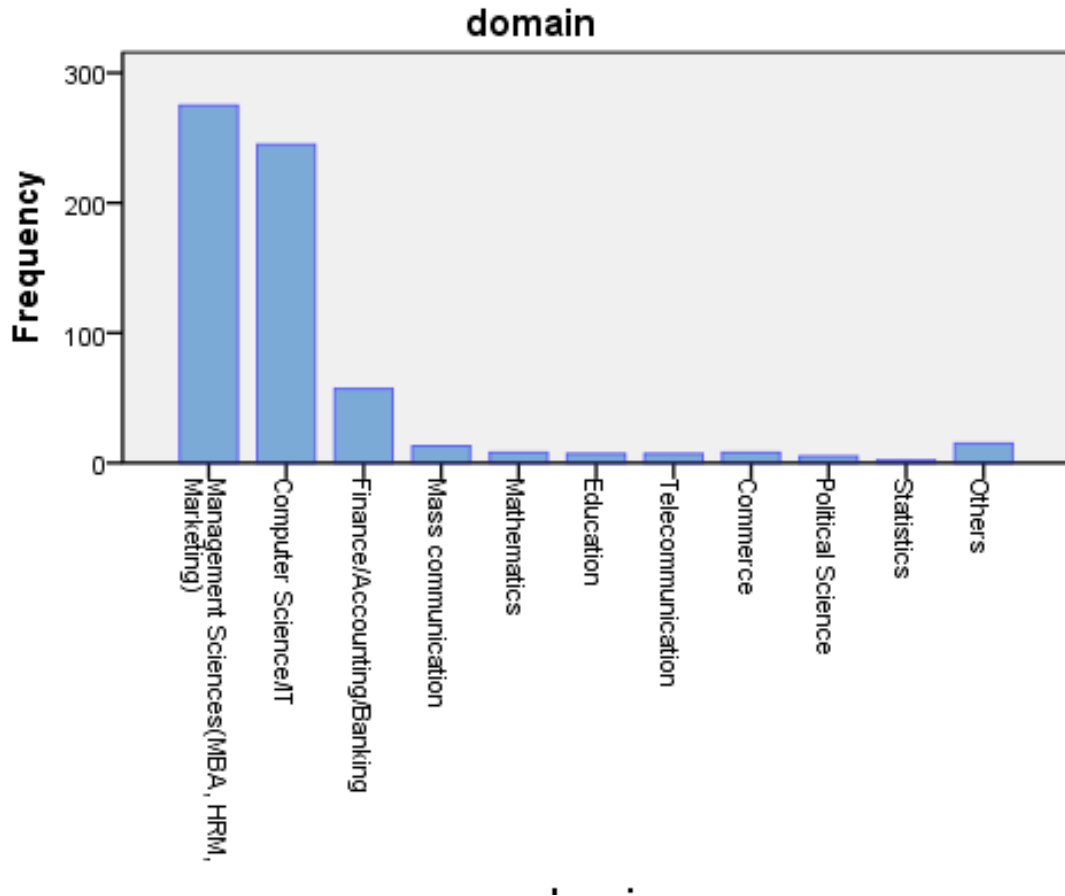


Figure 3.2: Subject Distribution

In this section we analyze the responses of the students of Computer Sciences to the questionnaire. Furthermore, responses from students of Management Sciences are analyzed for comparison purpose. These questions are mapped onto our six major enquiries or objectives i.e. for each objective of the questionnaire as set of questions are asked. In addition to the domain of knowledge, we have also looked into the level of education i.e. undergraduate or postgraduate. During the analysis, we have also endeavored to highlight the dependencies of the responses on the level of education, as well as on their domain of study. For this, we have used chi-square tests and determined the dependences of the variables.

Students' Understanding Regarding the Purpose of Citation and Referencing

To gauge the level of understanding of students regarding referencing and citations, seven questions were asked. For the students of Computer Science it was found that 47% of the students did not know the meaning of the terms "reference" and "citation". 44.5% of the students either did not know or disagreed with the fact that referencing and citation are used to avoid plagiarism. 56.7% of the students agreed that references can be provided to give credit to the source of knowledge while 43.3% were either not sure or did not agree with this statement. However 71.3% of the students did agree that they cited references to support their work. 51.8% of the students thought that they did provide references to get good grades. 61.2% of the respondents stated that they provided references so that the reader of their work can (could) go and read the original contents of the referenced article. The conclusion drawn from the above statistics is that a substantial majority of Computer Science students, i.e. more than 40%, are not clear about the purposes of references and citations.

For the students of Management Science, data from questionnaire indicates that 33% of the students did not know the meaning of the terms "reference" and "citation". 39.6% of the students either did not know, or disagreed with the fact that referencing and citation are used to avoid plagiarism. 70.1% of the students agree that references can be provided to give credit to the source of knowledge. However 78.1% of the students agreed that they cite references to support their work. 56% of the students thought that they provide references to get good grades. 67.63% of the respondents state that they provide references so that the reader of their work can go and read the original contents of the referenced article.

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A chi-square test was conducted to determine if each of these responses was dependent on the level of study and domain of knowledge. This information, along with the percentage of responses, is indicated in Table 3.1 below.

#	Question	Computer Science % (strongly Agree/Yes)	Management Science % (strongly Agree/Yes)	Dependency on education level	Dependency on subject
1	Do you know what is meant by references and citations	53%	67%	Yes	Yes
2	References are cited in the submitted work to avoid plagiarism.	55.5%	60.3%	No	No
3	References are cited in the submitted work to impress the reader about your knowledge	52.7%	56.4%	No	No
4	References are cited in the submitted work to give credit to the originator of the idea	56.7%	70.1%	Yes	Yes
5	References are cited in the submitted work to support your idea or work	71.3%	78.1%	No	No
6	References are cited in the submitted work to get good grades	51.8%	56%	No	No
7	References are cited in the submitted work so that the reader of the submitted work can read the contents of the cited reference	61.2%	67.6%	No	No

Table 3.1: Students' Understanding the Purpose of the Referencing Task

The overall picture in Table 3.1 does not show any marked dependency of the understanding of the purpose for referencing on the level of education and the domain of knowledge (5 out of 7 responses indicates no dependency). Response to question no. 1 and 4 indicates that Students of Management Science have slightly better understanding of the purpose of referencing as compared to the students of Computer Science. This fact was also

indicated by the results of chi-square test (Table 3.1). Similarly for these two questions responses are dependent on the level of study; post graduate have little better understanding as compared to undergraduate students. On average 40% of the sample population was not aware of the purpose of references and citation. Thus, there is a need to inculcate the purpose for the references and citation among students at higher education institutes.

Do Students Consider Citation and Referencing as an Important Activity?

The next issue was to determine if students of Computer Science are aware of the importance of references and citations. Nine questions were put to the students in the given questionnaire to get answers. 54.7% of the respondents from the domain of Computer Science stated that they have never used references and citations in their coursework. This alone is an alarming statistic, as all these students are at various level of education in their respective universities, and indicates that staff members or curriculum developers are ignoring this aspect of skill development. However, those who did use references and citations in their work seem to deem this activity as important. More than 86% of the students who provided references consider this activity (i.e. referencing) as an important part of their assignment. Furthermore, more than 91% of the students that use references in their coursework stated that it is important to have correct name(s) of the author and title of the paper. About 77% of the students thought that putting the edition number of books is important. About 69% of them thought that giving correct page numbers are important while 72% stated that dates are important. More than 64% were of the view that using the correct reference style is also important. Thus, it can be inferred that the students of Computer Science who use referencing in their coursework consider it to be an important part of their study.

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Similarly, data obtained from students of Management Science reveal that 36.7% of the respondents stated that they have never used references and citations in their coursework. Those who did use references and citations in their work seem to deem this activity as important. 91.9% of the students consider this activity as an important part of their assignment. Furthermore, 95.4% of the students who used references in their coursework stated that it is important to have correct name(s) of the author and 94% considered correct title of the paper as important. 78% of the students thought that putting the edition number of books was important. 73.5% of them thought that giving correct page numbers are important while 70.7% stated that dates are important. 79.9% were of the view that using the correct reference style was also important. Table 3.2 summarizes the above findings. A chi-square test was conducted for each question to determine the dependency of the response on educational level and domain of study.

#	Question	Computer Science % (Very Important-Important/Yes)	Management Science % (Very Important-Important/Yes)	Dependency on education level	Dependency on subject
1	Have you ever cited reference in your submitted work?	45.3%	63.3%	Yes	Yes
2	How important is reference citation in your submitted work	86%	91.9%	Yes	Yes
3	While citing a reference, how important is it to write the correct name of the author of the cited reference?	91%	94.5%	Yes	Yes
4	While citing a reference, how important is it to write the correct title	90.2%	96.3%	Yes	No
5	While citing a book reference, how important is it to write the correct edition number of the cited book?	77%	78%	No	No

6	While citing a reference, how important is it to write the correct page number.	69%	73.5%	No	No
7	While citing a reference, how important is it to write the correct date.	72%	70.5%	No	No
8	References are cited in the submitted work to get good grades	51.8%	56%	No	No
9	While citing a reference, how important is it to use the required citation format/method/style?	64.4%	79.9%	Yes	No

Table 3.2 Importance of References and Citations

Responses to six out of nine questions were independent of the domain of knowledge; however, responses to five questions indicated that their responses are dependent on the level of education. Postgraduate students have a better understanding about the importance of referencing as compared to the students of undergraduate. Critical information to note is that only 45.3% of the students studying Computer Science are asked to do referencing while 54.7% of the sample population is not asked to cite references. From the 45.3% of students who use reference, on average 75% are aware about the importance of this task. However if we consider the entire sample population from the domain of Computer Science, only 33.75% of students know the importance of this activity. In comparison, students of Management Science are slightly more aware of its importance.

Attending Technical Writing Skill Courses

To achieve the third objective, we asked students if they had ever attended any academic writing course or workshop/session. More than 58% of the students of Computer Science stated they had never attended any session/workshop or course in this regard. This information alone is sufficient to highlight the fact that educational institutes are lacking in equipping their students with the necessary skills of referencing and citation. More than 69% of

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students from Management Sciences stated that they have never attended any formal training/workshop to learn about the skills of references and citations, thus re-enforcing the information about lack of training session. A chi-square test indicates that training sessions attended are not dependent on level of education, whereas training sessions received by the students are dependent on domain of knowledge. Interestingly, the majority of students from the domain of Computer Science state that they received formal training for references and citations, while the majority of students from other discipline stated that they did not receive training on referencing. Hence, we can safely say that students of Computer Science are likely to be better prepared to perform well at this activity; however, surprisingly, they are not well prepared.

Feedback from Teachers/Tutors

The next question was about the feedback received by students from their tutors/staff members. 53.2% of the students state that they receive positive feedback about their referencing and citation work. 42% of the students who use references/citations in their work state that they do not get grades for their referencing task or get them rarely. It is important to note here that all the respondents of the questionnaire were enrolled in taught courses only, and not in research. Responses to these questions indicate that about 50% of the participating students who cited references did not get regular feedback or regular grades for their referencing activity.

For students of Management Science 51.6% stated that they receive positive feedback about their referencing and citation work. 47.3% of the students who use references/citations in their work state that they do not get grades for their referencing task or get them rarely.

Table 3.3 indicates the percentages as well as the dependency of responses from students of different education level as well as domain of knowledge.

#	Question	Computer science % (Very Often- Often)	Management Science % (Very Often- Often)	Dependency on education level	Dependency on subject
1	How often do you get positive feedback/remarks for references and citations	53.2%	51.6%	No	No
2	How often do you get grades for the references and citations in your work	58%	52.8%	No	No

Table 3.3: Feedback and Grading

Table 3.3 indicates that the feedback received by the students on the reference skill is independent of the level of study, as well as of domain of knowledge. This indicates that a substantial section of students did not receive feedback and/or grades for their referencing skill. Effort needs to be placed on improving this mechanism.

Awareness of Students Regarding Referencing Style

Referencing style is an important aspect of referencing. Different domains of knowledge have their own referencing style and it is necessary for the students to follow these styles. Next, we tried to find out whether students of Computer Science are aware of different referencing styles. 73.85% of the students stated that they do know that there are different referencing styles, while 26.1% stated that they do not know about it. This indicated that the majority of Computer Science students from the sample population were aware of reference styles. 75.5% of the students from Management Sciences stated that they do know that there are different referencing styles.

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The responses are dependent on the level of study as indicated by a chi-square test. Students of postgraduate level have higher percentage of awareness about reference styles than the students at undergraduate level. This aspect of awareness is not dependent on the domain of knowledge.

Use of Reference Management Software

As discussed in Chapter 2, reference management software is available in the market to facilitate the management and generation of references. Some of these systems are free, and can easily be used by students. To determine if students are aware of such software and if they use them in their coursework, two questions were asked about it in the questionnaire. From the responses received, it was found that 53.54% of the students from the domain of Computer Science were not aware of the existence of reference management software. Thus a gap existed between the existence of the tool and its awareness among students at higher level of education. 38% of all the students who responded to this question stated that they have used reference management software, while the rest of the students have never used any reference management tool. For the domain of Management Sciences 58.2% of the students were not aware about the existence of reference management software. 35.5% of all the students who responded to this question stated that they have used reference management software. Chi-square test revealed that the responses to these questions are neither dependent on the subject (Domain of study), nor on the level of education.

Before we proceed to the next section, it is important to note that through the data collected from both the universities (Virtual University and University of Warwick), it is evident that students from these universities consider references and citations as an important task. However, 50% or less percentage of students from these universities received any formal

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training sessions. Regarding the purpose of referencing, sample data has indicated that students of Warwick University have better understanding than the students at Virtual University. More than 80% of students from University of Warwick stated that the purpose of referencing is avoiding plagiarism and providing credit to the originator of ideas as compared to 60% response from the students of Virtual University. Regarding the feedback to students on referencing, the data collected through the questionnaire has indicated that 52% of students from Virtual University stated that they receive feedback as compared to 18% of students from the University of Warwick who stated that they received feedback.

Result

The above analysis highlights the fact that the practices of referencing — as well as its perception among students — is not specifically dependent on the education level and domain of knowledge. This supports the information received through the literature review in chapter 2 — i.e. that errors in references and citations occur in all academic writings by authors from a variety of domains and geographical locations. Hence, it is indeed a global issue and needs rethinking in terms of providing education for this aspect of study. One of the issues highlighted for referencing during the analyses of this questionnaire is the low rate of training of students for this work. Furthermore, many students have never cited references as their teachers did not ask for them to cite (informal training). The current practice of providing feedback and grades for this task is also not sufficient. These answers help us in resolving and answering our first major research questions in general and specifically the first sub-question of this main question (**RQ1.1** in Chapter 1).

Analysis of Staff Questionnaire

The purpose of gathering information through the staff questionnaire was to take into account the teachers' perspective on erroneous references/bibliographies of students' work, and to determine and highlight the factors that they think cause such errors to creep into the reference lists and citations for the undergraduate and postgraduate students. Answers to the following questions helped us in answering the second sub-question and third sub-question for the first major research question (**RQ1.2.** and **RQ1.3.** Chapter 1):

1. Do Staff/teachers create interest and awareness for the activity of reference citation?
2. Do Staff/teachers provide feedback about the citation and referencing work of the students?
3. From the teachers' perspective, what are the reasons for errors in students citing and referencing activity?
4. How often do students commit errors in citation?
5. Are students encouraged by teachers to avail Software such as Reference Management Software for citing references?
6. Are teachers using the reference management software for their own work?
7. Is technology (Software and hardware) available to facilitate teachers in creating awareness about reference citation among students?
8. Are teachers aware of the existing technology i.e. software and hardware (if any) to support assessment and feedback activity for reference citation by students and are teacher using the technology (if available) to provide feedback and assess students referencing and citation activity?

Participants

A total of 20 staff members responded to our questionnaire. The majority of the respondents were from the domain of Computer Science (40%) followed by staff members from Statistics, Mathematics, Management Sciences, English and Physics — as indicated in Figure 3.3.

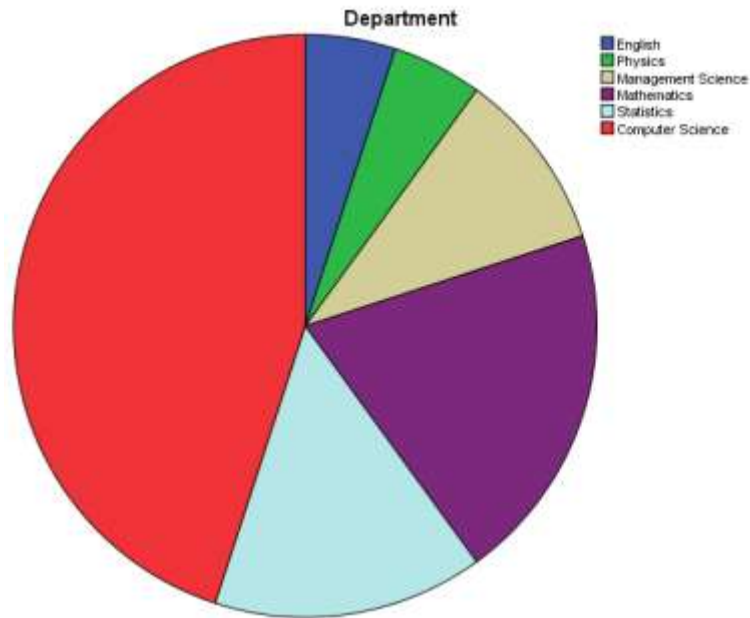


Figure 3.3: Subjects Taught by Teachers

Nearly 24% of the staff members were female and 76% respondents were male, with experience of teaching ranging from 6 months to 42 years, as indicated in Figure 3.4. In this figure, information along x-axis indicates the number of years and the information along y-axis indicates the number of teachers.



Figure 3.4: Teaching Experience

The staff questionnaire was aimed to answer our second sub-question of the first main research question (**RQ1.2** in Chapter 1). During analysis of teachers' response, we will focus on the teachers of Computer Science; however, data obtained from teachers of other faculty are also analyzed for comparison.

From the data collected, it was found that six respondents never gave any assignment or coursework that required referencing and citation. This fact alone is in-line with our findings that more than 40% of students studying in universities are rarely required to enter references in their coursework. The following subsections analyze the responses to determine if the objectives of the questionnaire were met and whether we have been able to answer our research sub-questions 2 and 3 of the first major research question (**RQ1.2** and **RQ1.3** in Chapter 1).

Creating Awareness and Interest

To continue a legacy of using scientific methods in research and development, it is necessary to equip our students with this task. The purpose of academia is to provide all the necessary information and practice opportunities to its students so that they are able to develop

and enhance new and existing knowledge, and to put these skills into practical world. Thus to determine if the teaching staff are endeavoring to provide these skills to the fresh and inquisitive minds of today, we asked teachers how often they try to create students interest in referencing during their lectures and discussions. 37.5% of Computer Science teachers responded to this question. Of these 37.5% teachers, 66% said they do it “quite often” while other Computer Science teacher said “occasionally”. Thus only 25% of the sample Computer Science teachers said that they try to create awareness and interest about referencing among the students of Computer Science. Teachers from the other domains did not respond to this question. This low response to our question indicated that teachers themselves are not interested in creating interest and awareness of the task of referencing.

However when asked if they required students to provide references in their coursework, the majority of teachers said they did. To determine the interest and awareness about referencing by students we asked teachers how often their students asked for help regarding referencing and citations. 12.5% teachers of Computer Sciences stated that their students come to them for help in referencing “quite often”, while 50% Computer Science teachers stated “occasional” to “very seldom”. 20% teachers from Non Computer Science subjects (Mathematics/Statistics/Management Science) stated that that their students come to them for help in referencing “quite often”, while 60% teachers stated “occasional”, “very seldom” to “Never”. Statistical tests indicated that this behavior is independent of the domain of knowledge. This might indicate that students do not have any issues regarding references, or they are not interested. However, interviews with students and through analysis of their documents, it is clear that students do have issues regarding referencing and their reference lists have errors in them.

Thus, we may infer from the above answers that teachers need to generate more interest and awareness in the importance of this work among students in higher education institutes.

Feedback about Citation and Referencing Work

Feedback is a very important aspect of education. Here we strived to determine if the feedback is provided sufficiently to the students or not. For this reason we asked two straight forward questions; *“how often do they provide feedback to students on their reference lists?”* and *“how often do they provide grades?”* Responses were in-line with those from the students questionnaire as 40% of the Computer Science teachers who responded to this question stated that they provide feedback “very” to “quite often”, while 60% stated that they provide feedback “occasionally” to “very seldom”. Majority of non-computer science teachers; however, , responded by stating that they provide feedback to their students “quite often”. Regarding the grades, 20% of the Computer Science staff stated that they provide grades for the task of referencing “very” to “quite often”, while 80% of the teachers stated that they either provide grades “occasionally” or “never”. This percentage is higher for teachers of management sciences and statistics subjects.

These results indicate that effort needs to be placed by the teachers of Computer Sciences on providing either summative or formative feedback to students.

Reasons for Errors in Students’ Referencing Activity

As may be seen from Figure 3.4, the teaching experience of the staff members is extensive. Hence based on their teaching experience we wanted to get some answers regarding the reason for errors in students’ reference list. Table 3.4 shows the responses from teachers of

Computer Science, to the questions asked to get answers to the sub questions of first major research question (**RQ1** in Chapter 1)

#	Question	% (Strongly disagree/ disagree)	% (Neutral)	% (Agree/Strongly Agree)
1	Students commit errors in reference and citations because it is a very complicated/difficult task for them to understand.	62.5%	0%	37.5%
2	Students commit errors in references and citations because they do not have sufficient resources	62.5%	0%	37.5%
3	Students commit errors in references and citations because they are not aware of the importance of this activity.	25%	0%	75%
4	Students commit errors in references and citations because they have not studied any course/module, such as technical writing skills	37.5%	0%	62.5.3%
5	Students commit errors in references and citation because they assume that no one reads it.	25%	25%	50%

Table 3.4: Reasons for Errors in Referencing and Citations

Table 3.4 provides a picture of what the respondents of questionnaires from the domain of Computer Science think about students’ erroneous references. 75% of staff members are of the view that students do not consider referencing as an important activity, indicating that major percentage of staff members are of the view that student don’t think it as an important part of their study. This view is also confirmed by responses to open ended questions within the questionnaire. 62.5% of teachers disagreed that referencing is a complicated concept for students to master, and that students have sufficient resources for understanding and performing this activity. However, 62.5% of the respondents from the domain of Computer Science agreed that a reason for errors in referencing could be that students have not studied any formal course or training session to acquire this skill, with 50% of the respondents also

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saying that students are of the view that no one will read their reference list. These are interesting responses, and highlight the need for formal training for referencing and citations. It also implies that teacher should provide regular feedback to the students for this activity else the students will think that no one reads it, and hence, will not care to remove any errors or ambiguities in their referencing task (This answers our question **RQ1.2.2** given in Chapter 1)..

Responses from the teachers of Mathematics/Statistics/Management Sciences are similar, since 60% of staff members are of the view that students do not consider referencing as an important activity. 70% of teachers disagreed that referencing is a complicated concept for students to master. 80% teachers are of the view that students have sufficient resources for understanding and performing this activity. However, 40% of the respondents agreed that a reason for errors in referencing could be that students have not studied any formal course or training session to acquire this skill, while 40% remained 'neutral'. Furthermore 40% of the respondents also saying that students are of the view that no one will read their reference list, and 40% of the respondent remained neutral.

Answers to questions number 3, 4 and 5 (Table 3.4) are of prime importance, and lead to some issues in our teaching mechanism for this task.

How Often do Students Commit Major Errors in Referencing

The main purpose of gathering information about students' trend in producing errors in references is to verify the results obtained through the literature review and document analyses, as well as to determine how vigilant teachers are in this respect. The following table indicates responses of teachers from the domain of Computer Science.

#	Questions	% (Very Often/Quite	% (Occasionally/Very
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		Often)	Seldom)
1	How often do/did the students provide incorrect author names while citing and listing the references in their submitted work?	20%	80%
2	How often do/did the students provide incorrect page numbers of a paper/book/report while citing and listing the references in their submitted work?	40%	60%
3	How often do/did the students provide incorrect titles of the papers/books/reports while citing and listing the references in their submitted work?	20%	80%
4	How often do/did the students provide an incorrect volume number of the journal from which the paper is cited in their submitted work?	20%	80%
5	How often do/did the students provide an incorrect date of publication of the papers/books/reports of the cited reference in their submitted work?	20%	80%

Table 3.5: Frequency of Errors

Table 3.5 highlights a very important point — for all errors mentioned, the majority of teaching staff in the domain of Computer Science indicate that these errors occur either “occasionally” or “very seldom”. Document analyses of the students’ work during this study, as well as the literature review, has indicated that certain errors are committed more often than others. These responses lead the researcher to the conclusion that teachers are not aware of the types of error made by their students in referencing lists and bibliographies. This indicates that teachers need some assistance for checking students’ referencing activity. Responses from the groups of mathematic/statistics and management sciences indicate similar responses..

Usage of Reference Management Software by Teachers and Students

As is evident from the information in chapter 2 of this thesis, Reference Management Software is of great help in generating good reference lists and bibliographies. We asked teachers if they use these tools and whether they encourage their students to utilize them. The responses were

interesting, with 80% of Computer Science staff members/teachers stating that they did use Reference Management Software to manage and develop their references. 20% of the teachers stated that they never use these tools. In regards to students' usage of this tool, 80% of the staff stated that students use Reference Management Software(RMSs) "occasionally" to "very seldom", while the rest of the teachers are of the view that students never use these tools for referencing. It was further indicated from the responses of teachers that only 20% of the Computer Science teachers encourage students to use these tools while the rest of them either never encourage them to use RMSs or do so rarely(80%). An interesting factor to note is that while 80% of Computer Science teacher use reference management system themselves, they do not encourage their students to use it.

These responses show a lack of interest by the teachers in Reference Management software (RMS) tools. These could be due to their lack of confidence in these tools or a lack of interest in the task of referencing and citations. On comparing the group of teachers from mathematics/statistics and management sciences, it was found that all the respondents from mathematics/statistics use reference management system while all the teachers from Management Sciences said they never use it. Within this group, 71.4% of the teachers are of the view that their students also use RMS. 42.8% of teachers stated that they encourage their students to use RMS often, while the remaining staff members do so "occasionally" to "never".

Existence of Support to Create Awareness about References and to Provide Feedback for Referencing

We were interested to know if the teachers were aware of any additional support available to help them to impart knowledge of referencing to their students. At the end of the questionnaire we asked if they ever directed their students to online tutorials and guides for

referencing exercises. Only 37.5% from the domain of Computer Science responded to this question. 66% of them said that they do guide their students to these sites “quite often” while one said “Very Seldom”. When asked if they were aware of any software or other technology available to facilitate them in providing feedback to their students, only 37.5% staff members from the domain of Computer Science chose to respond to this question; however, they all stated that they are not aware of such a facility. Faculty members from other groups did not choose to respond to these questions at all and left them blank indicating their disinterest in providing information to students about referencing and citations through electronic mode.

The above responses further indicate that although there are tutorials available for students to enhance their knowledge of referencing, there is no facility for the teachers to provide feedback to students on this task. Hence there is a need to help and facilitate teachers in providing feedback to students for referencing.

Result

As a result of the above analysis it may be seen that the majority of teachers in the domain of Computer Science as well as non-computer science agreed that the reason for errors in referencing by students is due to the lack of any formal training sessions as well as their (students) perception that no one looks at this work, furthermore students do not consider this as an important task. At the same time teachers are of the view that this is an easy task and students have ample resources to cite from. 40% teachers of Computer Science stated that they provide feedback regularly while rest of the teachers from this domain stated that they are not regular about it. Staff members from the domains of mathematics/statistics and management sciences were of the view that they provide feedback to students about referencing on regular basis. This analysis also indicates that very few teachers (15% of the total respondents) tried to

create interest about referencing among their students. This percentage was 25% among teachers of Computer Science while teachers from other domains refrained to respond. Thus from this analysis we can infer that in order to improve the quality of references and citations we need to have training sessions for students at higher education. Furthermore teachers should provide regular feedback and support students by creating their interest in this area and acquaint them with any automated solution, such as reference management software,

Analysis of Students' Documents

Content Analysis of students' documents are a rich source for verifying and determining the trend, frequency and type of errors that creep into the reference lists of undergraduate and postgraduate students. Information collected through this process helped in answering first research question.

Data Collected

To achieve the above objective, a total of 14 documents were collected. These documents comprised undergraduate project documents as well as academic papers and thesis chapters from the current work of postgraduate students. 10 documents had reference list in them. 142 references were analyzed in the footnotes, reference list and bibliographies within these documents. The collected data is analyzed as follows.

Categories of documents accessed for referencing

While analyzing the errors in referencing, we are able to categorize the referenced documents into two broad categories:

1. Internet based information.
2. Non internet based information

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Statistical analysis in the form of a chi-square test and likely hood ratio test indicate that there is a great dependency between the level of education and the type of resources accessed by the students, with a chi-square value of 83.433970 (at $p = 0$). Similarly, the likely hood test value is 97.8 at ($p= 0$). We will now present some of the findings during our analysis for both the categories of referencing sources mentioned above.

Internet Based Information

From the broad category of internet resources, it is interesting to determine which type of source is cited most. From the documents analyzed, the following forms of internet information sources are identified:

1. Online tutorial/lessons
2. Websites
3. E-Journals
4. eBooks
5. Online user manuals/guides
6. Online articles
7. Online encyclopedias
8. Online white papers
9. Online conference proceedings
10. Online doctoral dissertations, M.Sc. dissertations and project reports (academics)
11. Seminar presentations available online
12. E-Documents (e.g. e-reports by Microsoft, Parliament bills, patent documents etc.)

From the above list, it is evident that the confidence in online information of those students, whose academic documents are selected, is substantial and they visit these types of

information source sites often to gain knowledge and understanding of their desired domain.

Figure 3.5 shows the percentage of various internet resources cited in the given documents.

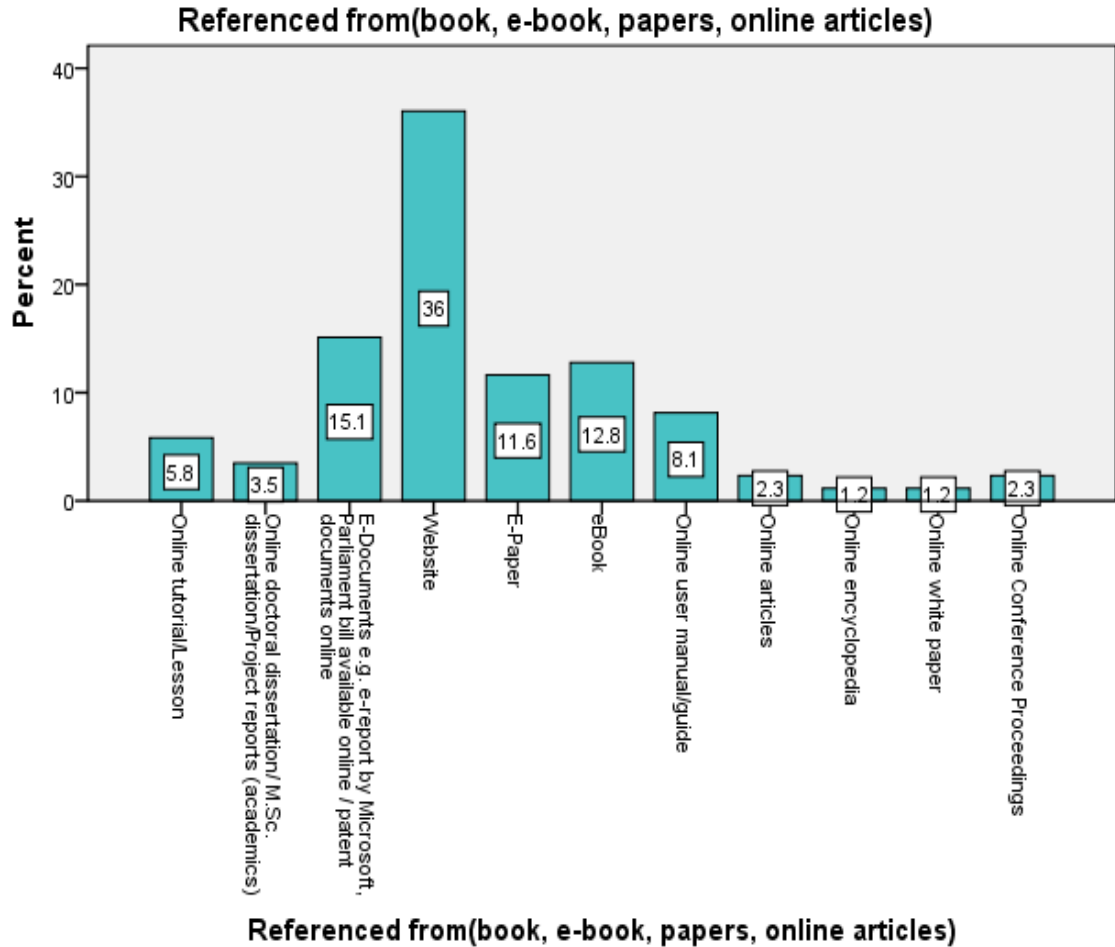


Figure 3.5: Reference Sources

Figure 3.5 indicates that the type of resource referred most is website, followed by e-Documents, eBooks, e-Paper and so forth.

The trend of using the internet as a major source of information is greater in the undergraduate students, as compared to the postgraduate students. Figure 3.6 shows the various types of internet sources used by postgraduate and undergraduate level students:

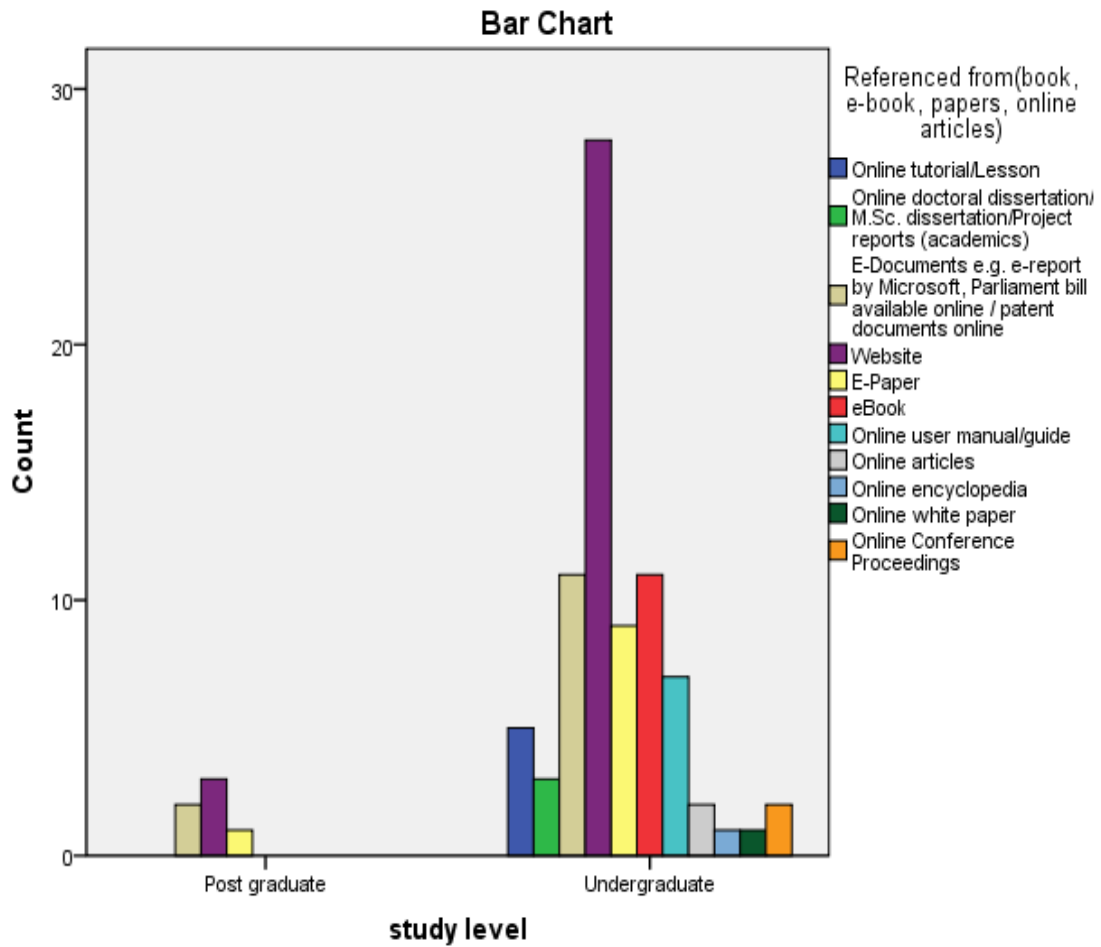


Figure 3.6: Favorite Online Sources

Figure 3.6 indicate that the postgraduate students have referred to e-Documents, e-Papers and websites, whereas undergraduate students tend to mainly refer to websites, followed by e-Documents, eBooks, academic papers and so on.

Non internet Based Information

Non internet based sources of information are generally traditional ones. From the analysis of the given documents, information is retrieved from:

1. Books
2. Chapters in the book

3. Academic paper from journals
4. Documents/Articles

The majority of postgraduate students were found to be using offline sources for information retrieval (90%), as is shown in Figure 3.7.

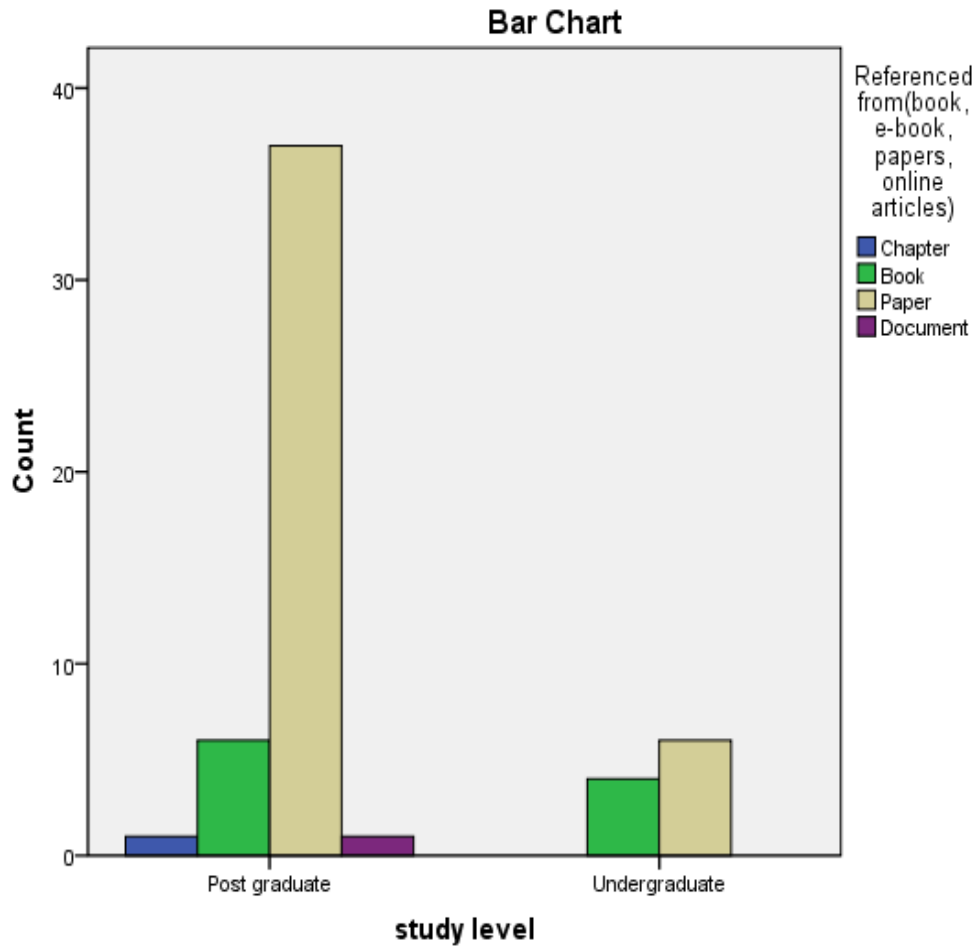


Figure 3.7: Favourite Reference Sources

Figure 3.7 also indicates that the trend of referencing for, both undergraduate and postgraduate student is, from papers within various journals followed by referencing from Books, etc.

Rate of Error

As this is the world of cyberspace, information access and retrieval through this mode is becoming exceedingly popular. Therefore, our first investigation was about the extent to which this phenomenon has penetrated into reference citation activity of students. From the data collected by analyzing work of undergraduate and postgraduate students, it is seen that 58.9% of the students use data directly from the internet, such as websites or documents from the internet, whereas 41.1% still rely on data in journals and books. However, the majority of students (considering undergraduate as well as postgraduate level) did not use the term '[Online]' to clarify this point as directed in the referencing style.

None of the postgraduate students and only 25.26% of undergraduates used the term '[Online]' , indicating a need to educate students to this aspect of citing.

From this result, we may hypothesize that there is a dependency between the level of study and the usage of internet based documents. For this reason, a chi-square test of independence is used on the two nominal datasets to obtained a result of 89.2 ($p = 0$) at $df = 2$. This indicates that there is a strong dependence between the level of study and the usage of internet based documents.

From the given data, it may be seen that errors in the authors' name in given references is 11.9%. We hypothesize that there is a dependency between the variables "level of study" and the errors in authors' name/number field. However after calculating the chi-square value, it is found that there is no dependency between the two nominal variables, with a chi-square value of 0.19 ($p < 0.66$) at $df = 1$.

Next we looked at the error rate with writing the date in the reference field. It is calculated from the given data that 12.1% of references contained in the documents (combining

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the documents from undergraduate and postgraduate students) contained errors. Furthermore, this is independent of the study level, as is evidenced by calculating the chi-square value i.e. 0.31 ($p < 0.53$) with $df = 1$. It is interesting to note that 70% of the students made this error in their referencing task. The errors identified for this field are:

1. Name of author/organization/website not given
2. Name of author or organization partially missing (e.g. first names Initials not provided)
3. Incorrect format for authors' names
4. Missing names of authors in a given list, thus not providing the required acknowledgement to all of the authors

The next field analyzed was that of "date of publication", which is a mandatory field in the reference list. 12.1% of references had errors within this field. 9.4% of such errors were detected in the work of postgraduate students, while 13.3% were detected in the work of undergraduates. Issues in this field, as identified from the given data, involve missing dates (including a failure to write "n,d") and incorrect dates.

The title of a paper or a book is an essential field in the reference. Considering the title field for the given data, it was found that 11.3% of references contained errors. However, interestingly, the rate of this error was higher amongst postgraduate students (19.3%) than undergraduate students (6.4%). A chi-square test gave a value of 7.05 ($p < 0.029$) at $df = 2$, indicating that the two variables are dependent. 30% of the students made these errors, although the frequency of such errors varied from student to student. The following errors were identified for such errors:

1. Spelling mistakes

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2. Partial titles
3. Missing words in the titles
4. Incorrect words within the title

The next part that we analyzed was the title of the journal/website/conference/book. Errors were detected in 11.8% of the references. However, no errors were found in the work submitted by postgraduate students (i.e. 0% error). A chi-square test indicates that there is indeed a dependency between the two nominal variables, as the value of 19.1 ($p = 0$) indicates. 30% of the students were found to have made this error, with the frequency of such errors being up to 7 in a document. Errors in this field may be classified as:

1. Not provided
2. Some information missing
3. Formatting problem such as journal/conference name written in capital letters

The volume number is an important field in helping the reader retrieve the correct article. 42.5% references of all the references required a volume number – however, 25.4% of these references contained errors. A chi-square test revealed that there is a dependency between the level of study and the errors within the volume number, (chi-square value = 45.2 — $p = 0$). 50% of the students made errors in this field. Some students made this error up to 6 times in a document. The only problem identified by this type of error is where authors do not mention the volume number of the journal in which the referenced paper is published.

Similarly, the issue number of a journal is equally important to retrieve the source of the reference. However, out of the 39.5% of references that required an issue number, 40% contained errors. A chi-square test reveals that there is a dependency between the level of study and the number of references missing the issue number (value of chi-square = 45.2 — $p =$

0). It is worth mentioning that the majority of these errors were detected in the work of postgraduate students. One explanation for this is that the majority of postgraduate student cite references from journals. 50% of the students were found to have made this error, with a frequency of up to 11 times. From the analysis of the documents, two issues were recorded; incorrect issue number and missing issue number.

The page number is also an important piece of information for retrieving data. However, out of the 46.7% references that were required to mention page number, 33.8% contained errors. A chi-square test revealed that there is a dependency between the level of study and errors within the page number (value of chi-square = 49.7 — $p = 0$). 50% of the students were found to have this error in their documents with the frequency of this error in a document being up to 8. From the analysis of the documents, two issues were recorded; incorrect page numbers and missing page numbers.

For all the references that are cited from the internet, it is mandatory to state the date on which the information was retrieved. 56.2% of the total references were from the internet of which 40.21% did not contain the date of retrieval. A chi-square test indicates that the study level and the error in information retrieval date from internet are dependent on each other (chi-square value: 75.29 — $p = 0$). 60% of the students made this error, with the frequency of error up to 19 per document.

From the analysis of the documents at hand, two issues are recorded: date not mentioned and information other than date given, e.g. referencing to some page etc.

For all the references that are cited from the internet, we checked to determine if there was any error in visiting these sites through the given URL. Out of all the references, 55% of them were from the internet of which 14% could not be visited as either the URL had changed,

or they were password protected or just that the URL was not provided. A chi-square test indicates that the two variables (study level and the accuracy of the URL) are dependent on each other with a value of chi-square of 80.33 ($p = 0$). 70% of the students' documents had this error in their reference list. The following issues were recorded for the URL:

1. URL not given
2. Incorrect URL causing a "Page not found" error
3. Partial URL
4. URL is correct but the information taken away from the site
5. URL is correct but the information is password protected and thus cannot be retrieved

Result

The analysis of the students' documents has indicated two main trends. The first trend is in regards to their choices for references, and the second trend is the pattern of errors within a reference list.

A popular source of references for undergraduates whose documents are analyzed is from the internet whereas postgraduates students tend to use traditional hardcopies.

Furthermore, the analysis of documents has indicated that popular references for the internet are websites, followed by e-documents such as e-reports of the organizations (white papers, patent documents, etc.), e-papers, eBooks, online tutorials, user guides/ manuals, conference proceedings, doctoral theses. From these different types of internet resources, postgraduate students are using websites, e-papers and e-documents only.

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Popular offline resources that are referenced are academic papers, books, chapters and other documents (articles, reports etc.). From these resources, undergraduate students referred to academic papers and books while the chapters, article and reports are not utilized by them.

The second aspect of our analysis focused on determining the pattern of errors that are generally made by students. From the documents analyzed it is seen that the percentage of errors in authors name, date and title are around 11.5%. The rate of errors increases for other fields, such as the volume number (25%), issue number (42%), page number (33.8%), date retrieved 40% and URL (14%). This trend indicates that students are paying even less attention to these parts of a reference list.

From this analysis, it may be concluded that the trend of choosing referencing material is changing from traditional hardcopy sources to internet resources. Thus there is a need to provide better understanding of referencing to these sources.

3.3.2. Analysis of Qualitative Data

By analyzing qualitative data, we aim to determine some trends in errors by students while referencing and to determine underlying reason for it. Since semi-structured interviews were designed therefore the approach adopted for analyzing these interviews was deductive/Inductive approach. Deductive approach is a top down approach. This approach is suitable for the research type embedded in the epistemology of positivism. A deductive approach was used to determine interview themes or categories, these themes or categories were derived from the literature review. Any further themes or subthemes were obtained using an inductive approach.

Once interviews were conducted and transcribed, we divided interviews into sentences and paragraphs, and labeled sentences or paragraphs with one of the themes of the interview.

Then, we collected all the individual quotes for each theme and analyzed them again for any further ideas within them. Any further ideas in a theme then formed sub-themes for this interview. This process is termed as “coding” of the interview. In the next stage of analysis we tried to determine how these themes and sub-themes relate to each other. The following sections elaborate on the analysis for interviews with the students as well as with the staff members to highlight salient points.

Analysis of Students' Interview

To clarify and verify some responses from the students in the questionnaires and to gain a deeper understanding of issues about referencing in the academic arena, interviews were conducted with the students (Baker, and Edwards, 2010; Meson, 2010). For our study, we randomly selected 9 postgraduate students. Four students were from Masters level study and five students were at various levels of their PhD research study. These students were studying various disciplines, such as English, Management Science, Manufacturing, Computer Science, Education, Arts and Media, Nursing and Political Science. Since we were not able to interview students from undergraduate level, we made a special effort to seek information about the experience in undergraduate study from all our participants.

A semi-structured interview was designed (Appendix B). Questions were prepared and arranged thematically, to ensure that our research questions were appropriately addressed (See **RQ 1** in Chapter 1). Seven themes were derived from literature review these are: general perception, motivation and experience about referencing, teaching methods, practice of referencing, expectations from teachers, problems while referencing, use of Reference Managements Software and reasons for errors. Reasons for these themes were:

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1. To understand what students' general perceptions, motivations and experience are about referencing;
2. To understand how references are taught in academia;
3. To understand how students choose and manage their references;
4. To understand problems faced by students during this activity;
5. To understand what their expectations are from their mentors in this regard;
6. To understand their viewpoint about Reference Management Software;
7. To understand why they make certain errors.

In the following sections we will discuss each theme, and determine if there is any relationship among them.

General Perception/Motivation/Experience

We wanted to understand the general perception, motivation and experience of the interviewees (for both postgraduate and undergraduate level) about referencing. For this, the following points were raised during the interviews.

1. For how long have you been citing references?
2. How would you describe your experience in this regard?
3. Why do you think students are asked to cite references?
4. What was your motive for providing references in your work?

All participants had different experience regarding referencing. First participant had his first referencing experience 25 years ago. He compared the practices for referencing done 25 years ago and of today, and found the advances to be "phenomenal" and "extremely convenient". He stated that 25 years ago, everything was done manually; it was very time consuming, and access to knowledge was limited. However now it is a "joy" researching and

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developing references. Another interviewee returned to academia after 40 years of professional life. During her earlier study, she had never used any references, she found the experience to be tiring and said she “dread[s] doing this work”. The third participant of interview had returned to the university after 20 years, her first experience with referencing was during a certificate course. She stated that in her current study she feels much more organized than during her earlier experience because she had attended many training sessions during this degree. Three interviewees had training about referencing during their undergraduate study, and one interviewee attended academic writing course before joining post graduate study, they thought that this task is a difficult one to perform and is very time consuming, they did not enjoy it, but it had to be done. Two participants who used referencing during their undergraduate level but to whom no formal training was imparted during that time dreaded doing this task. This indicates that there is direct relationship between experiences of referencing with the perception of this work.

All interviewees agreed that the motivation for using referencing was to prevent themselves from being accused of plagiarism, to give credit to those whose ideas they use in their academic documents and because it was the requirement of their module or degree. Three interviewees who were getting grades for this activity stated that they do referencing to get grades. The majority of the interviewees were of the view that referencing supports their work, and shows the breadth of their knowledge. One of the participants stated that he believes in the “democratization of knowledge”, and thus by introducing the work of the authors as references in his work he actually allows the people in his region of the world to know that this information exists, as they might not know it otherwise. This seemed like an interesting motive, as to him, referencing other work was not just about acknowledging the source of knowledge but will help his region to become aware about new knowledge. Another interviewee stated that she cited

references to keep track of how and where she got the knowledge, so that she may go back and review that information again, if needed.

Two interviewees did not consider this work to be important. One of them said she does not consider it important, since she will never get into research work and thus this knowledge is of less use to her. The other one stated that for her, the contents of the module she is studying is more important than referencing and citations. All the other participants considered it to be an important task for their work. Thus the perception is dependent on the motivation for referencing. Another perception of students regarding referencing is that their teachers do not consider this to be an important part of their study. Six interviewees were of the view that their supervisors/teachers do not consider this task to be important hence do not provide required feedback and guidance for this task. Three interviewees stated that their teachers provide them with grades and guidance indicating that they deem it as an important part of their education.

Thus the perceptions about this skill are dependent on the experience of, as well as motivation for referencing.

Teaching methods

It is of particular interest to identify how each student is taught about referencing skills, since this information may lead us to some of the reasons for erroneous references and bibliographies among the students in higher education. Thus we asked them:

1. Where did you learn to cite others work as references?
2. How was this skill taught?
3. Which style of referencing did you use in your project and why?

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Five participants stated that although they have previous referencing experience at their earlier study level, no formal training was provided for them. Only three students stated that during their undergraduate study, they received formal training of referencing; however seven out of nine students stated that during their current study they have attended session on referencing. This fact indicates that teaching of this skill is not being taken seriously for the undergraduate students. One participant said that she first cited references in her native country of China, but at that time, she was just asked to do in-text citing. During their current masters studies, four out of five students attended an academic writing skills course which introduced them to the skill of referencing however they were never informed about the referencing style they were using or any Reference Management Software tool; a page was simply given to the students with examples on how to cite various types of sources and students follow that style. One of the interviewee stated that she did a three month course in English language and that during this course they were introduced to the concept of referencing, but there was never a mention of reference management software. Another interview from the same class stated that they were given one mock assignment at the beginning of their academic writing course, and during that time, their teacher corrected their reference style and formatting.

Students of PhD study had varied experiences in terms of gaining formal training. One of the interviewees said she had a very comprehensive training about referencing during her Masters study and has attended a few academic writing courses at University of Warwick. Meanwhile four out of five of the students stated that they never had any training on references prior to enrolling onto their current PhD program. Four PhD Students attended some training sessions during their current PhD study which included information about referencing. They had also attended some sessions on reference management software. One participant stated that he

has never been advised to attend any course or training session by his supervisor and hence has no formal training on references. Thus, it seems that comprehensive training sessions on referencing are required to develop expertise in this skill, and this is needed at all levels of education. Furthermore as stated by one of the participant they are not informed as how to site online sources and other sources such as videos and from material in different languages and archival data. Furthermore these training sessions are conducted once during their study period. This information indicates that there is a need to reconsider and update our teaching methodology and contents for referencing and citations.

It is interesting to note that six of the interviewee stated that they used the Harvard style of referencing only because they are expected to do so by their supervisor, and they do not want to learn about any new style. One interviewee stated he uses 'Oxford' style of referencing since no one has informed him which style to use. Two interviewees (who were studying in the department of English) were not aware about the style of references that they were using since they were just copying from a sheet given by their teacher. Thus indicating that during training sessions they were not informed about this aspect of referencing. Thus, there is a direct relationship between the teaching of referencing and the way students practice this skill.

Practice of Referencing

To propose a better mechanism for referencing, it is important to know how it is done in today's world. To gain an insight into this aspect of referencing, the following points were raised during interviews:

1. How do you select and collect your references?
2. How do you arrange your references in your work?
3. What are your favorite sources for references and why?

4. What is your opinion about references from internet?

Very interesting responses were obtained for this aspect of references. Two interviewees stated that they get a list of books from their tutors and they mostly cite from there, and rarely have to look elsewhere. Two of the interviewees stated that they look for the books and journals that are relevant to their assignments. They search for such material through university online catalogs as well as through search engines such as Google, after reading the articles they note important quotes and information which they later embed into their assignments. One of the interviewees stated that initially he started by first reading the relevant material and then starting writing; however, this was an extremely time consuming activity for him so now he first writes and then goes back to search for the material that supports his arguments —by doing so, he says he saves reasonable time. Another interviewee stated that during her first year of study she used to read relevant book, papers and archival data, summarized and tried to use them in her academic documents, but now she first writes and then look for relevant supporting material for her work, both these interviewees never had any prior training sessions and learnt it through experience. However, the rest of the participants do search for relevant books, articles and papers from journals. One of the most widely used source for citations was journals. The majority of participants stated that they note the contents for referencing before starting their work. From this interview, it is also clear that students tend to site from online sites; however, they are not fully informed as how to site online material.

Problems Faced During Citations and Referencing

We also investigated the problems faced by the students during their referencing. This is an important aspect that will lead us toward the solution of this problem. The following questions were asked in this regard:

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1. In your opinion how cumbersome or difficult is this task?
2. Are there any specific problem(s) you face during this activity i.e. selecting, collecting and inserting references in your coursework?

The majority of the participants stated that it is indeed a difficult and cumbersome task, but it has to be done. One participant stated that she did not think it to be an important activity and thus did not put effort into having perfect references, but still she thinks it is a difficult task. Only one participant considered it to be a very easy task in today's modern world due to the availability of resources on the internet for research and reference management systems for managing their references. Since he remembers having an extremely difficult time referencing 25 years ago, he actually enjoys doing referencing.

Upon asking about the problems faced during referencing, participants highlighted the following issues:

Two interviewees stated that they experience difficulty finding page numbers or volume number of the journal for a certain article — especially when the referencing information is taken from online sources

Two interviewees said that sometimes a source that is relevant to their topic does not have enough credentials to be cited; thus, the issue of whether to cite it or not occurs

Four interviewees stated that they have problems managing time as this activity is very time consuming and is often done at the end. One of the interviewees stated that she sometimes leaves an empty space for the in-text references for quotes so that she may add it at the end, but later forgets to do so

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Two interviewees stated that they have difficulty searching sources that are in different languages or are placed in some archival forms.

One participant faced problems with learning how to cite archives, because no one guided her.

Eight interviewees faced problem in formatting references because it is difficult to remember, especially when they are copied from different web pages and are in different formats. Two interviewees who used Reference Management Software stated that errors were introduced due to the software which ended in embarrassment in front of their teachers.

Expectations from their Tutors

Students have some expectations from their tutors when it comes to learning and guidance. In relation to this, we asked following 3 questions:

1. Do you think your teachers could have helped you in a better way to cope with these issues?
2. What is it that you think they could have done for you in this regard?
3. Are you satisfied with the amount of feedback and support you received from your teacher?

Three out of five PhD students wanted more feedback and guidance from their supervisor regarding referencing/citation. The type of guidance required includes guidance about proper formatting for citations and references, and guidance on where to search for relevant material. Masters level students wished their teacher would have provided information about some existing software for referencing/citations, as no one told them. They further wished that their tutors would guide them about the things they did incorrectly. Both Masters

and PhD students wanted their teachers to pinpoint the exact errors that they make so they could better correct them.

Students in Masters degree programs wished for more feedback and support for referencing; however, one participant was satisfied with the attention of their teachers on the references.

Views about Reference Management Software

To elicit views about reference management software the following questions were asked during the interviews.

1. In your opinion how widely is reference management software known by students?
2. What is your opinion about this software?
3. Are there any anxieties associated with utilization of such software?

None of the students at Masters level used reference management software. According to these students they were never informed about this software, and they did their referencing manually. Four out of five PhD students used the reference management software Endnote. Out of these four students, two students seemed completely satisfied with this software while two students stated errors are introduced due to this software. For example:

1. In case of more than one author of a book or paper, the software inserts additional text (e.g. "Inc ltd")
2. For about 70% of the cases, the software inserts the length of the paper along with the page numbers
3. For Harvard system of referencing, reference management software does not put the initial of the first name, instead the complete first name appears

The other two students had better opinions of Endnote and stated that they cannot imagine working without it.

One PhD student said that she manually enters her references and citations, because for her, the reference management software is a difficult learning curve and that she has heard that software actually introduces errors into referencing and citation. Thus the usage of a reference management software is directly related to the way the skill of referencing is taught during training session as well as during other modules taken by the students. According to one interviewee “ If they teach us about Reference Management Software then what will be there use” . This is a rather negative remark, but indicates students perception as to why there teachers never teach them about this software.

Why do Students make Errors while Referencing?

To identify why students make errors while referencing, we asked:

1. Why in your opinion are errors introduced while referring to internet sites and web pages?
2. Do you think students in general are aware of the fact that they make errors while they reference?

When asked why errors are introduced in student’s citation and referencing following points were highlighted by the participants:

1. It is human to err
2. Very little time for referencing
3. Difficult to remember formatting styles and putting them in alphabetical order

4. Not considering this activity as important and thus not putting enough effort to correct them
5. Errors due to reference management software

In response to our second question, some participants stated that students only knew that they committed errors when they were sensitized to this by providing appropriate feedback. One of the participants stated that students would not commit an error if they knew about it — indicating that they do not know if they have committed an error.

Result

An analysis of the interview has revealed following relationship between seven themes.

This relationship is illustrated in Figure 3.8.

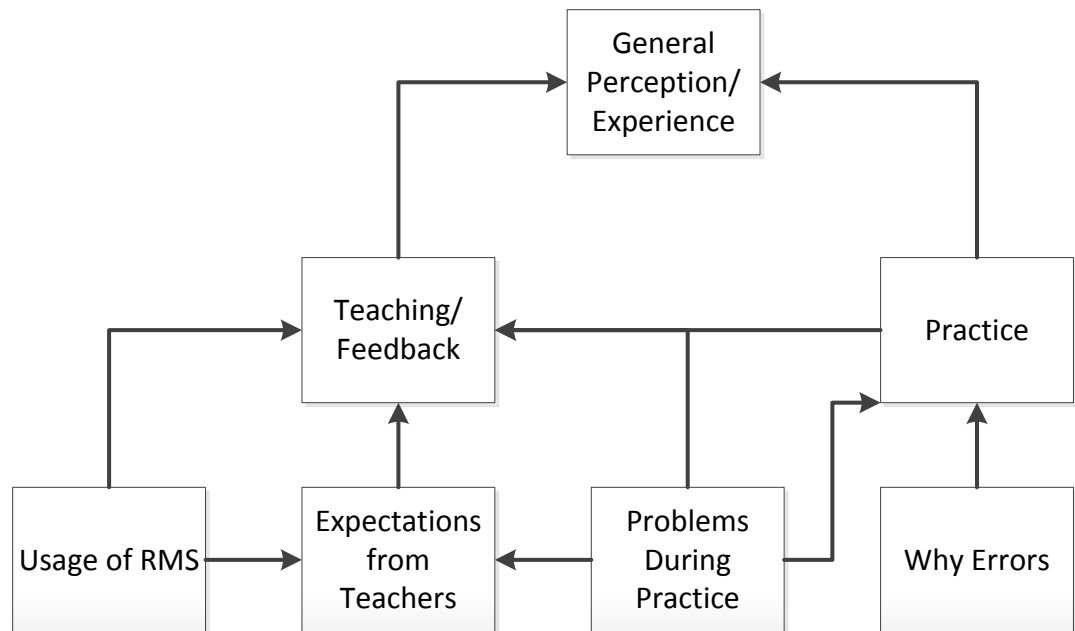


Figure 3.8: Students Interview

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Figure 3.8 shows seven themes derived from the literature review. Relationship between these themes is indicated by the arrow. The result of analysis indicates that students experience and perception about referencing task is related to the way this skill is taught to them, including frequency and meticulousness of feedback. For example if very short training sessions are conducted once in a study tenure and very little feedback is provided on this task, students reduce the priority of this task in the assignments and course work. There is also a direct relationship between the way students practice this task to the way it is taught. All the students who were not educated about Reference Management Software did not use it. Furthermore usage of Reference Management Software is related to the expectations of student from their teachers. Student expect that their teachers would tell them about this skill so that they (students) are better able to do this work. Expectation from teachers depends on how this work is taught. Students expect their teachers to provide more support in referencing by letting them know where they went wrong and how to improve upon their work. As shown in Figure 3.8 perception/experience also depends on the way this skill is practiced. Students who are more methodical in referencing have a better perception about it. Students who were not taught about reference styles did not know about it although they were using it in their course work. Furthermore the student who did not receive formal training had a view point about referencing that was different from the others i.e. purpose of referencing being democratization of knowledge. The result of this analysis has further, indicated that the way students practice this skill is also dependent on the way this skill is taught which in turn affects their perception about it (Figure 3.8). Perception also depends on the experience, which is a sub theme of perception/experience theme. It is also clear from analysis of students interviews, that the usage of Reference Management Software depends on the training sessions students receive for this skill. Thus, those who had training about using Reference Management Software they use it.

Students' expectation from their teachers/supervisor depends upon the issues they face while referencing and are inter related and depends on each other.

Thus, interviews with students have revealed interesting facts. Students seek appropriate guidance and support from their mentors and teachers regarding the practices of references and citations. Those who have attended academic writing courses or training sessions are not fully aware about the styles and supporting tools for referencing. The range of issues faced by students includes finding appropriate sources for referencing and the problems in formatting references according to required style of referencing.

Those who used Reference Management Software provided mixed responses. They faced issues such as incorrect insertion of data into reference lists because of the Reference Management tools. Despite the issues, these tools are helpful for the students. One interesting thing however has been that despite the usage of such software, students still wanted feedback from their teachers. Again, there seems to be a need to re-think the process of imparting this skill to the students. The above discussion answers sub-question **RQ1.1** presented in chapter 1 of this thesis, and verify responses received through students' questionnaire.

Interviews with Teachers/Academic Staff

Interviews with teachers/staff were important in determining how references and citations were taught to the students. Since during the interviews with the students the course title "academic writing" came up as a primary source of introduction to references and citations, we sought to interview the staff member who taught this subject. The aim of interviewing her was to verify claims made by the students to determine how they teach this skill, and if they require any additional help in teaching this course. We also interviewed a staff member who was teaching a course in Computer Science. The aim of interviewing him was to determine how

the teachers in Computer Science courses may perceive this activity. Please note that since we have obtained data through questionnaires from teachers, therefore this interview was conducted to verify the information provided by them (Baker and Edwards, 2010) .

A semi-structured interview was designed (Appendix B) — questions were prepared and arranged thematically, making sure that our research questions are appropriately addressed (See RQ1 in Chapter 1). The themes used for this interview were: Teachers perspective, teaching practices and use of automated solution to provide summative/formative feedback. The order of the thematically arranged questions was as follows:

1. From a teachers' perspective, how do students perceive this activity?
2. The opinion of teachers regarding the methodology of teaching, grading and providing feedback to the students for the task of references.
3. The opinion of the staff about automated solutions for assessing references and citation in the students' work.

We will discuss the information collected for these themes in the following sub-sections.

The Teachers' Perspective: How do Students Perceive this Activity?

To obtain the teachers' perspective about students perceptions, the following questions were asked from both the teachers:

1. What is your impression/opinion about the overall quality of referencing work by students?
2. What is your impression/opinion about the overall behavior (interest/importance, level, etc.) of students toward this activity?
3. Do students come to you for guidance in this matter?

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As stated above, *Interviewee 1* was a tutor of an academic writing course, while *interviewee 2* was an experienced teacher teaching Computer Science. Both interviewees stated that they ask their students to provide references in their coursework.

Quality of referencing is an important aspect. Thus, when asked about the overall quality of referencing by students, both the interviewees agreed that some students do better than others. Interviewee 1 was of the view that 20% of the class does excellent work at referencing while 60% understood the system of referencing but make minor mistakes while the rest have no idea about it. Mostly *international students* face a lot of problems in referencing. Interviewee 2 did not have any idea about it and stated that “it is hard to say how many and then do the average on number of student who do better work than the others”. This indicated an important aspect and that Computer Science teachers may not be putting effort to identify the quality of referencing done by their students.

Attitude of students toward referencing skill is an important factor in ensuring that a better quality referencing is performed. Interviewee 1 was of the opinion that referencing is a matter of priority for students. Students’ first priority is to write their essays, referencing comes as a second priority. Thus, this task is left to be done at the last minute. Interviewee 2 had similar responses, According to him “Some students see no need for it, hence they just copy and paste it from the internet” because (as per interviewee 2) “ they copy and then get away with it”. This was an interesting observation by interviewee 2, since it indicated that proper attention was not given to this task, and this explains why students get away with the copy past of referencing.

The level of students interest in perfecting this task or for getting clarity for the concepts of referencing is also important and is directly linked with how low in priority is this task. To

determine this we asked our participants whether their students approach them about referencing work. Interviewee 1 stated “not much”, maybe through emails sometimes, but otherwise no. Interviewee 2 had interesting information as he stated that students come to him to ask “how they can get away with it?” or “is it worth it?”. Interviewee 2 stated that students are not willing to read 20 or 30 papers written by others — they can write their own thoughts, but reading other work is difficult for them, so they just copy titles without knowing what is in those documents. Motivation for students is just to get the degree and the marks that’s they will be awarded for referencing. Hence, a response from this enquiry indicates that quality of references is compromised due to its priority level being low (as perceived by the students). Furthermore, motivation for this task is not fully understood by the students hence either they think it is not worth it or they seek benefits such as grades for this task. Therefore (as per interviewee 2), the true spirit of referencing is absent from today’s students. These responses indicate that there is a direct relationship between the quality of referencing and the way it is taught. Students’ sense of low priority for this task is a reflection on their teachers response to them.

Teaching Practices: Methods of Teaching, Grading and Feedback for the Referencing Task of Students

Responses to the above questions have indicated that the majority of students make mistakes in referencing because of the low priority and worth of this task; hence the next aspect is how this knowledge is imparted to them. Do they get sufficient incentives and feedback for their effort? To obtain answers to such issues, the following questions were asked from the interviewees.

1. How do you impart the knowledge of referencing to the students?

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2. Have you given assignments/project-work/thesis work to the students in which they are required to cite references?
3. Do you provide grades/marks for referencing work of students?
4. What is the current method of marking reference work of students?
5. How satisfied are you with this method?
6. Do you provide feedback to students about their reference work?
7. What is the current method of providing feedback to students about their reference work?
8. How satisfied are you with this method of feedback?
9. Do students use any tool such as Reference Management Software for their referencing task?
10. Would you like to suggest any changes/improvements in the current practices of grading and feedback for referencing task of students?

Academic writing courses introduce students to the skills of referencing. Thus response from interviewee 1 (academic writing skill tutor) indicated how the foundation was laid down on referencing. Interviewee 1 stated that in her course (“Academic Writing Skill”) they devote an entire seminar on referencing skills and teach them its importance as well as provide them with a sample referencing sheet to illustrate how various types of references can be cited — thus this knowledge is formally provided to them. About five assignments are given to the students— all requiring references and citations. She further stated that they separately grade referencing task as it is part of their course and that she was satisfied with the grading mechanism since thought it was quite comprehensive.

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Courses taught in Computer Science are focused on teaching content related to this domain. It was interesting to note how the practice of referencing was carried out here. Interviewee 2 provided insight into this information. He stated that during these courses teachers do encourage students to do referencing and they sometimes provide guidance material to them, but was not sure if students followed the instructions and guidelines. Generally students are asked to put references in their third year final report; however, depending on the subject some other assignments do require students to provide references. Regarding grading this activity, he said that in Computer Science there are no separate grades for referencing. In his opinion “it does not make any sense”, because referencing is a part of the solution — hence collective grades are given for “the entire solution provided by the students”. No separate marks are allocated for referencing. Interviewee 2 further emphasized the fact that he is not really in the favor of providing grade for referencing task. He thought that there was always room for improvement in teaching references. Students should be taught the ethical and moral obligations for referencing as a motivation factor instead of providing them incentive with grades/marks. This indicated that there is a deficiency in inculcating the aspect of morality regarding referencing task..

Feedback is an important component in teaching a concept; hence, we asked our Interviewees “Do they provide any feedback to the students?” Both staff members stated they do provide feedback. However their mechanism for providing feedback varied a little. For the course of “Academic Writing Skill”, Interviewee 1 stated that for the first assignment in particular, she looks at the references very closely and give students feedback in the form of notes on their returned assignment documents — but it is discouraging the next time that students have the same errors in their reference list. She said that she also has a feedback form on which students are informed about their mistakes including references along with the

grades. In her opinion, students either do not look at the feedback, or they look at the feedback but forget about it next time they do referencing. Interviewee 2 stated that he sometimes provides feedback to the students while discussing their work with them. He stated that they try to guide students about referencing so that they “do a better job next time”. Interviewee 2 mostly asked his student about the academics papers they have cited and what are the primary sources for information. Interestingly, Interviewee 2 does not think reference styles are of any importance and thus does not advocate adherence to the styles.

Furthermore, since Reference Management Software are designed to facilitate users in referencing, we inquired about its usage by their students, Interviewee 2 stated that he does not know if his students use this software, he further stated that he never asked his students to use it (this fact was indicated during the analysis of questionnaire for teachers). Interviewee 1 was also of the opinion that using a Reference Management Software is a complicated task for the students. Interviews with students had indicated that the academic writing skill course does not inform them about any Reference Management Software. Interviewee 1 further stated that even she has never used such software to build her own reference lists and bibliographies. This indicates that teachers do not guide students to use these tools and perhaps — as stated by interviewee 1 — there are errors and complications in using such tools.

The above information, plus data received through questionnaires, indicates that not only do teachers refrain from guiding students about new technological facilitation for referencing but there is a mismatch between teaching this skill and the way it is practiced in the subsequent modules. Academic writing modules give emphasis on the way references are formatted and styled, where as in the other modules teachers do not think this to be of any importance. To inculcate the importance of this task teachers in academic writing skill provide

grade for this activity where as in other modules (in Computer Science) they are not in favour of giving grades for this activity thus reducing the priority level of this task. The priority level is further reduced by the way feedback is given to students. One reason for poor quality highlighted was that during their study tenure students tend to forget how to reference mainly because this skill was taught at the beginning of their study and this information was not amply repeated again. Hence there is again a close relationship between the way this subject is taught during entire study tenure and its priority among the students and the quality of this task.

The answers to these questions indicate that responses from the questionnaire for staff are in line with the responses from staff interviews. The majority of staff members are of the view that they indeed provide some form of feedback. At the same time, the majority of teachers do tend to avoid giving any kind of grade for this activity. This further verifies the fact deduced from the questionnaires that students do not consider this activity of high priority — some even consider it worthless.

Opinion about an Automated Solution for Assessing References and Citation Work by Students

Since analysis indicated that the priority and the quality of referencing depended on the summative and formative feedback, this aspect needed further probing and exploration, hence we asked few questions in this regard, as follows:

1. How convenient is the method for providing grades and feedback to students?
2. Do you think an automated solution for grading and feedback will be helpful to the staff members?
3. If yes, then, how can this be helpful (what are the benefits?)?

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4. Which features would you like this automated solution for marking/feedback of references to have?
5. Would you like to be part of this research work by using any developed software in assessing your students work?

Feedback is a salient feature in academia. By understanding issues regarding this aspect, we aim to find solutions for it. Regarding the feedback to students referencing work Interviewee 1 stated that it is a time consuming task and gets cumbersome when the same information needs to be provided to three or four students. Interviewee 2 stated that “it depends on how much in detail we look at the references, most of the times we just take an impression about this activity”. He further stated that no reader has the time to read about all the references made. These answers clearly indicated that this task is indeed time consuming.

It was hypothesized that automated solutions for grading and providing feedback may overcome this issue. Thus, this idea was presented to our interviewees. Interviewee 2 stated that since he is against the marking of this activity he would not favor the automated solution for marking references and citations. However he will support the idea of having an automated solution to provide feedback on student referencing task. Interviewee 1 was quite interested about such software. However she also was of the opinion that embedding grades into the software might not be acceptable to many departments and teachers. We further asked the participants what features they would want to have in the software. Interview 1 pointed out the following features that she would want to have in the software:

1. While checking the reference list, the software should signal how the references should have actually been written (i.e. it should provide the correct reference).

2. Signaling the missing data, (the most common missing data being publication date, location of publishing, page numbers, volume numbers etc.)
3. Correct order of each data field.

The above information formed the basis for the development of our automation system. Furthermore interviewees showed their interest in participating in this research work indicating that they deem it important.

Result

As a result of the analysis of teachers' interviews, the following themes and the relationship between them emerged. These are presented in Figure 3.9.

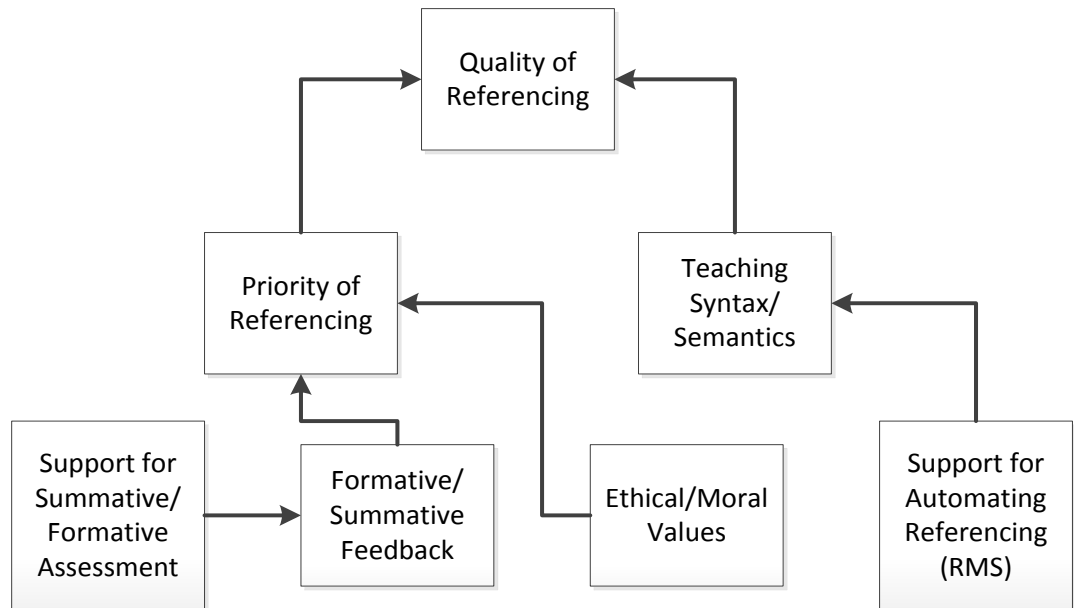


Figure 3.9: Interview with Teachers

Arrows in Figure 3.9 indicate the relationships and boxes represent themes or ideas that are connected through these relationships. The result of staff interview analysis indicate that, the quality of referencing by students depends not only on the syntactical and semantic information imparted to students regarding referencing skill but it also depends on the priority

given to this task by students as well as by teachers. Thus if the priority is low the quality of this skill suffers. Priority given by students depends on the type and frequency of summative/formative feedback received by them from their teachers. If the feedback is infrequent and/or not comprehensive then priority of this task is reduced. Feedback may improve and become regular if an automated solution is provided to teachers. Priority also depends on the moral and ethical values transferred to the students about referencing. If these values are strong, then the priority of this work is high else it is low.

Furthermore the interviews with teachers were very informative, as they provided insight into aspects such as why some teachers do not provide grades for the referencing activity and how this skill is taught. Certain teachers in academia are of the view that providing separate grades negates the purpose and the real essence of referencing, Students should do this as an ethical and moral obligation instead of for grades. From these interviews it is evident that with the courses like “Academic Writing Skills” references are introduced to the students. During other courses, this skill is not emphasized or highlighted as important. Thus — as per our interviewee 2 — “students forget how to cite references”.

It may be concluded from these interviews that there is a gap in re-enforcing the concept of references among students. The aims and objectives for referencing are not clearly instilled into students’ mind during their academic tenure. Thus a mechanism needs to be developed to reduce this gap. Furthermore, teachers do find the act of providing feedback to be time consuming, and feel that an automated solution will resolve this issue for them.

3.4. Discussion on Analysis

Since the third stage of the first phase of this research aimed to explore the reasons for errors in referencing of students at higher education (**RQ1** in Chapter 1); therefore, both the

major stake holder (students and teachers) were taken into considerations. Extensive activity in acquiring information and insight into this issue was conducted using both quantitative and qualitative research methods, as discussed above (Figure 1.5). The following discussion highlights and interprets the answers received for the three sub questions (**RQ1.1**, **RQ1.2**, **RQ1.3**, in Chapter 1) of first research question (**RQ1**).

It is nearly a universal fact that for better quality of learning, motivation and effective pedagogy/training are key features. Students learn more when they are amply motivated. Thus, motivation should be a key factor in education. Motivation is divided into two main types i.e. motivations are either intrinsic or extrinsic in nature (Huitt, 2011). Extrinsic motivation are derived from external sources such as rewards or avoiding any negative experience, It further stems from the desire to be socially accepted or part of group. Intrinsic motivations come from within. Examples of intrinsic motivation include working on something that is interesting and help us in fulfilling self established goals. Good training sessions, for any skill, contributes in enhance either intrinsic, extrinsic or both types of motivations. For the skill of referencing, our quantitative as well as qualitative research has indicated that there is a lack in the extrinsic motivation. This lack stems from the low feedback provided by the teachers for this task, in case of taught courses, few teachers provide any grades or marks for this activity, and those who do fail to explain to their students why eamed marks are reduced. Low feedback on this task indicates to students that this activity is not deemed as important to their teachers and perhaps teachers do not even look at how this task is performed. This in turn becomes one of the reasons for the reduction in the quality of referending performed by students because the priority of this task reduces. Extrinsic motivation that leads them to cite at all includes the fear that they might be accused of plagiarism, students consider this as a risk and try to avoid it. For some students referencing also provides the satisfaction that the teachers or readers would

know how affluent they are in their domain of knowledge and have mastery over the topic. Intrinsic motivation is the moral and ethical nature of the task, students feel that it is just and right to give credit to those whose ideas they pick and let the readers read information from the original sources, thus contributing to the knowledge and education of their readers. Providing referencing also helps them to enhance their knowledge, and thus becomes a source of satisfaction.

One of the factors that affects extrinsic/intrinsic motivation is the experiences students have in the past and present. In our study it was found that student that were asked to do referencing at PhD level without any prior training for this task actually dreaded doing it. Thus their fear for referencing hampered their learning of this skill, one of the interviewee stated that even after attending training workshop for referencing she still does not feel competent about it and fears doing it. One participant who was very motivated to do referencing had difficult time doing this task 25 years ago, but today's Reference Management Software has fascinated and motivated him. One important concept that came out from qualitative analysis is that the motivation is dependent on the relevancy of the skill toward achievement of students' goals and objective in life. One participant stated that she does not put effort to make her referencing skill better since she is never going to use it in her professional life. Thus, the concept of relevancy is also a dominant factor for using this skill.

Students' motivation and experience in referencing is closely related to the pedagogy adopted by their teachers for this purpose. Our research has indicated that students receive training of referencing through two distinct modes. The first mode is termed formal training sessions. During these sessions, the teacher provides information about syntactic and semantic concepts of referencing. The second mode through which students are aimed to learn about is

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termed as informal mode. In this mode students are required to embed referencing in their coursework, and are sometimes provided with the guiding material and occasional feedback. Quantitative analysis of the sample data has indicated that less than 50% of Computer Science students receive formal training. Same is true for other domains such as Management Sciences. This fact is endorsed by the sample data obtained from the participating teacher in the questionnaires. 55% of sample Computer Science students never had to cite any reference in their assignments thus they were deprived of informal training for referencing as well. Condition of teaching referencing in other domain of knowledge such as Management Science is similar. Another important aspect is the return time for an assignment. Current study shows that in certain modules return time of an assignment is one month. According to some participants, this may be due to the strength of a class.

Formal training imparted to students for referencing seemed to have deficiencies. Our investigative study has revealed that such sessions rarely provide information about reference styles and fail to instill importance of this activity. These sessions do not direct students to any automated solution such as Reference Management Software to facilitate students. Furthermore students are still struggling while referencing from online material, archival data, images, videos as well as referencing information that is in language other than English because they do not know how to do it. Document analysis as well as qualitative data has indicated that students tend to cite from online sources; however, they are still not clear about its formatting style. During informal training of this task students complain that their teachers do not provide feedback. These students wished that their teachers would help them by identifying exact errors in their referencing including correct formatting and style. From the analysis of both quantitative analysis and qualitative data it is found that teachers that are involved in informal training do not pay attention to formatting and style of referencing either, and hardly ever guide

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students to good sources for referencing. Hence, even if students had any formal training for this skill, they tend to forget how to do it during the remaining tenure of this study.

The above discussion has highlighted the fact that teaching of this skill needs to be reconsidered and improved. In order to improve the pedagogy, the contents as well as the style of teaching should be improved so that comprehensive information and practice for this skill is performed. Teachers need to be more interactive and provide ample and constructive feedback to their students. However it is found that providing comprehensive and detailed feedback to students about referencing is time consuming activity. Teachers that are teaching modules other than academic writing skill concentrate more on the contents of their course, and thus do not have time to provide consistent and detailed feedback on referencing. Even a teacher of academic writing course stated that it is cumbersome and time consuming work. Another factor highlighted in this regard is that low as well as superficial feedback is dependent on the number of students in a class. The greater the number, the harder it is to provide feedback on this task.

Analysis of the documents verified the fact that the quality of referencing is indeed not good. It is seen that certain errors are repeated by a student indicating that this error was not there by chance but student actually did not know how to do it. Trends in referencing practices are shifting toward the internet as more and more undergraduate students tend to site their references from online sources. They are thus willing to learn about new ways of conducting this task. Students at postgraduate level are a little reluctant though since from the document analysis it seems that the percentage for citing references from online sources.

Chapter 2 indicated that automated solutions are facilitating users in research, including referencing tasks; however, no solution exist to facilitate teachers in this regard Teachers are of

the view that if such a solution is provided to them it will help improve the quality of their students referencing skill and give them the time to improve their teaching skill.

3.5. Conclusion

In conclusion, we can state that through this investigative study, we have been able to answer our first research question (**RQ1** in Chapter 1): “Why do errors creep into citations and bibliographies/reference lists of students coursework?” and its’ sub-questions. The answers are that the students are not appropriately sensitized to this activity. Students in certain domains or subjects are not provided with ample opportunities to practice this task i.e. they are not asked to provide references and citations into their course work. The discussion above has highlighted that there is a need to improve educational methods to instill the concepts and skill of referencing. A proper training and feedback mechanism should be provided for this activity. There should be regular and timely feedback provided to the students for this part of their assignment/coursework i.e. references and citations.

The above discussion, as well as information from literature review, has highlighted the fact that looking into each and every reference in a reference list is a difficult and time consuming activity for the tutors, therefore there should be some mechanism and/or tools made available to the tutors or developed to help tutors and staff in this regard. In the next chapter (Chapter 4) we propose a framework to address all the issues that are highlighted in this chapter.

Chapter 4

Framework to Enhance Skills of Referencing (FESR)

4.1. Introduction

It is important for students and teachers in higher education institutes to understand that problem in referencing and citations exist. Once they are aware that this problem exists and that it has impact on the future of education and the building of new knowledge (Chapter 1), the next logical step is to find ways to improve these practices. In this chapter we propose a pedagogical framework to enhance this skill. This framework encompasses both the stakeholders – students and teachers. The next section in this chapter briefly explains what pedagogy means, what its various approaches are, and which pedagogical approach may be suitable for teaching referencing skills. Section 4.3 highlights the reasons why we need a new framework to teach this skill. It provides the findings from our investigation (Chapter 3) and indicates issues frequently faced by students. Section 4.4 describes the components of the proposed framework, and section 4.5 provides the workings of this framework, discussing how this framework can be implemented. In section 4.6 we discuss the benefits of this framework, and the final section concludes the chapter.

4.2. Pedagogy and Pedagogical Approaches

Before discussing the proposed framework for teaching the skills of references, i.e. the pedagogy for imparting this concept and skill to learners in general and students at higher education in particular, it is important to understand what is meant by the term pedagogy. The term pedagogy was derived from French and Latin adaptation of Greek word *pedagogia*,

meaning an attendant leading a boy to school (Mortimore, 1999). This definition of pedagogy is no longer valid and educationists of modern era have taken into consideration all the aspects of teaching and learning in education, thus coming up with more up-to-date and relevant definitions and explanations for this term. The Oxford English dictionary defines pedagogy as “The method and practice of teaching, especially as an academic subject or theoretical concept”. The Marriam-Webster dictionary defines pedagogy as “the art, science, or profession of teaching”. Watkins and Mortimer (1999) define it as “any conscious activity by one person designed to enhance the learning of another”, and Alexander (2003) has further stated that “Pedagogy is the act of teaching together with its attendant discourse. It is what one needs to know, and the skills one needs to command in order to make and justify the many different kinds of decisions of which teaching is constituted”.

Pedagogy is strongly influenced by various learning theories (Illers, 2011). Learning theories are conceptual frameworks that describe how information is absorbed, processed, and retained during learning. The most popular learning theories include behaviorism, constructivism, cognitivism and humanistic model theories. Behaviorism implies that the instructions cause observable change in the behavior of the learner. Cognitivism causes change in the thinking process of learner and is assessed to determine if the cognitive processes have enhanced through the set of instructions provided to the students. Constructivism means the construction and enhancement of knowledge through social and situational interactions and hence the set of instructions require learners to interact with individuals or respond to certain situations for learning. Humanistic pedagogical approaches emphasize the growth and development of humans and advocate that feeling, emotions, personal satisfaction and values are important aspects for long lasting and effective learning. Each of these learning theories helps pedagogists to design pedagogies for the achievement of their goals.

An interesting question that arises is whether we can design a pedagogy that utilizes more than one pedagogical theory. It is possible to answer this question in the affirmative. For example, analyzing the task of referencing and citations indicate it has various aspects that require attention. These aspects include the requirement for correct and consistent formatting and style of referencing and of getting into the habit of referencing while producing academic writings. By utilizing the concept of reward, such as positive feedback and grading/marking system, students will get into the habit of referencing. Furthermore, step by step and repetitive instructions may enable students to have correct syntax and semantics of referencing. A behaviorist pedagogical approach caters for this aspect of referencing. However, the task of referencing is more than syntax/semantic, it is also about a deeper understanding of the concept and importance of this task. A cognitive pedagogical approach caters for this aspect of learning. Furthermore, a cognitive approach ensures longer retention of this concept, i.e. a cognitive pedagogical approach allows students to develop understanding of the usage and importance of this task. They learn when it is most appropriate to use a reference and how to present it. This level of comprehension and understanding leads to better mechanism of embedding and using references within the text of a document. A humanistic approach will facilitate instilling ethical and moral values since this approach deals with the more human spiritual aspect of education. It may help teachers in making this task enjoyable and satisfactory for the students thus helping in learning from the dimensions of humanism (Mangal, 2007). Therefore, while developing the pedagogical framework for referencing and citations, these three approaches may be utilized.

4.3. Rational for FESR

Before proceeding to develop a unique pedagogical framework to enhance skills of referencing, it is essential to establish the need for such a framework. The findings from the literature review and investigation of primary sources revealed that erroneous referencing practices are independent of the area of knowledge or the geographical location of the authors, and extend over time – from the ancient eras to the modern and cyberspace eras (Chapter 2). The cubical structure in Figure 4.1 explains the scope of this problem.

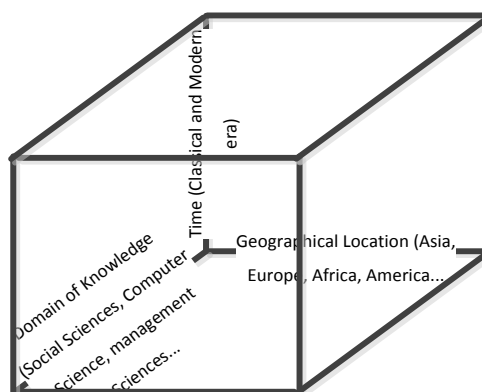


Figure 4.1: Space of Erroneous Referencing

The three axes in Figure 4.1 indicate the three dimensions of the problem. The *domain of knowledge* axis indicates that all domains of knowledge have issues in referencing – including science, medicine, social sciences and many more. The *geographical location* axis identifies that authors and students from various geographical locations have errors in their in-text citations as well as reference indexes and bibliographies. The *time* axis indicates that this issue is not new – it started from ancient times and still exists in the present day. Hence, the space of the issue indicates the seriousness of the problem at hand. A closer focus on higher education indicates that this problem is indeed evident in all levels of education. This is illustrated in the following figure (Figure 4.2).

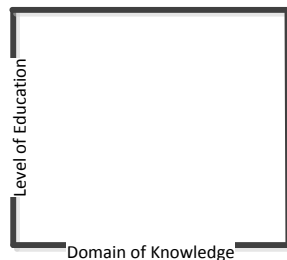


Figure 4.2: Space for Erroneous References in Higher Education

Figure 4.2 represents the space for erroneous references in higher education. The X-axis represents domain of knowledge, which includes all subjects of humanity, sociology, science etc. The Y-axis represents level of education which includes undergraduate and postgraduate (including PhD level) as identified by our investigation in chapter 3. The above two figures indicate that errors in referencing are a global phenomenon.

4.3.1. Methods of Teaching this Skill (Current Pedagogy)

Educational institutions have the responsibility to teach students about the coming challenges. The purpose of academic institutions (schools, colleges, universities etc.) is to produce skilled individuals. These individuals should be equipped with all the necessary knowledge and practice to face challenges in their practical life (Bowen and Schwartz, 2005; Ryan and Cooper, 2010). With this concept, we have focused our research on the academic arena and are looking at the reasons for erroneous references and citations by students, and how they are taught this skill. We need to find out if teaching this skill is sustainable – i.e., do students sustain this knowledge and skill during the entire tenure of education so that it is proficiently practiced during their professional life?

Our investigation has revealed various approaches in this regard. Firstly, the responses from the questionnaire (Chapter 3) indicate that the majority of students never had any formal

training, seminars or workshops on referencing – students have to learn about this skill by themselves. They are generally asked to put some references in their assignments but are not appropriately guided as to how to do so. There are some cases where students at their various levels of education are not even asked to do references, and hence are not even introduced to this task. According to the initial investigation (Chapter 3) Students who are asked to do references without any guidance have poor concepts of this task.

In the second approach (Chapter 3), students are introduced to this activity in a section in a writing skill sessions or in some cases through entire sessions on referencing tasks during an academic writing skills course and are informed about syntax and semantics of referencing. Generally, such a session is conducted once during their academic tenure (i.e., either at the start of their degree or when the students are required to submit their final projects or reports). Other courses may ask for references as part of the assignments but the knowledge of this skill is not refreshed in subsequent modules.

Another approach is that university libraries prepare some form of training sessions for referencing, and may request students to attend these sessions, but these are not mandatory sessions and generally awareness about these sessions among students is low [ref]. .

4.3.2. Issues Highlighted in these Methods of Teaching

The above discussion indicates that there are cases where students may learn the about referencing through formal training sessions. However, there are issues that are identified in teaching these sessions. Our investigative study, which employed both quantitative and qualitative research methods, has identified the following issues:

1. These sessions occur once in a academic degree, which is insufficient to inculcate this skill among students

2. These sessions do not inform students about referencing styles
3. These sessions do not guide students about any helping tools
4. Students are generally directed to some reference guides or books and students struggle to learn this skill on their own
5. Students are not generally satisfied with the feedback they receive
6. Teachers are of the view that students do not take this activity seriously and the priority of this task is less than the other tasks

Once such a session has been conducted it is not repeated again during their study program. Other modules may ask students to do referencing in their coursework and expect students to learn this skill (Informal mode). For these modules, students are of the view that:

1. Teachers do not think this work is important
2. They do not generally provide any grade for this activity (and perhaps do not read them)
3. The return time of the assignments may be about one month (Chapter 3), and for certain courses assignments are given to students at a quicker rate than they are returned by the tutors.

From the teachers' perspective, checking references is a cumbersome task and takes their time. Generally, teachers just browse the reference list and may highlight some formatting issues.

4.4. Development of FESR

The discussion in section 4.3 indicates that there is no standard pedagogy for teaching the skill of referencing. This produces issues such as plagiarism, missing or partial referencing and generally a poor quality of referencing. Therefore we need a framework that is focused on teaching referencing skill. Here a framework is proposed that caters for these issues. It is discussed in the coming sections of this chapter.

4.4.1. Objective of the Framework (FESR)

The purpose of the proposed framework is to eliminate these issues and provide:

1. Continuous coaching and training in the skill of referencing.
2. Effective teaching methods of referencing skill based on learning theories.
3. Awareness about the purpose of referencing among students.
4. Knowledge about syntax and semantics of referencing based on the reference styles.
5. Awareness and identification of plagiarism.
6. Awareness and identification of bad practices such as partial referencing, incorrect references and syntactical errors.
7. Awareness about software tools available online to facilitate referencing.
8. Comprehensive and precise feedback on the referencing skills of the students.
9. Feedback in a timely manner – late feedback does not help in teaching the skill.
10. Sense of priority and ethical obligation in performing this task.
11. Enhanced retention of this knowledge.
12. Support for students and staff in referencing through software.

Thus the objective of FESR is to improve the skill of referencing by implementing a unique pedagogical framework.

4.4.2. Description of the Framework (FESR)

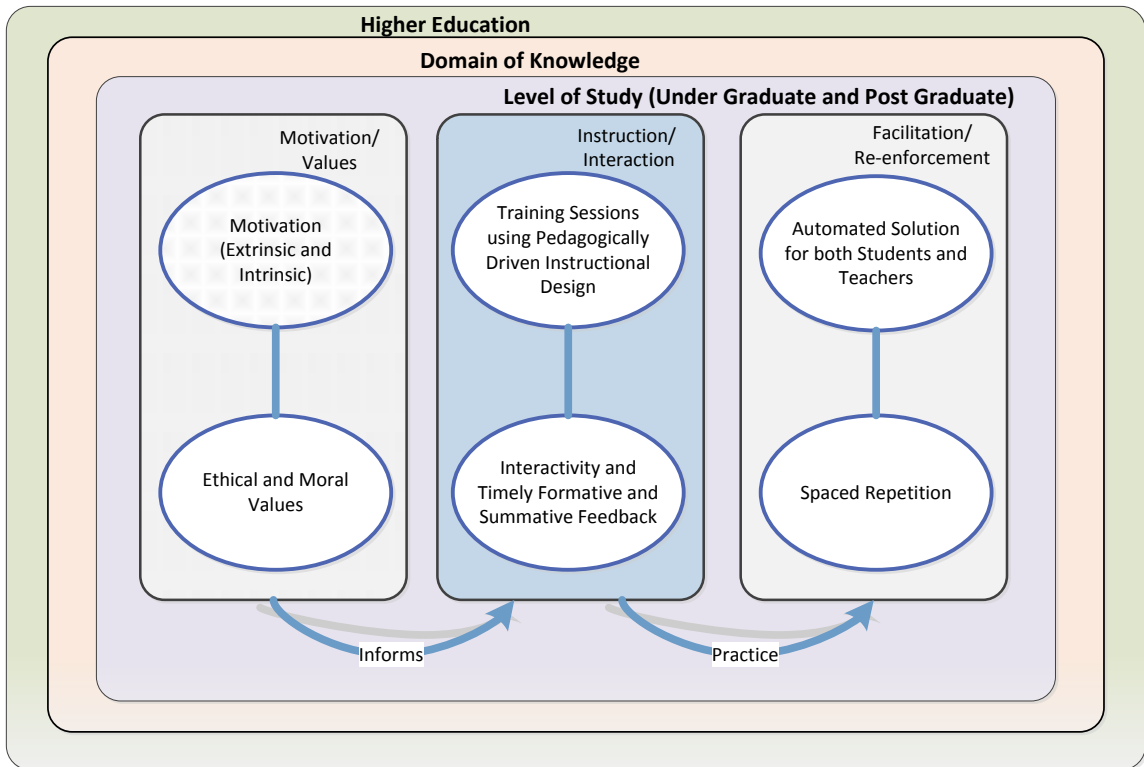


Figure 4.3: Framework for Teaching the Skill of Referencing

Figure 4.3 illustrates the structure of the proposed framework. The outer rectangle represents the domain of academics – this signifies that the framework is seated in academia. By academia, we mean higher educational institutions such as universities, colleges and any institute that teaches the concept of references and citations, including e-learning, blended and classical paradigms of teaching. Within academia, the next rectangle indicates all the domains of education that are taught at the educational institute. The subject domains include all the subjects (e.g., science, information systems, management science, humanities, social sciences, business education). Each domain of knowledge is further divided into level of study. By level of study we mean undergraduate study and postgraduate study. This information is represented here by the rectangle within the rectangle for domain of knowledge. Hence in higher education,

for each domain of study and level of study there are three basic components that are necessary for the effective education on the referencing and citation task. These components are *Motivations/Values*, *Instruction/Interaction* and *Facilitation/Re-enforcement*. Each of these components is further divided into subcomponents. The component titled *Motivation/Value* has two distinct subcomponents named “Motivation (Both extrinsic and intrinsic)” and “Moral/Ethical Values”. The *Instruction/Interaction* component is further subdivided into “Training sessions using pedagogically driven instructional design” and “Interactivity including timely summative and formative feedback”. The *Facilitation/Re-enforcement* component comprises “Automated solution for both students and teachers” and ‘Spaced Repetition”. As indicated in Figure 4.3. *Motivation/Values* informs the *instruction/interaction* component to help generate better instructions and feedback mechanisms. These mechanisms are then facilitated by the third component of our framework. This aspect is indicated by the two arrows, as shown in Figure 4.3.

Before explaining each of the three components and their subcomponents, we would like to add that this framework is applicable for students in classes with tutors as well as for students who study on their own and may not have tutors or regular assignments. This framework may be equally useful for professionals who aim to do better referencing. Hence, the scope of this framework is wide and applicable to those who need to enhance their referencing skills. This concept is highlighted in Figure 4.4.

The Y-axis of Figure 4.4 indicates that this framework is useful for students who receive regular assignments from their teachers in a classroom. An example of this scenario is the students that are enrolled in taught courses. The Z-axis indicates students that want to study or learn about referencing on their own. This means that they are not taught by tutors. Examples

include students enrolled in research degrees. They develop their academic papers and articles, and want to ensure that they understand and correctly practice this skill. X-axis of this diagram represents professional writers and academic scholars. Through this framework they can learn and practice referencing skills and get timely comprehensive feedback for this task.

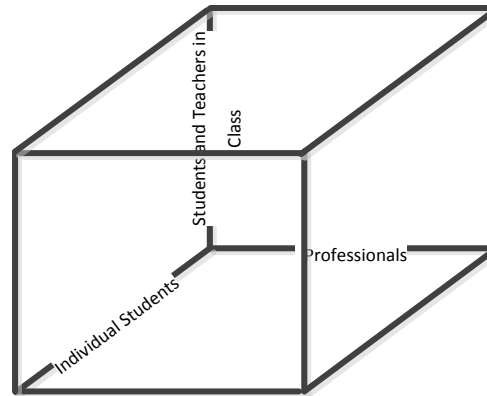


Figure 4.4: Scope of Utilization of the Framework

No such framework has previously been developed for the task of referencing and citation. It is simple, and uses the tested principle of education and learning. In the following subsections we will discuss each of the three inner components and sub components of the framework in detail.

Motivation/Ethical Values

The investigative study (Chapter 3) highlighted the fact that students are not amply motivated to perform the task of references and citations. Due to the lack of motivation, students tend to deem this task at a lower priority level and put little effort to improve it (Figure 3.9). Thus to improve this skill the component of motivation/ values has been proposed for the framework.

Motivation means to be moved to do something (Richard, Ryan and Edward, 2000) and is an important part in educational psychology and contemporary learning (Illeris, 2009). Huitt (2011) has further defined motivation as:

- internal state or condition that activates behavior and gives it direction;
- desire or want that energizes and directs goal-oriented behavior;
- influence of needs and desires on the intensity and direction of behavior.

Several motivational theories have been presented (Öztürk ,2012; Huitt, 2011); however, motivation is mainly divided into two categories namely *intrinsic* and *extrinsic* motivation (Richard, Ryan and Edward, 2000; Huitt, 2011). Discussion in Chapter 3 has indicated that students lack *intrinsic* as well as *extrinsic* motivation. We need to understand what these two categories comprise in order to inform our instruction/interaction component. Both Huitt (2011) and Richard, Ryan and Edward (2000) agree that there is a zone where *intrinsic* and *extrinsic* motivations merge. Huitt (2011) has depicted this in Figure 4.5.

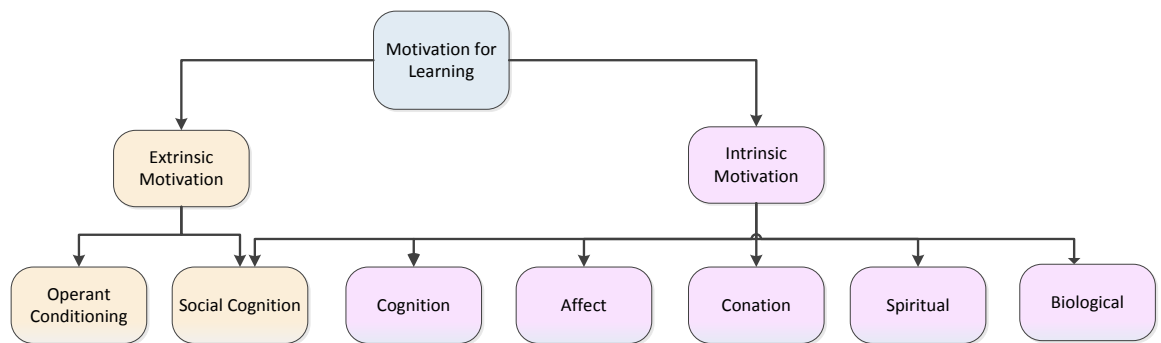


Figure 4.5: Categories of Motivation (Huitt, 2011)

As indicated in Figure 4.5, *extrinsic* motivation comprises *operant conditions* and *social cognition* components. *Operant condition* is a term in psychology that was first introduced by B.F. Skinner (Skinner, 1938; Skinner, 1953). It implies that behavioral changes can be observed and modified using positive or negative re-enforcements. Thus the concept of reward and

punishment can be applied to modify behavior of individuals (Weiten, 2013). Discussion in Chapter 3, as well as information gathered through literature review (Chapter 2) has indicated that there is a lack of operant conditions while teaching the skill of referencing. Thus to motivate students such conditions are proposed to be provided so that the students are motivated to do referencing.

Next is the concept of *social cognition*. This is defined as “Manner in which we interpret, analyse and remember information about social world” (Baron and Byrne, 1997). Students’ motivations are thus the influences of society and how one interprets them. They learn by observing behavior of others, and are motivated to achieve goals based on how they are perceived by others and by themselves (Calrston, 2013). This helps in the self regulation process, which is of prime importance for referencing skills. Students should be able to regulate themselves in performing this skill. However for this we need to see that their teacher or other seniors consider this task to be important and worth spending time on. However as stated in Chapter 3 students think teachers do not consider the task of referencing as an important one. In the proposed framework the teaching component is aimed to motivate students based on concepts of *social cognition*.

The next component that comes under *intrinsic* motivation is *cognition*. It is defined as “the act or process of knowing in the broadest sense; specifically, an intellectual process by which knowledge is gained from perception or ideas” (Webster's Dictionary). *Cognition* is intrinsically motivated (Reeves and Cole, 2001). Examples of cognition include maintaining attention to something interesting or threatening, solving a problem or making a decision and developing meaning or understanding. Our investigative study has indicated that generally students deem this activity as important; however, many students find it hard to perform and

face many difficulties (Figure 3.8). Thus it is proposed through this component of our intrinsic motivation to develop instructions for enhancing cognitive motivation for referencing skills.

Affect is defined as a feeling or emotion, and is different from cognition, thought, or action (Huitt, 2003), and examples include increase of feeling good, decrease feeling of bad, increasing security of or decreasing threats to self-esteem, maintain levels of optimism and enthusiasm (Huitt, 2011). As indicated in our study, (Chapter 3), the majority of the sample students had negative feeling about it, some “dreaded” referencing while others found it to be cumbersome and did not enjoy doing it. Our pedagogy should invest effort into developing a positive and enjoyable atmosphere for learning as well as practicing this task.

The next component of intrinsic motivation is *Conation*. It refers to the connection of knowledge and affect with behavior, and is associated with the issue of "why." It is the personal, intentional, deliberate, goal-oriented, or striving component of motivation (Huitt, 1999) for example meeting individually developed/selected goal, obtaining personal dreams, developing or maintaining self-efficacy and taking control of one's life (Huitt 2011). This aspect of *intrinsic* motivation is a strong force, and helps individuals to put in a lot of effort. In the field of referencing students who believe that this task helps them in enhancing their knowledge and in achieving mastery in their subject, consequently providing them the sense of fulfillment and satisfaction, are triggered by this motivation; however, the sample data collected through quantitative and qualitative tools (Chapter 3) suggest that the percentage of such students is relatively low. This motivation appears to be higher in the PhD students than in others. Therefore, there is a need to design instruction and interactive sessions including feedback to inculcate such motivations among students.

Biological and *Spiritual* aspects in *intrinsic* motivations also play vital roles. Many psychologists think that biological factors are a very potent force of motivation. Senses such as taste, smell, touch and hunger motivate a person to perform or act. We have mentioned this aspect of motivation for the completion of the topic; however, this aspect might not have a direct bearing on the task of referencing and citations.

On the other hand, the *spiritual* aspect of motivation deals, among other things, with the values we possess. These values come from ethical, moral and religious teachings. Values such as justice and providing the credit where it is due stem from the spiritual aspect of motivation. Hence, it is proposed that our pedagogical framework cater for this aspect by embedding such values into the instructional design. It is suggested that by triggering such motivations, the problem of plagiarism may be avoided, and students may be compelled intrinsically to give credit to the originator of the idea.

It is thus proposed that while designing instructions and providing feedback to students, all aspects of motivations be addressed. It is proposed that by doing so students will put more effort into practicing referencing. Furthermore, the literature review has suggested that many scholars consider *intrinsic* motivation to be more effective and lasting longer than *extrinsic* motivation (Richard, Ryan and Edward, 2000). Hence, it is suggested that while designing instructions, special emphasis be given on inculcating intrinsic motivations. In order to trigger intrinsic motivation, it is proposed that teachers should explain why learning the skill of referencing is so important and relate it to students need. Students should be presented with variety of activities and interactive exercises to stimulate interest, satisfaction and positive feelings such as “joy” or “fun”. For extrinsic motivation, it is proposed that timely and

comprehensive feedback be provided to students. Furthermore, they should be rewarded for the task that is performed accurately.

One important aspect that was highlighted during our investigation was the concept of the relevance of the task of referencing to the students' needs and future goals (Chapter 3). It was found that some students did not pay attention to this task as they did not consider it relevant to their goals. This is an important factor, and lack of relevance leads to low motivation in performing this task. Thus, it is suggested that this *instruction/interaction* component should incorporate the ARCS model of motivational design. This model was first proposed by Keller and caters for the aspect of Attention, Relevance, Confidence and Satisfaction (Keller, 2009). It is proposed that by incorporating this motivational model higher quality in referencing could be achieved.

Instruction/Interaction

Instruction/Interaction is the core component of the proposed framework. Through this component, students will be introduced and taught the skill of referencing and citations. This component is further utilized to conduct refresher sessions. It embeds all the pedagogical requirements directed by the three pedagogical theories discussed in Section 4.2. Furthermore, the motivational requirements highlighted in section 4.4.1 are catered through this component.

To incorporate behavioral aspects into our pedagogy, step by step instructions may be provided to learners, to ensure that they are able to reproduce same syntactic and semantic constructs for the task of referencing (Figure 3.9). Students will be familiarized with reference styles and their variations. This information will be provided for both in-text citations as well as for reference list and bibliographies. To enforce this skill and to assess students' understanding and performance, timely and comprehensive feedback on summative as well formative

assessment will be provided (Irons, 2008). This feedback will in turn re-enforce the concept by virtue of rewards in the form of grades/marks, as well as positive and encouraging feedback remarks, thus providing operant conditions for students and hence increasing the level of motivation for performing this task.

Cognitivist pedagogical aspects are proposed to be part of our pedagogical framework as well. This pedagogy is introduced so that students have a deeper and better understanding of underlying concept of referencing as they will learn the principles of this task and hence may be able to apply this for their various academic writings. Through this approach students will be able to retain and recall this knowledge for a longer period of time. Teachers are encouraged to use inductive methods of teaching in this case. Examples of *how* and *why* are proposed to be provided so that students understand these concepts. Again prompt feedback is required to let learners understand and practice this concept. Figure 3.8 and Figure 3.9 indicate that students' perceptions and experiences are strongly connected with the way this concept is taught. Furthermore, Chapter 3 has highlighted the fact that retention of this concept is not satisfactory and students tend to forget how to practice this task. Using this approach in the proposed framework it is expected that students will be extrinsically and intrinsically motivated triggered by the social cognition and cognition component of motivation (Section 4.4.1).

Moreover, investigative study has further suggested that students do not like to perform this task (Chapter 3). They find it difficult and uninteresting. For complete learning both cognition and affect should be taken into consideration (Huitt, 2009). For this our pedagogical framework will further adopt a humanistic approach for teaching and learning. This theory was first proposed by Maslow (1943) and is focused on the idea of self actualization (Mangal, 2007). According to Maslow, goals of learning includes discovery of one's vocation or destiny,

knowledge of values, acquisition of peak experiences, sense of accomplishment, satisfaction of psychological needs (Huitt, 2009). Through a humanistic approach of teaching, *affect, conation* and *spiritual* components of intrinsic motivation may be activated and promoted. Thus, the instructions may instill the feeling of satisfaction, sense of accomplishment and justice, leading to better referencing quality and reduction of plagiarism.

It is thus proposed that when the instruction/interaction component is informed and guided through the three pedagogical theories, students may be able to perform and appreciate the task of referencing

As indicated in Figure 4.3, this component has two subcomponents. The first of these is termed a training session, and the second subcomponent is interaction and timely/comprehensive feedback. The reason for separating training sessions from interaction and feedback subcomponent lies in the manner by which this task is taught and exercised during educational tenure at higher education institutes, i.e. formal mode (training sessions) and informal mode (feedback for this task only). We will now look into these two subcomponents in detail.

Training Sessions

Training sessions for any skill are the most important part of learning (Prais, 1995). We need to get trained for skills. Equally important are the refresher sessions. Thus, this subcomponent is of prime importance. It is proposed that for the skill of referencing and citation there should be mandatory formal training sessions, teaching students the science and art of referencing and citations guided by the above mentioned pedagogical approaches. Additionally, any electronic and otherwise guiding material should also be mentioned. During training sessions following main aspects should be highlighted.

Purpose of Referencing: Students should be sensitized to the purpose of referencing and citations. They should be informed why referencing is practiced, why it is important for them to practice it, and what are the disadvantages of not providing references within their academic documents.

Syntax and Semantics of Referencing: Students should be informed about the salient components of referencing, such as, name of the author, date of publication and so on. They should also be informed about the sequence in which such information is placed. This sequence is determined by highlighting the style of referencing to be used. These rules are applicable for both the reference list and in-text citing. During training sessions, it is equally important to explain the semantics of referencing. Students should know what words and phrases to use while citing, how to connect their thoughts and ideas with that of the cited authors to produce meaningful writings.

Software Tools and Websites: During training sessions, students should be informed about existing software tools, as well as digital libraries to facilitate and educate them about current technological aid available to them for referencing. They should be introduced to the concepts of reference management software and guide them in using it.

Undesirable Practices in Referencing: For quality referencing it is important to inform students about undesirable practices in referencing and citations. Students should be warned against errors introduced due to carelessness, such as missing or partial referencing, spelling mistakes, inconsistencies in using reference styles and issues due to copy past.

Plagiarism: Another undesirable practice is that of plagiarism. It is segregated from *undesirable practices* because it is a serious issue, and its penalties are stronger. Plagiarism does

not stem from carelessness but it is considered to be intentional omission. Students should be specifically made aware about the dangers of plagiarism.

Interaction and Timely/Comprehensive Feedback

The above concepts are taught by using the three pedagogical theories mentioned above. One common aspect within these pedagogical approaches is “feedback”. Feedback is necessary during the training session as well as during the modules in which referencing is required for the coursework. The above mentioned aspect of training should be re-enforced during the feedback provided on formative and summative assessments.

Therefore, the second subcomponent of the current component is interaction and timely/comprehensive feedback. Interaction is mostly exercised for the tutored students. Teacher and students should have discussion in a class as well as on individual basis about the referencing task during tutorial sessions and classes. Furthermore timely response holds a significant position in the effectiveness of feedback (Irons, 2008). It has been stated “feedback” should be timely in that it is received by students while it still matters to them and in time for them to pay attention to further learning or receive further assistance” (Gibbs, 2010). Authors such as Bryan and Clegg (2006) and Ramsden (2003) have emphasized the importance of turnaround time for the feedback, and have stated that it is of prime importance for effective learning.

The above discussion highlights the fact that timeliness should be an important constituent in teaching about references and citations. Students should get feedback on their reference skills before they get the next assignment. This will provide them the time to reflect on the issues highlighted in the feedback. Furthermore it may inculcate the impression among

students that this task is considered important by their teachers, thus increasing the priority of this task.

The investigative study conducted during the first phase of the research work (Chapter 3) highlighted the fact that students strongly desire comprehensive and precise feedback both for the formal training sessions and for informal mode where referencing is practiced but not formally taught. They want the feedback to be detailed and guide them to improve their referencing skills. This desire is not dependent on the subject students are taking or the level of study at which they are studying. Although some studies in the literature indicate that grades sometimes tend to have negative effect on the learning capabilities of students (Guskey, 2011), our investigation has shown that students want summative assessment of their work. According to Ramsden (2003), assessment defines the higher education curriculum in students' eyes, and it is known that "action without feedback is completely unproductive for a learner" (Laurillard, 2002). Furthermore, it is evident from various researches that high quality feedback is the most powerful single influence on student achievement (Hattie and Timperley, 2007; Brown and Knight, 1994; Irons, 2007). Hence assessment has long been viewed as the catalyst for improvement in teaching and learning (Beaumont, O'Doherty and Shannon, 2011; Joughin, 2009).

As discussed above, the two subcomponents of the framework have great value individually for teaching and learning. However to provide the optimum learning experience for the skills of referencing and citation it is imperative to use these subcomponents collectively. It may be safely stated that feedback alone cannot provide the best teaching for referencing hence a training session or a refresher workshop for this task is essential. In the following subsections we present three scenarios to indicate the importance of integrating training

sessions and feedback. The aspect of feedback is further divided into two separate parts i.e. *timely feedback* and *comprehensive feedback*.

Training Followed by Timely Feedback

When a training session is followed by timely feedback, students will get prompt responses to their work on referencing. This is good practice and at the beginning may be endorsed by the students. It may also indicate to the students the importance of this task by their teachers. However, if the feedback is not comprehensive and pinpoints the precise issues in referencing, students may soon lose interest in the feedback and may not look at it (Irons, 2007). This will in turn have a negative effect on learning and the retaining effect of the training sessions, and the learning experience of the students may not be optimal.

Training Followed by Comprehensive and Precise Feedback

In the second scenario, students get a refresher session or training on the task of referencing. They also get comprehensive and precise feedback for formative and summative assessment – however it is not timely. As indicated by some of the students during our investigation, the return time is about one month. During this time, students continue with their coursework or additional assignments. They do not get the opportunity to find where they went wrong for their referencing skills and make the same mistakes in the coming assignments (Irons, 2007). This scenario leads to negative progress in learning for the students. They do not have any time to reflect on the errors they made and to correct it in coming work. Hence, the benefit of comprehensive and precise feedback is minimized and optimal learning is not achieved.

Timely, Comprehensive and Precise Feedback

In this scenario, students are not provided with any training sessions for the skill of referencing, as stated by some in our investigative study (Chapter 3). An important aspect of education is missed. It may be argued that comprehensive feedback may compensate for the absence of this training; however, feedback cannot replace the training material.

Hence, it is evident that all subcomponents of this component are an integral part of our framework. Each part has its significance – if any of these subcomponents is absent then optimal results are not obtained.

Furthermore it is important to mention that the content of the feedback provided should not only be understandable and positive for the students but should also be in line with the information provided to the students during training sessions (Irons, 2007), and it should not conflict with the knowledge provided to the student during training. Hence it is proposed that the two subcomponents synchronize. The reason for this is that the training session is usually only conducted once in a term (i.e. at the beginning of the term). Later assignments or coursework requiring references are given subsequently.

This framework proposes continuous training sessions and refresher workshops for referencing. Based on feedback about the referencing task, training can be altered and improved (Johnson, 2001). This is possible by analyzing the contents of the feedback provided to the students in earlier modules and determining the problem areas. Training sessions can be updated based on the problem areas identified through analysis.

Automation/Re-enforcement

The third and final component of our proposed framework involves the aspect of automation, using software technology and the concept of re-enforcement of the knowledge of

referencing and is hence titled “Automation and re-enforcement”. From chapter 3, we have learnt that it may be difficult for staff members – especially those who do not teach an academic writing skills course – to look at each and every reference cited by the student. This fact is evident by the questionnaire responses from teachers as they did not know which item of the reference list in particular is frequently cited incorrectly. The interviews also indicated that the staff members just try to get the overall impression of how the references are cited. They may not check or verify whether the references have incorrect names, titles, volume numbers etc., because there is not enough time to do so and because staff members might not consider it to be their task to check such things. Furthermore, it may be hard to determine if the same feedback is provided to the students for the same or similar errors. This means that the feedback we provide to students may not be consistent for all.

Evaluating each reference either in text or in a reference list/bibliography, for accurate formatting and content, is also a time consuming activity (See Chapter 3). In the case where the number of references for each assignment or document is large, checking becomes a tedious and time consuming task. Considering the number of assignments and the student-staff ratio, it becomes exceedingly difficult to spend this much time and attention on the referencing task. Hence providing timely feedback is a challenging undertaking.

Automation

In order to resolve such problems and to support teachers and students, the first subcomponent of the component *facilitate/re-enforce* is introduced, i.e. an *automated(software based) system*. This automated system should be guided by the pedagogical requirements laid down in our second component i.e. *instruction/interaction*. Users of this system may be both students and teachers. The module that facilitates teachers should have sub modules to allow

teachers to provide instructions, examples and interactive exercises for referencing skills. It should also have a module in which teachers would provide contents for the comprehensive feedback. It is further proposed that teachers have some analytical tools to analyze the progress of their students and see how they are performing as individuals as well as a group/class. For students it is proposed that they be provided pedagogically driven online instruction on how to learn this skill. Students should be able to get timely and comprehensive feedback for their task of referencing.

Spaced Repetition

The next subcomponent for this component is *spaced repetition*. The concept of 'spaced repetition' was introduced as early as 1932 (Wozniak, 1995). This theory was further developed during the 1960s when cognitive learning was coming into the picture. Many papers and research studies to date have indicated the importance of the repetition of teaching concepts, ideas and skills. Regarding the repetition of such training, spaced repetition theories have proved that repetition of training can be good for fixed interval repetition as well as irregular intervals (Cepeda *et al.*, 2009). For this component, we propose that training sessions should be repeated for all the modules that require referencing in their assignments or coursework. The advantages of spaced repetition (Cepeda *et al.*, 2008) are as yet not being provided to the students. The main advantage of spaced repetition is the retention of the skill even after the end of degree course (Cepeda *et al.*, 2008). Hence, it is anticipated that if the concept of spaced repetition is not employed, the main purpose for providing this skill may be compromised, and students may not remember how to cite once they leave their university.

4.5. Operational Model for FESR

The operational model indicates the mechanism through which FESR may be implemented. Proposed FESR encompass students and teachers in the academic arena and may be extended to accommodate professionals who strive to make their references error free – hence avoiding getting their journal papers returned to them. For the implementation of FESR therefore, there are two scenarios. The first scenario is class based – i.e., where students and teachers engage in teaching through a traditional classroom environment, or a blended mode – the scenario may also include online teaching and learning. The second scenario is for students and professionals who want to learn on their own and achieve excellent referencing work. In both scenarios to achieve our aims of enhancing referencing skills, an operational model is required. This model should be practical and easy to implement, so that it can be used by as many people as possible. Thus we need to:

1. Design our academic writing skill tutorials in such a way that students get all necessary information for referencing and citation based on pedagogical requirements
2. Devise a mechanism for providing timely and comprehensive feedback to the students on various aspects of references, and do it repeatedly
3. For the tutored or class based scenario, facilitate staff members in providing guidance and feedback to students repeatedly, on time and comprehensively

The operational model caters for both the instructional aspect of references and citations and a comprehensive and timely feedback mechanism. This model fulfills the aims of the framework and thus caters for the needs of all levels of education – i.e., for the undergraduate level as well as for the postgraduate level of education. It further aims to

encompass the enhancement of referencing skills amongst independent students (for example PhD students), and all those who want to check their assignments before submitting it. Thus, as stated above, it is for all domains of knowledge and is not restricted to Computer Science or Management Sciences. Furthermore, this model can be used by professionals of all domains of knowledge. A high level representation of this model can be seen in Figure 4.6.

Operational Model for FESR

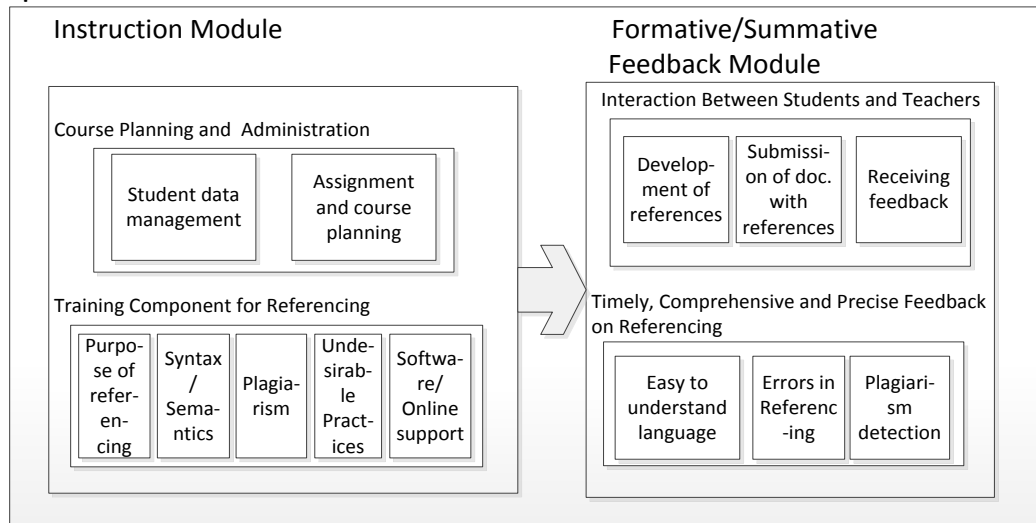


Figure 4.6: Operational Model of FESR

The model shown in figure 4.6 has two major modules. The first module is called the ‘instruction module’. The first subcomponent of the second component of framework resides within this module. This sub module has two units. The first unit prepares for all the necessary pedagogical and administrative needs. The second unit is called the “training component for referencing”. This is the core of the second component of our framework and has all the salient features embedded in it. The second module of the operational model also consists of two units. The first unit in this module indicates the interaction of documents between the student and the teacher. This includes the submission of documents/assignments along with references and obtaining feedback on these activities. This unit is highly important as it indicates the process of enhancing referencing skills among students. The second unit of this module encapsulates all

aspects of feedback, be it comprehensive, timely or precise. It further indicates that the feedback is given on the errors in referencing, as well as identification of plagiarism. The arrow indicates the direction of information between the two modules. We will discuss each of the modules and the units within them in detail, and propose a mechanism for them.

Instruction Module

This module is the launching pad for the skills of references and citations. In this module preparations are made to provide training to the students on referencing skills. Each of the two units in the module aims to help students/users to learn about referencing.

Course Planning and Administration

Multiple dimensions can be added to this unit. We have highlighted two sections, the first section is the course planning section. For the tutored or class based cases/scenario the teacher organizes and plans their course. They develop assignments and coursework that require students to provide references. Teachers also plan the number of students in group assignments etc. The second unit is termed as the administrative unit, and it has been added into the operational model to allow administrative tasks to be done, such as registering students to the class and collecting their data. It is proposed that electronic media be used for all these activities.

Training Component for Referencing

This unit aims to provide necessary instructions about references and citation skills. These may include providing workshops, revision sessions and/or written material to enforce and refresh knowledge about developing reference lists/bibliographies and in-text citations. The model also provides directions about the information necessary in these training sessions as discussed in section 4.4., specifically:

1. Information about the purpose, ethics and moral values involved with this task
2. Training on how to cite references within the text and in the reference index or list
3. Information about the reference styles, why are there different reference styles and which one is used in the university or used for their domain of knowledge
4. Information and guidance about software tools, online tutorial and guides
5. Sensitizing about plagiarism

The above components are derived from our investigative study (chapter 3). They are essential for providing clear and comprehensive knowledge about this skill.

To ensure that such a mechanism for providing this information on a regular basis is consistent, it is proposed that training sessions are provided by librarians, since they usually have dedicated resources and individuals who are trained in providing this training. It may also be provided by the tutors of academic writing skills, as they have sufficient knowledge and background about this task. In the scenarios where students or the users do not have access to live training sessions and workshops, it is proposed that this information be provided to them through electronic media and cyber space. Hence appropriate tutorials and guides should be made available to the users and they should be guided to visit these sites and refresh their memories and skills about referencing.

Formative/Summative Feedback Module

Preparations and training provided in the first module of the model is applied to the second module (i.e., in the module for formative and summative feedback). This module has two important units and are discussed in the following subsections

Interaction between Students and Teachers

The first unit allows students or users to develop references for their assignments, coursework or any document that requires references. Students need to follow the instructions given in the training sessions to locate good reference sources and cite them correctly. Once they have developed the reference list and their assignment is complete, students submit them. Students may submit their work in a traditional hard copy form. However, our model proposes the submission be done in electronic mode. Thus, in using the operational model of the framework, it is required that students submit their work electronically. After submission of the document/assignment by the students they should receive feedback on this referencing task. This feedback may be provided as a report, electronically to the students and should reach the students' email accounts. The reason for sending feedback through email is that the student can access the feedback from anywhere (e.g., at students' residence or on university/college campus). In this way, students can access their feedback reports easily and reflect on the problems that are highlighted in it.

Timely, Comprehensive and Precise Feedback

An investigative study (Chapter 3) has shown that the major demand of students has been for a comprehensive and precise feedback. Timely feedback plays a vital role in enhancing the learning skill of the students. Both of these aspects of the feedback (i.e. comprehensive, precise and timely feedback) are salient component of the framework. The first unit mostly deals with the other side of these two components (i.e., development and submission of the documents on which such feedback is provided and receiving this feedback in the form of electronic report). This unit concerns how to provide such feedback.

The word “comprehensive” is defined in the Oxford English dictionary as “including or dealing with all or nearly all elements or aspects of something”. Therefore, when comprehensive feedback is desired, feedback on all aspects of referencing is needed (i.e., feedback should be provided on issues pertaining to the formatting of references and on problems of incorrect data in the reference list – such as incorrect name, date volume number, etc.). Comprehensive feedback also requires that issues of missing data in the reference list are highlighted. Furthermore, it is not sufficient to identify the errors in the reference list but it is even more important to provide the correct information/data for the highlighted issue. Thus, comprehensive feedback means identifying all sorts of errors in the referencing task and providing correct solutions for these errors. Doing so will enhance the learning skill of students for this task. Furthermore, identification of plagiarism should also be done and highlighted in the feedback provided to the students. If summative assessment on referencing is required by the course, feedback should also include grades.

Moreover, comprehensive feedback also implies that the content of the feedback is easily understandable by the student/user – it is well presented and easy to decipher. Thus the report sent to the student should have all the above features.

“Precise” feedback requires that feedback should pinpoint the exact location or the item in the reference list where each error is encountered or identified. Thus if the error in one of the references is “Incorrect name of the author”, the contents of the feedback should read something like “The name of the author for this reference is incorrect”. If the date in a reference is missing, feedback should point this out by saying “Date for this reference is missing”. Or if the reference list is not in alphabetical order, the feedback report should identify the exact reference which is not in alphabetical order.

Timely feedback implies that students should receive the above report in a timely manner. The return time should be short. It should allow students to view and reflect on errors that are identified in the report. In the tutored/class based scenario, students should be able to avoid such errors in the next assignment and also see the correct values. For the un-tutored/independent students and professionals, they should be able to correct these errors before submitting the final documents or paper to the journal.

Software Solution

The third component of the proposed framework highlights the automation of this operational model through the use of software. In this section we will discuss it further. An extensive search was done to find such software solution on the market/internet. The question about the existence of such software was put to our teachers in the questionnaire and interviews (chapter 3). Responses to these questions indicated that staff members/teachers have never heard about such a software system. It was therefore concluded that the required software solution does not exist and needs to be developed to make the framework operational. In the next chapter we will discuss about the development of such software.

We will now briefly discuss how this software can be utilized to implement our FESR Model. As there are two scenarios i.e. tutored/class based and untutored/student based we will discuss both cases separately.

Tutored/Class Based Scenario

For the scenario where tutors are available, the following scheme is proposed:

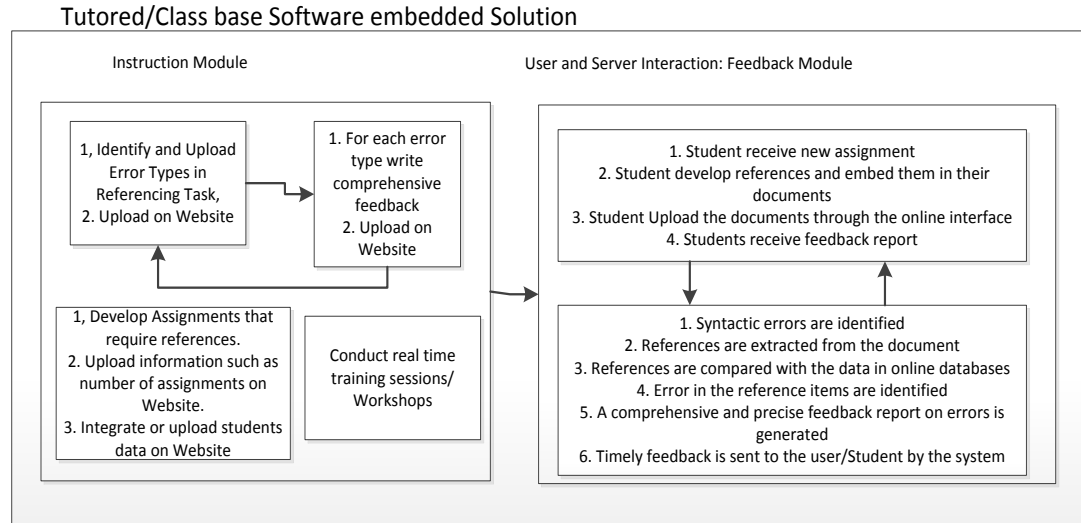


Figure 4.7: Tutored/Class Based FESR

Figure 4.7 explains the software embedded operational model for FESR. Here we see that the instruction module has 4 processes. 2 processes are completely software based (i.e. error type and feedback content process). It is proposed that before the start of any course, tutors (especially those who will be delivering training sessions) should be engaged. They can identify errors that may occur, such as formatting errors, missing data errors and incorrect data errors. After identifying these errors they insert these errors in the software solution. For each error identified and entered into the software solution, tutors enter the feedback contents for it – i.e., each error should have its corresponding feedback text. Arrows between these two processes indicate this relationship.

Within the instruction module, the next process is for the course leads (the tutors who will conduct the given course) to develop assignments for the course and enter the data (such as assignment number) in the course and its description into the software. This activity will help in generating feedback reports at later stage. The last process in the instruction module is the actual training session. This training session may be conducted by the tutors of the academic writing skills course or by the instructors from the library as mentioned in earlier sections. It is

important to note that the all the features mentioned in the training session unit in figure 4.6 should be incorporated in this process.

Once all the processes of the instruction module are conducted, students and software systems will be ready to receive assignments and generate the comprehensive, precise and timely feedback. The arrow connecting the two modules indicates the sequence of events – i.e. the instruction module is conducted first for each course followed by the feedback module.

The feedback module has two distinct processes. The first process is student based and the other is system based. All the activity performed in the student-based process involves students' intervention and responses. Thus students receive assignments from their tutors, they develop their assignments and embed references in them. Students submit their assignments electronically – i.e. through email or an interface developed for this purpose. After submitting assignments, students get feedback on their work in the form of a software generated report.

It is proposed that the second process in this module is fully automated. In this process references are checked for all the errors types and a comprehensive report is sent to the students. Since this process is completely automated the time required to provide feedback to students is very short. This process will be discussed in detail in the next chapter.

Un-Tutored/Student Based Scenario

For the un-tutored scenario, the system will be pre-populated with various error types and corresponding feedback contents. Students will be encouraged to go to the sites to refresh their referencing skills before uploading the documents containing the reference list/bibliography. This scenario is shown in Figure 4.8:

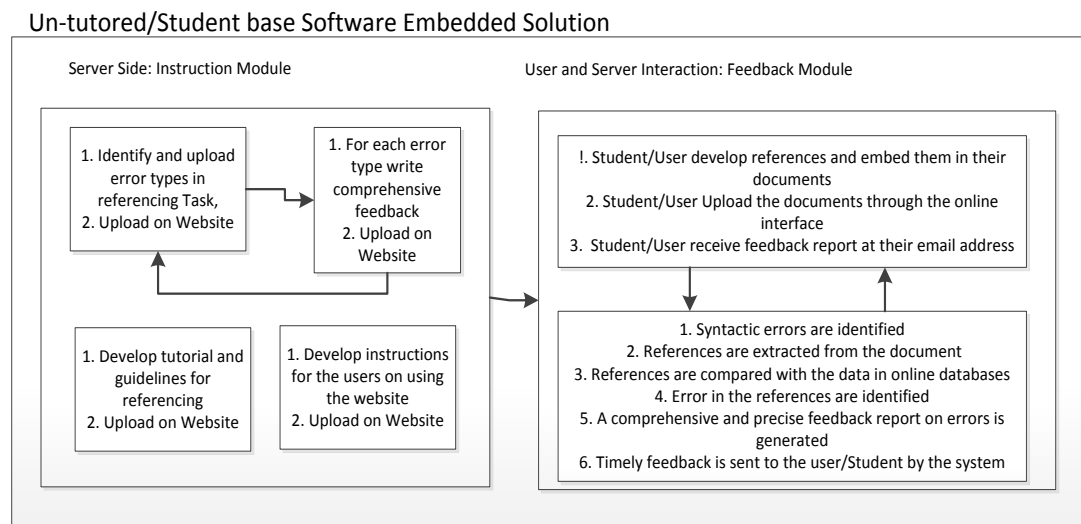


Figure 4.8: Operational Model for Un-tutored/Student Based FESR

Figure 4.8 explains how our operational model achieves the aim of FESR for students and individual professionals. As is evident from this figure, the feedback module is similar for both scenarios – users embed references into their document and upload the document to the website through an interface especially developed for them. This document can be a students’ assignment, or academic papers. Similarly professionals may also use this model to get feedback for their reference indexes, in-text citations and bibliographies.

The instruction module indicates differences between its counterpart module in the tutored/class base scenario. The major difference is that this module is not course specific. It is solely for the task of referencing. No assignments are developed and their data stored. There is no need to store student/professional/user data. Thus, the administrative unit has a different role here. Furthermore, there is no real-time live training sessions proposed for this scenario. Instead computer based tutorials and guides should be made available to the students in the online mode. Students should be strongly recommended to visit these tutorials and guides to refresh their memories to get the benefit of spaced repetition concept embedded in the

framework. These training tutorials should contain information about the aspects highlighted in our operational model (figure 4.6).

The important processes of entering error types and corresponding feedback contents can be entered into a database by a specialist of the field and can be considered as a one time job. Instructions on how to use the website should also be uploaded on the server.

Hence, through the software based implementation of the operational model of FESR, the scope of utilization and enhancement of reference skill is proposed to be achieved.

4.6. Discussion

It is interesting to note that a skill that has been practiced since eons is still far from being perfect(Chapter 2). Scholars and academicians have not only been practicing the skill of referencing but have been trying to improve its mechanics. This effort has increased since the advent of computing and digitization (Chapter 2).However literature review highlights the fact that even in this era the problems of erroneous references within academic writings of scholars and students at higher education is predominant. The answer to our first research question (**RQ1** in Chapter 1) highlights the issues faced by students in acquiring excellence in references and citations task. We also gained an insight into teachers' perspective about this activity (Chapter 3). However more interesting and useful aspect is to determine a solution that improves this task (**RQ2** in Chapter 1).

Therefore the solutions for the underlying issues, to produce error free referencing, were sought. It is discovered that the methods of teaching this skill are not adequate and need to be upgraded. After reviewing various pedagogical frameworks, it was found that none of the existing frameworks are dedicated to improving references and citation skills, and they do not

provide solutions to our specific need. Generic educational frameworks exist that encompass overall pedagogical aspect of teaching. The framework provided by Charlotte Danielson (Danielson, 2013) is widely used in USA and focuses on teachers' responsibilities as well as activities in education. Several research works are being conducted to identify the methods of reducing the gap of students learning a concept and retaining it even after their academic education tenure (Lindsey *et al.*, 2014).

Hence a new and practical framework is proposed in this chapter. This framework provides answers to issues highlighted in the investigative study. Components of this framework aim to provide sustainable lifelong learning of the skill of referencing. Information in this chapter has indicated interesting pedagogical and humanistic aspects to a skill which is deemed as simple and straightforward. Many academicians may argue that referencing is behavioral in nature and can be enforced using behavioral pedagogical approaches. However our investigative study (Chapter 3) has suggested that for a better quality of referencing it may be important to activate higher cognitive skills and it may also depend on the motivational stimuli. Furthermore it is interesting to know how a humanistic approach to teaching and learning is embedded in performing this task. Humanistic learning theories have powerful implications for learning since they are human centered and tasks such as referencing and citations may get affected by aspects that involve human emotions and spiritual values. It seems reasonable to state that referencing skills comprise various attributes. It is something that a student or an academic author should be in the habit of performing, at the same time these individuals should be able to understand deeper meaning and methods for seemingly effortless integration of their ideas and those from whom they refer so that their writings are not just technically accurate but more effective, hence involving higher cognition attributes and comprehension. Therefore the pedagogical approach suggested includes information from the three pedagogical theories

highlighted in section 4.2, and explained in section 4.4.2, respectively. For better quality referencing students should be able to continue practicing this task in the professional life; however, human psychology indicates that if certain ideas are not re-enforced from time to time they start fading from memory. The component of repeated training sessions is based on the theory of spaced repetition. By including this concept we propose that the issue of retaining the skill of referencing is reduced. This skill is further enforced by the component of timely feedback and comprehensive/precise formative and summative assessment

The operational model of FESR provides a roadmap for implementing this pedagogical framework. It is interesting to note that while building an operational model for FESR we discovered that this model could also be utilized by professionals as well as by the students who want to check their own work before submitting. This shows the generic and yet focused nature of this framework. It aims to facilitate teachers in providing feedback (both formative and summative) however at the same time it is applicable to a wider audience – i.e. students as well as professional academics.

The categories of students who may benefit from this framework (and hence the operational model of this framework) are students who want to check their assignments before submission, students who do not have any class tutors and are studying on their own, and PhD students who need to submit papers to conferences and generate academic documents for their research. Each of these categories of students needs to verify and then rectify any reported errors. It is worth mentioning that in spite of the many reference management tools available there are errors in students and professional scholars' work. Through the operational model a last minute check can be made on the references.

For the staff members/tutors of the class based scenario, this framework and its corresponding operational model can be of great help in saving time in assessing and marking of the references. This time can then be utilized in preparing and updating the contents and methodology of teaching their course. At the same time their students get detailed feedback on this particular task, and it is proposed that in turn the students learn referencing skills.

The following section briefly summarizes the benefits of the proposed FESR.

4.6.1. Benefits of FESR

The expected benefits for this framework are:

1. For each module that a student studies, a session to refresh them about the working, usage and benefits of references and citations will be reiterated.
2. Students will get timely feedback. Based on this feedback, students will be able to improve their referencing work for the next assignment/academic work.
3. Staff members will have a reduced burden of marking/providing feedback for students' referencing tasks and spend more on analysis and teaching
4. For the un-tutored model, students will have the benefit of getting feedback on their work by simply uploading their documents. They do not have to do anything extra. Thus, their time will be saved and they will have better chances of getting good grades.

Hence, it is anticipated that not only the number of errors in referencing and citation will be reduced during their academic career but also that the student will carry this practice into their professional life. This in turn will lead to better bibliographies and reference lists, thus fulfilling the objective of the proposed framework (Section 4.4.1). With the help of FESR we hope to answer our second research question (**RQ2**).

4.7. Conclusion

In conclusion we state that the proposed framework has encompassed all the problems highlighted by the students and teachers who participated in this research. This framework is proposed to affect only the referencing skills of the students and is totally independent of the level of education of the students and other users. FESR is not dependent on the domain of knowledge – the student/user may be from the domain of science, social science, humanities, business, medicine, etc. Since the operational model of the framework is based on a software solution and we have talked about uploading contents on a “website” we indicate that the aim of this framework – and therefore, the model – is widespread.

We can further conclude that the proposed framework can be adopted by universities, colleges and at any place where references and citations are considered important and is part of the workflow. This may therefore include any research and development organizations or companies.

In this chapter we have proposed FESR. The next chapter will elaborate on the software development aspect of this framework. We will discuss various requirements for the software in detail and how it can be used for the proof of this concept.

Chapter 5

Software Solution for FESR

5.1. Introduction

In Chapter 4, a pedagogical framework (FESR) was introduced. The aim of this framework was to reduce the errors in referencing in academic documents of students by using pedagogically driven instructional designs along with the concept of re-enforcement of these concepts. It is further stated that FESR may also help professionals to improve their referencing skills. Chapter 4 further describes the development of an operational model for this framework.

In this chapter, we focus on the software-enabled units of the operational model. Since two scenarios are presented for the operational model we will discuss both of them, and show how a software solution can help in achieving the aims of the proposed framework. The next section (Section 5.2) highlights the components of the operational model that is to be computerized. Section 5.3 discusses the analysis, design and implementation of the prototype developed for providing proof of concept of the proposed framework. This prototype interacts with online digital libraries and digital catalogs in order to evaluate students' referencing data. This section further discusses some protocols for accessing digital library catalogs. Section 5.4 summarizes this chapter.

5.2. Software for Operational Model of FESR

The operational model explained in Chapter 4 highlights the fact that it aims to work for both staff members/tutors in the tutored/class base scenario as well as for the student-based scenario (untutored). The tutor-based scenario requires the software to be developed

considering tutors as users because tutors will be the owners and operators of the software solution. Software for the un-tutored/student-based scenario is aimed to be used directly by the students.

The software components of both scenarios are highlighted in the following figure.

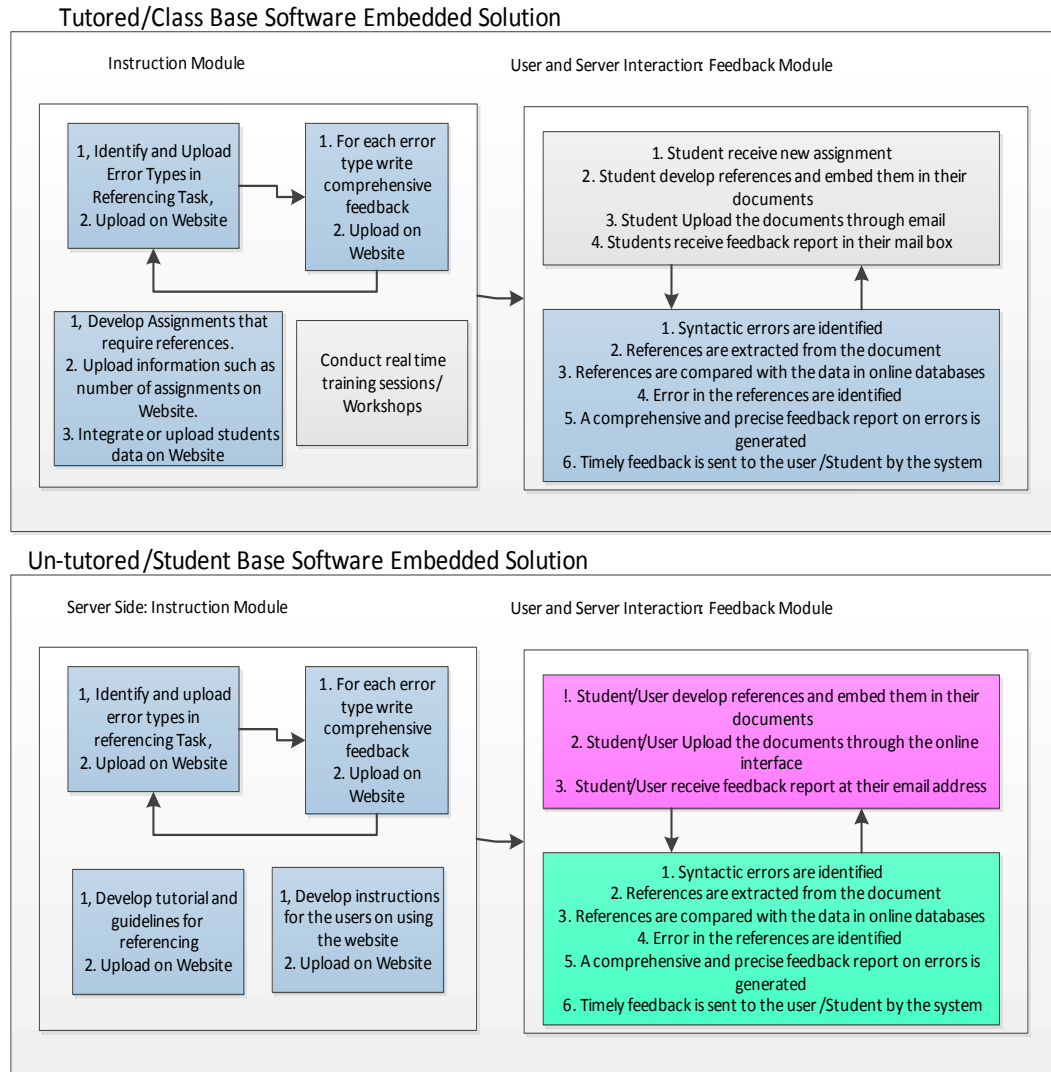


Figure 5.1: Software Components of the Operational Model

Figure 5.1 highlights all the components that require a software solution. For both the scenarios (i.e. tutored as well as un-tutored), the sections highlighted in blue indicate areas where a software solution is required but also require tutors/consultants intervention for its

initialization and working. The student interface for the un-tutored scenario is highlighted in magenta – this part requires a software solution, and is used by the students to upload their documents. In the un-tutored model, the feedback provision component is used – this is the area colored with cyan. A software solution is required for this part, and does not need any intervention by tutor/consultant or students – this is a fully automated unit, and should be triggered when students upload files. The two gray colored parts in the tutored case indicate that a software solution is not required, and the existing infrastructure can be utilized (electronic or otherwise). For instance, no software needs to be developed for the student activity part in the tutored scenario diagram. Students submit their assignments through email or by any other electronic mode. In the same scenario, the training session is done in person by tutors or library staff members, and thus does not require a software solution to be developed.

5.3. Prototype: Reference Skill Enhancement Software Solution

(RSESS)

Despite a thorough and rigorous search to find an existing software solution that supports our operational model, it was found that such software was not available (Chapter 3). However, since software solution was a salient part of FESR and was required to implement the operational model therefore effort was put to develop it. For this research a prototype of the software solution was developed. The purpose of the development of this prototype was to have a proof-of-concept for the proposed framework. This prototype is by no means a full production suite. The following subsections discuss the methodology taken for the development of this prototype, the requirements identified for the software, its high level design and its working.

5.3.1. Methodology

There are many software development lifecycle models to develop software. These include the Waterfall model, Boehm spiral models and, Agile models, as well as the development of prototypes (Sommerville, 2011). The decision to adopt a particular method for the development depends on the product that is to be developed and the project resources including the timescale (Holodnik-Janczura, 2010). A research study conducted by Holodnik-Janczura indicates that medium to large scale development is generally supported well by spiral models; however, more rigid small to medium scale development uses the waterfall model. For our research work, we needed software to provide us with a proof of the concept – i.e. a method that can highlight the effectiveness or otherwise of the proposed framework and its operational model. In order to do so, the most appropriate method is a prototyping method that utilizes the waterfall methodology. We aimed to build an evolutionary prototype (Budde, *et al.*, 2011) so that the software that comes out of this effort can later be converted into a fully developed system which could be marketed in the future. In this approach, both horizontal and vertical prototyping is done, i.e. dividing the system in such a way that some of its features and functionalities are represented in breadth and some are represented in depth (Hartson and Pyla, 2012). These features and functionalities are explained in section 5.3.5.

5.3.2. Requirements for the RSESS

The requirements for the development of the software (Wieggers, 2003) are extracted from the operational model of FESR, as discussed in section 5.2. They are presented as points below:

1. The software should allow the user to add/update all possible types of errors in the referencing.

2. For each error type updated by the user, the user should be allowed to enter/update the corresponding feedback contents and associate it with that error.
3. For the tutored scenario, the software should allow information about the students (such as their name, university number and email address) to be uploaded.
4. For the tutored scenario, the software should allow the tutor to upload the students' assignments.
5. For the tutored scenario, the software should allow information about the assignments in the given course to be uploaded.
6. Tutors should be allowed to process one or more assignments at the same time to provide feedback to the students.
7. For the un-tutored scenario, an interface should be provided to students/users through which the students can upload their documents.
8. For the untutored scenario, Information about the training material (such as guidelines and tutorials) should be made available online.

This model provides guidelines on providing feedback such as the extraction of references from the document, comparing this data with online information available in digital catalogs and generating reports for the errors found in referending. In order to identify errors in the lists, it is essential that the system knows about these errors. Therefore, the software should allow users to enter all possible error types that can be encountered for this activity. Hence it is required that this information be entered and maintained by the experts/consultants/tutors who are involved in teaching and evaluating references.

Furthermore, once errors are identified, they should be reported in a manner and language that is clear, concise and understandable to the recipient of the report (e.g. students).

This information may again be entered by the professionals who teach this skill; although it could be argued that the content can also be provided by class teachers, since they would know the level and calibre of their students. The software should allow such individuals to add this content for each error type and let the content be updated as per the tutors' varying requirements, due to students' performance.

In order to generate feedback reports for each student in the tutored scenario, it is required that students' data be provided to the system. Thus the software should provide a mechanism to add these data. Student data include student name, student ID, course ID and email address, which allows the software to email the report to the student.

To generate the report, it is also essential to know the information about the assignments for which this report is being generated. Therefore, the software system should allow the tutors of the course to enter information about the assignments – such as the course for which the assignment is provided, assignment number and a brief description of the assignment. All these requirements are needed for the administrative unit of the operational model of FESR, as mentioned in chapter 4.

In the tutored scenario, the operational model indicates that when students send their assignments through email or to some system devised by their respective departments for uploading these documents, course tutors upload these assignments onto the RSESS. Thus, the software should allow the tutors to upload these assignment documents. This is a very important requirement, since the feedback report cannot be generated if the students' work does not exist.

For the un-tutored scenario, the operational model directs us to provide an interface to the user for uploading their documents. Thus, there should be a provision to add a user name

or any other identification. The interface should allow the user to provide their email address, since the report will be emailed to the user, and of course the mechanism to upload the electronic copy of their document.

As mentioned in the tutored scenario of FESR framework, tutors are the users of this version. Tutors should have the option to process all the assignments in bulk or have each assignment processed individually. The second option is necessary mainly for exceptional cases – for instance, if the assignment was submitted late or there was some need for the resubmission. Furthermore, it is required that tutors should have the option to let the report go directly to the student or receive any necessary intervention and additional comments.

For the un-tutored scenario, the operational model guides us to have online guidelines and material for the training component of the framework. Hence, it is required that such information be provided to the users, so that they may refresh their concepts for better understanding and retention.

5.3.3. Analysis of the Requirements

Analysis of the requirements is an essential part of software development lifecycle (SDLC). During this phase, requirements from the customers are analyzed to understand the problem at hand. Two types of requirement analysis exist; the first type is called customer requirement analysis (C-requirements), and the second type of requirement analysis is called developer or detail requirement analysis (D-requirements) (Cromar, 2013). For the development of RSESS, both requirement analyses were conducted. The purpose of these analyses was to have information for the architectural design of RSESS (which will be discussed in the next sub-section of section 5.3.4).

From chapter 4 and from section 5.2 of chapter 5, we understand that there are two specific scenarios for developing and using RSESS – we may call them our two main use cases. A use case is defined as “a software and system engineering term that describes how a user uses a system to accomplish a particular goal” (Techopedia, 2013; Wiegers, 2003). A description of both use cases is given below.

Use case 1: Tutored/Class Based System:

The following use case diagram (figure 5.2) explains the working of tutored base system.

Actors

There are three “actors” in this use case. The first is the tutor, the second actor is the student; these two actors are the primary actors of the use case. The third actor is the digital library catalog; it is an online catalog with which the system interacts to achieve its goal, and it is called the secondary actor of this use case. This is shown in figure 5.2.

Purpose

The purpose of this use case is to allow tutors to provide timely and comprehensive feedback on references to the students of their class.

Description of the Use Case

In this use case, the tutor enters error types within referencing. Once the errors are entered, tutors enter feedback content for each error type. For this the tutor uses the “Maintain List of Error Types” and “Maintain Feedback Contents” Use Cases. Tutors can also update the *list of error type*, as well as the *feedback contents*. Alternatively, the “Maintain List of Error Types” and “Maintain Feedback Contents” Use Cases utilize “Update list of error Types” and “Update Feedback Contents” Use Cases. Once the tutor has populated the “list of error types” and the “feedback contents”, he/she uploads and maintains the students’ information. This is done

using the use case “Maintain Student Data”. The tutor enters information about the assignment that will be given to students in the current course. This information is entered and maintained through the use case “Maintain Assignment Information”. During the course/module, students are required to submit their assignments. Tutors receive these assignments and upload them into the system through the use case “Upload Assignments”. This is an important use case, since the work done in the previous four use cases may be utilized after achieving the goals of the “Upload Assignment” use case.

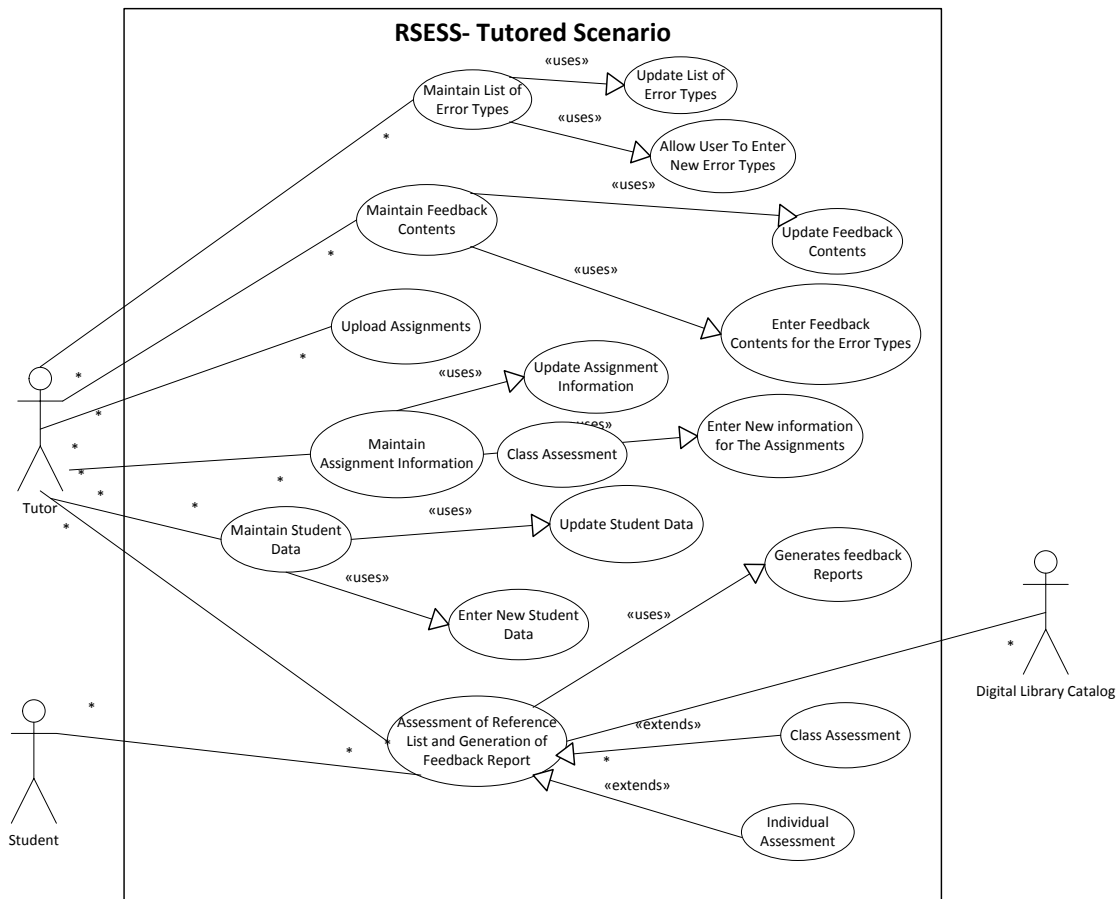


Figure 5.2: Tutor/Class Base Use Case

The final use case in this diagram is “Assessment of Reference List and Generation of Feedback Report”. This use case is triggered by the tutor and can generate feedback reports for

the entire class in the bulk mode by interacting with the secondary actor “Digital Library Catalog” All the assignments uploaded for a given course and assignment number are processed at the same time through this use case. However, there is an option which if used by the tutor can process a report for a single assignment. This use case uses the use case “Generate Feedback Reports” to develop reports. Once these reports are generated, the system sends the reports to the student, as well as the tutors.

The conditions when the report would not be generated or sent to students/tutors are: “Assignment does not have any reference task” or “Student data does not exist”.

Use case 2: Un-Tutored/Student Based System

The following use case diagram (figure 5.3) explains the working of the un-tutored base system.

Actors

There are three “actors” in this use case. The first actor is the consultant, and the second actor is the student/user. These two actors are primary actors of the use case. The third actor is the digital library catalog; it is an online catalog with which the system interacts to achieve its goal and it called the secondary actor of this use case. This is shown in figure 5.3.

Purpose

The purpose of this use case is to allow students/users to independently obtain timely and comprehensive feedback on their individual academic documents containing references.

Description of Use Case 2

The following use case diagram explains the given scenario.

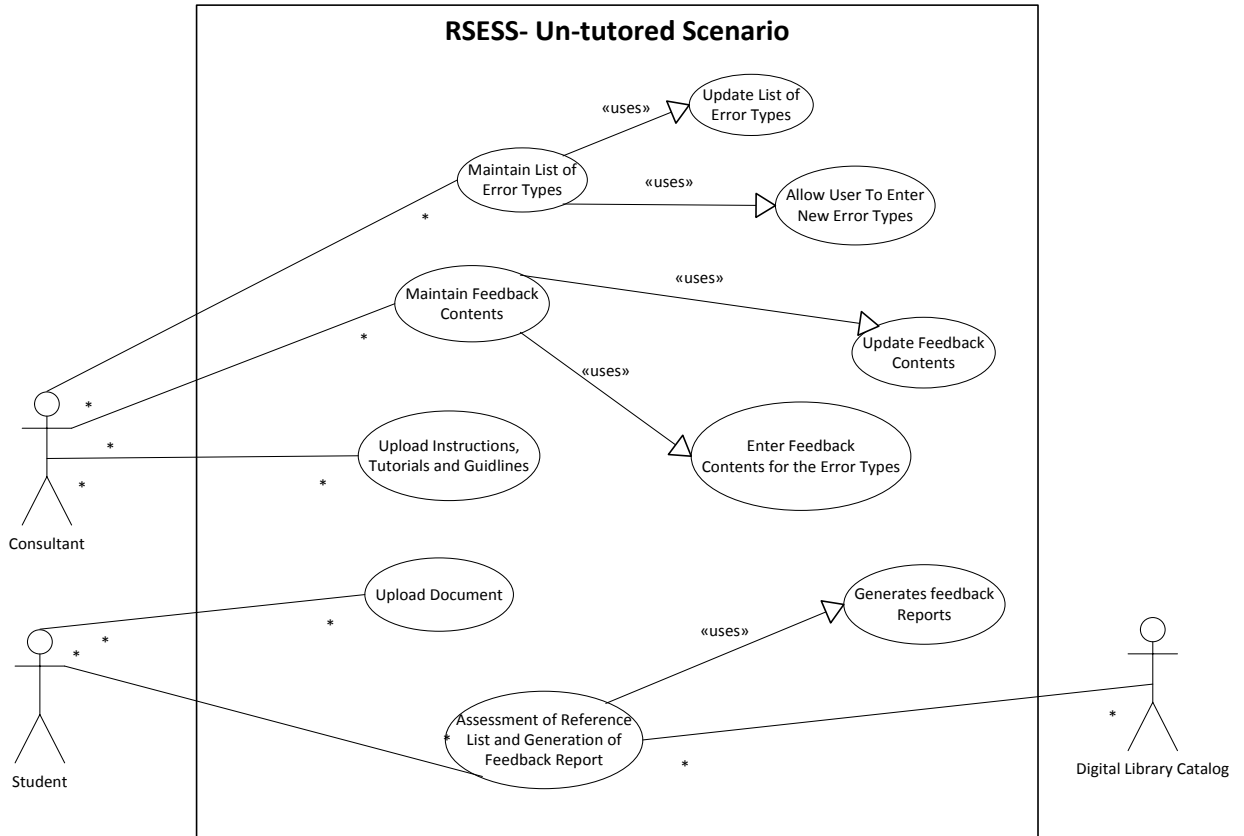


Figure 5.3: Un-Tutored Use Case

In this use case, the consultant (an expert in the field of teaching references and bibliographies) enters error types that are likely to occur during the generation of references. Once the errors are entered into the system, the consultant enters feedback content for each error type. For this he/she uses the “Maintain List of Error Types” and “Maintain Feedback Contents” use cases. The consultant can also update the *list of error types* or the *feedback contents*. Alternatively, the “Maintain List of Error Type” and “Maintain Feedback Contents” use cases use the “Update List of Error Types” and “Update Feedback Contents” use cases. The consultant also uploads guidelines and instructions on how to use the website. Students or users of this scenario upload their documents, and provide the email address that they want the feedback report to be sent to. This is done through the use case “Upload Documents”. The system processes this document and returns a *feedback report* about the referencing task to the

email account specified by the user when uploading his/her document. In the *use case 2*, the system interacts with the secondary actor “Digital Library Catalog” to get information about the references in the document.

The condition under which the report is not generated is when there are no references in the uploaded document.

A use case diagram is one of the methods for providing insight into the system from the user’s perspective. Other methods include context diagram, data flow diagram and event diagrams. For our specific software system we developed a context diagram as well as data flow diagrams. These two additional tools provided us with the information regarding the flow of data among various functions of the system (Data flow diagram), as well the overall interaction of the system with other existing systems (Context Diagram). For analysis of developers’ requirements (D-requirements), sequence diagrams were developed. These sequence diagrams were based on the use case diagrams made earlier. Analysis of the above requirements provided sufficient information to design the required software.

5.3.4. Architectural Design

Architectural design has been defined by Rogers as “Architectural design represents the structure of data and program components that are required to build a computer-based system. It considers the architectural style that the system will take, the structure and properties of the components that constitute the system, and the interrelationships that occur among all architectural components of a system” (Pressman, 2001). Architectural designs are built upon the analysis conducted during the requirement analysis phase of SDLC. As stated by Sommerville (2011) “The output of the architectural design process is an architectural model that describes how the system is organized as a set of communicating components”. Hence identification of

components and their relationship is emphasized for the development of the architectural model of the system.

Analysis of the requirements has provided us with solid ground upon which to build the architectural design for RSESS. Since emphasis has been placed on the identification of components of the system, this activity is performed first. To identify components we took help from use case 1 (Figure 5.2) and use case 2 (Figure 5.3) – this is indicated in Figure 5.4 and we will look at them in detail in the following paragraphs. Since the style of the architectural model also forms an important aspect for architectural design, various styles and patterns are considered. An architectural pattern that closely matches our requirements and helps in achieving the goals of the software system was selected. From the requirements (Section 5.2) it is clear that a software system should be web-based and applies to the referencing and citation domain. Thus, guidance for developing RSESS was sought from the pattern entitled “Web application”.

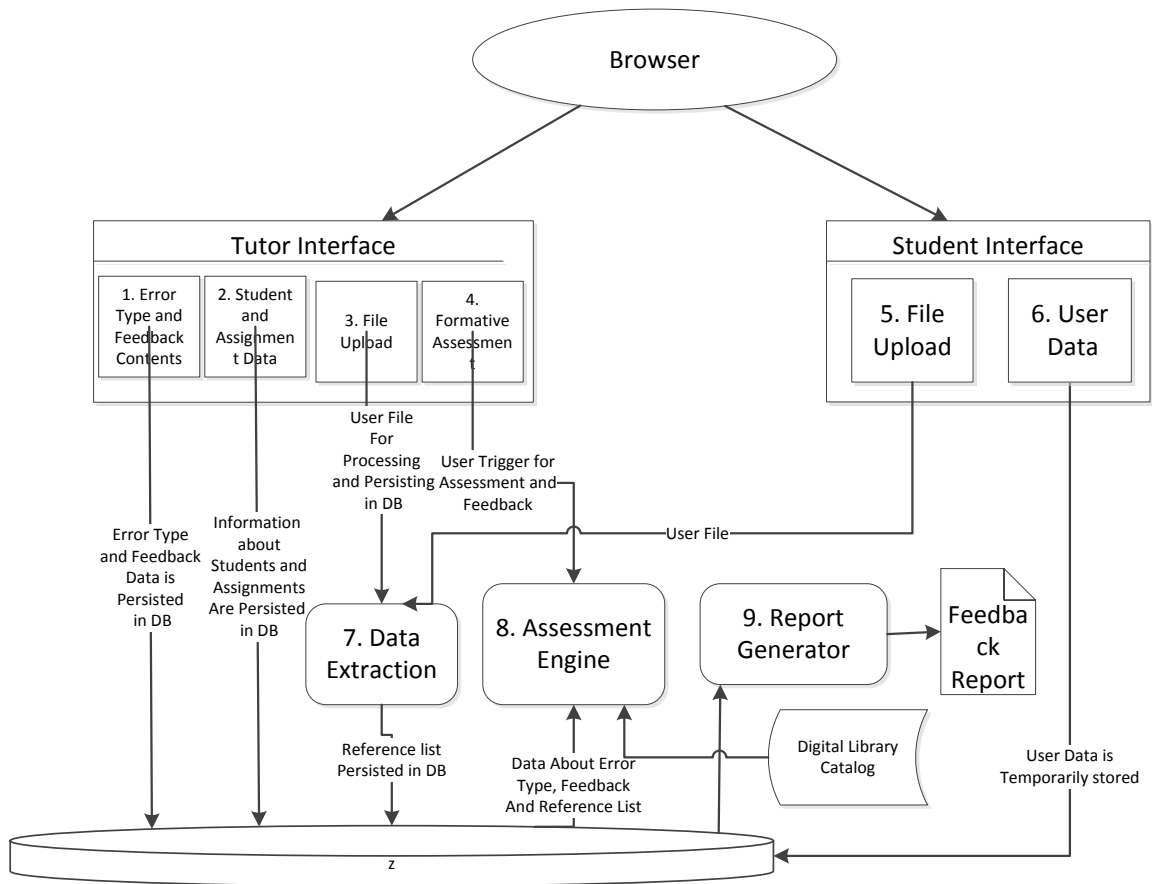


Figure 5.4: Architectural Design of RSESS

Figure 5.4 shows an architectural model for our prototype system. Users (e.g., tutors, consultants, students and professionals) interact with this system through a browser, which is located on their machine (i.e. client side). Each component of the system is on the server side. As indicated by the two use cases (Figure 5.2 and Figure 5.3), two distinct cases exist. One is the tutored case and the other is the un-tutored case. Both these cases require unique interfaces. Hence two main interfaces for the first layer (the presentation layer) are identified. Each of these two separate UIs has different components. For the tutored interface, 4 distinct components are identified and numbered, for the un-tutored interface, 2 distinct components are highlighted (Figure 5.4). These components form the interface for the users to achieve our

goals, and provide solutions to our second research question (**RQ2** Chapter 1). Note that numbering is provided for these components and the components of the next layer to assist with the explanation.

The next components (i.e., Data Extraction, Assessment Engine and Report Generator) form the business layer of the “Web Application” style. This layer contains all the logic and rules for processing the given data. As we were developing a prototype application, its architecture is kept simple. For this reason, a distinct data layer is not added, and components directly interact with data sources such as the database and the external data acquired through APIs from the digital library catalogs.

Once the components were identified and placed into their respective layers, the next important step was to determine relationship between these components. Figure 5.4 clearly indicates these relationships. Certain sub-components interact directly with the database/data source. For example components numbered 1, 2 and 6 interact directly with data source and directly persist and populate data. Therefore, information entered by users of the system (including error types and corresponding feedback, student/user information, and assignment information) are directly stored without any intermediary components.

Component number 7, Data Extraction, receives files from the presentation layer, extracts relevant information from this file (i.e., the list of references) and stores these references in the database. Component number 8 is the Assessment Engine, responsible for identifying referending problems in the students/users document. This engine is triggered by the user through the presentation layer. The engine gets data about the reference list, error types and its corresponding feedback content plus information about the student and the assignment. The assessment engine identifies errors and saves this data in the database. The

report generator generates feedback reports by extracting the required data from the database and sends it to the student.

The architectural design of RSESS clearly indicates the components and their relationship with each other. It shows how the two main use cases are going to support the operational model of FESR, which in turn will fulfill the goals of the proposed framework (chapter 4) and helps us find answers to our second research question (**RQ2** Chapter 1).

Now that the architectural design has been explained, we will discuss some salient aspects of the implementation of the prototype. This includes the scope of functionality covered in the prototype. We also present some important screenshots to highlight the implementation of the two use cases along with the algorithms used to process and present the data. Furthermore, some interesting findings about accessing data from digital library catalogs are also discussed.

5.3.5. Implementations of RSESS

The decision of how to implement RSESS was divided into two distinct parts. The first part was the scope of functionality that will be covered in the developed software and second was the integrated development environment (IDE) used to implement the software.

All the functionalities identified by the requirements analysis and design phase of the software development were implemented in the prototype. However, for each functionality, some of the features may or may not have been developed. Moreover, only a few salient functionalities are fully implemented, whilst other functionalities are left to be implemented during the development of the full production software. As mentioned in the methodology section (section 5.3.1), the RSESS prototype was developed using a hybrid approach – i.e., the combination of both the horizontal and vertical approaches. Hence all functionalities highlighted

in the use cases in Figure 5.1 and Figure 5.2 were implemented, indicating that a horizontal approach for developing the prototype was utilized. Components number 1, 2, 3, 4, 5 and 6 have been fully implemented (Vertically). These are the user interface components, and allow the persistence and population of data required for administrative as well as instructional purposes. Component 9 was also developed with a vertical approach; hence, the given requirements for the generation of a report are implemented. The Data Extraction and Assessment Engine components take into consideration reference lists/bibliographies and the errors that may occur in these lists. They do not look at the references made within the text of the document and plagiarism. Furthermore these two components cater for one reference style, i.e. Harvard style of referencing. The reason for excluding these functionalities was the lack of time available to develop this software. Errors identified in the reference list are sufficient to prove the concept of the recommended framework (FESR). Furthermore, for our prototype it was decided that we will process only Microsoft Word 2007 documents. In the future (i.e. for production mode development), other document types such as .pdf file formats may also be implemented.

After determining the functionality to be implemented in the RSESS prototype, the next step was to determine the integrated development environment within which this system will be developed. The integrated development environment (IDE) chosen for the development of our software was Visual Studio 2010. This IDE is developed by the Microsoft Corporation, and allows for the development of software applications for the Windows platform as well as for the web – including web sites, web applications and web services. It supports several programming languages such as C++, C#, VB, F#, J# etc. It has a very comprehensive database development environment as well as debugging and versioning features. Furthermore it has a user friendly interface. The software development language chosen for development of RSESS was C#. It is an

object oriented language which is type safe, and has many features which can be found at Microsoft web site (Microsoft, 2013).

After making the above decisions, the RSESS prototype was developed. The following sub-section will introduce readers to some of the screenshots of the prototype interface to compliment the discussion, and to give a deeper understanding about the prototype developed.

Prototype RSESS Interface

As stated by Galitz (2007) “The user interface is the most important part of computer system. Why? It is the system for most users, it can be seen, it can be heard and it can be touched”. Therefore, it should follow the principles of user interface design such as: the structure principle, the simplicity principle, the visibility principle, the feedback principle, the tolerance principle and the reuse principle (Constantine and Lockwood, 1999). The structure principle indicates that all the components of the interface are placed in a structured way – i.e., in a meaningful and useful way. The simplicity principle guide us to make a simple, easy to use and easy to understand interface. The visibility principle essentially states “What you see is what you need” (WYSWYN). This means that the tools and activities on the screen should be very clear and necessary for achieving a certain task, with no hidden or ambiguous information or tools shown. The feedback principle states that the user should get feedback for every task performed, such as the acknowledgement that a task is done or could not be done. The tolerance principle emphasizes the need to have a flexible interface – it should allow users to redo or cancel the task on the screen. Finally, the reuse principle highlights the fact that we should be able to reuse any internal or external components.

The above principles are identified for full production mode software. However, prototypes may have one or more of these principles for user interfaces. RSESS follows these

principles of HCI because the users of the prototype are students who are at their undergraduate or postgraduate level of study and may belong to different domains of study (e.g. Science, Computer Science, Social Science, etc.). Similarly the second user (i.e., the tutor) may be from a different domain of knowledge, and may or may not be very proficient with using software. Therefore it was essential to develop simple, clear and easy to use and easy to understand interfaces. The following screenshots will show that considerations were given for this principle while designing the interfaces.

Here, we present the interface for the students as well as a few screen shots of the interface for the tutors. The student interface was designed to provide a simple and easy to use mechanism for uploading files to be processed – this is shown in figure 5.5.

Please upload a word 2007 document(or of higher version) that contains a reference list. Few minutes after submitting your document, you will receive an electronic report in your mailbox(provided the email address entered is correct).

Reference Style checked : **Harvard**. Available at:(http://www2.warwick.ac.uk/services/library/help/guidespublications/bib_cit/). Please visit this page before uploading your document, to refresh your memory about Harvard style of referencing

Please Enter Your First Name: *

Please Enter Your Last Name: *

Please Enter Your Email Address: *

Select and Upload Document: *

* = Mandatory Field

Figure 5.5: Interface for Un-tutored Scenario

Figure 5.5 shows the interface that incorporates components 5 and 6 in the architectural design. This screen has instructions for the student (or other user) of the prototype for uploading their document. It also has a link to a guide for referencing in the Harvard style. Users are urged to follow this link and visit the site to refresh their memory regarding referencing and the Harvard style of referencing. The user is then asked to enter his/her name and the email address where they want the feedback report to be sent. To allow users to upload

their documents, a simple upload file field is added. Once a document has been uploaded, it is processed, and the report is generated. The user gets a message that the report has been sent to the given email address. The entire page is self-explanatory. Effort has been made to develop this page on the principles of user interface discussed above. It is clear from Galitz (2007) that an interface that is simple and easy to use is more likely to be retained and utilized. Since the aim of the framework and its operational model is to develop a system that is utilized by a whole spectrum of academic users (i.e. students and professionals) all the above factors are considered.

For the tutored scenario, there are a total of six screens. These screens provide an interface for the tutors to enter the data described in use case 1 and in the architectural design (figure 5.4). In this section, we provide two such screenshots. The two screenshots below are shown because of their importance in the functionality of the software. Feedback contents are very important in providing feedback to the students; hence, we have included a screenshot for this functionality (Figure 5.6). The second screenshot is the feedback and assessment page from the tutored scenario. On this page tutors can trigger the process of generating feedback reports.

FEEDBACK

Please Add/Update the contents of the feedback against the given error type
by clicking the link 'Edit' on the left most column of the table below

	error_desc	error_type	Feedback_desc
Edit	Incorrect name	1	There seems to be some problem with author(s) name. Either author(s) name is/are incorrect, missing or there is/are spelling/formatting mistakes. Please check the guidelines and source of information
Edit	incorrect Title	2	There seems to be some problem with 'title' field. Either the title is incorrect or there is/are spelling mistakes.. Please check the guidelines and source of information
Edit	incorrect Journal Name	3	There seems to be some problem with Journal name. Please check the guidelines and source of information
Edit	Incorrect date	4	Incorrect Date. Please check the guidelines and source of information
Edit	Incorrect Volume Number	5	There seems to be some problem with Volume number. Please check the guidelines and source of information
Edit	Incorrect URL	6	Both 'Online' and 'Accessed' identifier are missing
Edit	Incorrect online identifier	7	Online Identifier is not provided.:. Please make sure that when ever a URL is provided as a reference Online identifier has to be given.
Edit	Incorrect Page Number	8	Incorrect/missing Page Number, or the formatting of the page number not correct. Please check the guidelines and source of information
Edit	Incorrect Issue Number	9	Incorrect Issue Number. Please check the guidelines and source of information
Edit	Full Stop missing after date	10	A closing bracket or a Full stop is missing after the date field

1 2 3 4

Figure 5.6: Feedback Entry Form

Figure 5.6 shows the feedback entry form. It is a simple page. At the top there are brief instructions on how to use the page, followed by a table. This table is pre-populated with error types identified earlier in a similar form. Against each error type the user has the ability to enter new feedback contents, edit existing feedback contents or delete the feedback contents. These facilities are obtained by clicking on one of the links located at the left most column of the table. Upon clicking the "Edit" link it is replaced by two links "Update" and "Cancel" and its corresponding column "feedback_desc" becomes editable. Users may make the necessary changes for this corresponding column, then click the "update" link at the leftmost column of this row; alternatively, they can cancel the process by clicking on "Cancel", which is located adjacent to the "Update" link. Each page of the form shows 10 rows of error types, if the number of errors is greater than 10 they are displayed on next page. Users can navigate from one page to another by clicking on the numbers located at the bottom of the page. Figure 5.6

shows numbers 1, 2, 3 and so on to indicate the page numbers, with each page containing up to 10 error types.

Figure 5.7 shows the assessment and feedback page. This is a very important form, since this page allows the user to activate the assessment and feedback process, allowing a feedback report to be sent to the students. This page is designed for the tutored scenario; thus the user of this page is a tutor of any given and pre-defined course. The tutor first selects his course and then selects the assignment number for which the assessment and feedback process is to be initiated. The tutor also has the option to allow the report to be sent directly to the students, if for some reason tutor wishes to view these reports by himself/herself before forwarding them to the students he/she can select the appropriate radio button. Once this has been done, the tutor has the option to process all of the submitted solutions of a given assignment at once, or just to select one assignment by choosing the student ID whose solution is to be processed.

ASSESSMENT AND FEEDBACK OF UPLOADED ASSIGNMENTS

Please select the Course:

Course

Please select the assignment number to be processed:

Assignment Number

Would you like feedback sent directly to the student ? Yes No

Please select the assessment scope for this assignment:

Process all the files for the selected assignment

Select one file to be processed

Result for processing will appear here

Please select a student ID whose assignment is to be assessed

Student ID

Figure 5.7: Assessment and Feedback Form

Therefore, as indicated in figure 5.7, the button “Press to process all the files submitted for the selected assignment” can be pressed by the tutor to process all the assignments in the bulk mode. The tutor may press this button and leave his/her office. The system will process all the submitted assignments by checking the referencing work in them, and will then generate reports and send them to students directly or (if specified) to the tutor only. This feature is very useful as it allows tutors to provide timely feedback yet allows them to spend this time on some other academic work. Thus in this way, the solution to one of the problems identified during the investigative study phase (chapter 3) – i.e. tutors finding it difficult to check and provide timely feedback – is resolved. If the feedback contents (as shown in figure 5.6) are clear and comprehensive, we get timely and comprehensive feedback. This process assists tutors by

relieving them from providing the timely comprehensive feedback to students. At the same time, it helps students in getting feedback, and they can improve their referencing skills. In order to cater for circumstances where late assignments are received, the tutor will have the ability to process just that one assignment. This is achieved by selecting the ID of the student whose assignment is to be processed for the given course and assignment number, and then pressing the button “Press to process the assignment for the selected student ID”.

While we are discussing the interface for generating reports, it is logical to look at the format and layout of the report that is received by the student. The report on the feedback and assessment is generated as a PDF file, and is sent to the email address of the students. To achieve the goal of enhancing referencing skills, it is imperative that the layout and contents of this feedback are simple, clear and comprehensible. Layout designs were shown to students and staff to get their feedback on this. A sample report is shown in figure 5.8.

University of Warwick

References and Bibliography Feedback Report

Student Name:	Student 1	Student ID:	bc00001
Course:	cs133-Wallbank	Assignment No:	4

Feedback on the errors made

Reference:	Error:	Suggested data:
5 Iannella, Renato (2001). Digital Rights Management (DRM) Architectures. D-Lib Magazine. ONLINE. < http://www.dlib.org/dlib/june01/iannella/06iannella.html > [accessed 16th April 2013]	There seem to be some issue with the authors name and it's format	Renato Iannella
5 Iannella, Renato (2001). Digital Rights Management (DRM) Architectures. D-Lib Magazine. ONLINE. < http://www.dlib.org/dlib/june01/iannella/06iannella.html > [accessed 16th April 2013]	Incorrect/missing Page Number. Please check the guidelines and source of information	1-10

Figure 5.8: Feedback Report

As shown in figure 5.8, the student feedback form is designed to provide feedback on the *References* section of a student's document. This feedback form aims to identify erroneous items in the references section and suggest alternative information.

The report is divided into three sections. Each section is discussed below:

Header

The header of the report indicates that the report is about the references section of the document only, and that it does not provide any information about the other sections of the submitted work as shown below:

University of Warwick References Feedback Report

Information about student and course

This section is as follows:

Student Name:	Student-1	Student ID:	bc00001
Course:	Cs133-wallbank	Assignment No:	4

As shown above, the student's name, his/her ID, the course code and the assignment number are all provided. This is generated for users so that they can keep a record of their performance for each reference list they developed. All of the above information is extracted from the database.

Feedback on the errors made

In this section, feedback is provided for each error made in the reference list and alternative data is suggested (if applicable). This information is presented in a tabular form with three columns. Column number 1 gives the number of the reference in (the list of references) where an error is detected, as well as the contents of that reference. It is labeled as “Reference Number” This column may contain more than one instance of the same reference number/contents depending on the number of errors detected in that reference.

The second column of this table, labeled “Error”, provides a statement of the error made. This statement can provide information about an error in one item of reference, or it can provide a statement about the entire reference.

The third column is labeled as “suggested data”. Data in this column provide a suggestion for the correct data, where applicable. For example this column may contain a suggestion for the correct date, authors name, etc., as shown in figure 5.8.

Logic behind the Interface

We have thus far discussed the interface and the output of the system in the form of a feedback report. In order to generate this report, the system has to interact with external data sources – i.e. digital library catalogs and compare it with the data from students’ reference list. The following sub sections provides some insight into this activity.

Logic for Searching and Comparing References from Digital Catalogs

The assessment engine (component 8 in Figure 5.4) is responsible for searching digital catalogs and evaluating students references against the data received. It is a core component of the prototype therefore in this section we will look at the logic used for this activity. Pseudocode in Figure 5.9 illustrates a high level algorithm of the logic.


```

Input: Std_ID, Std_Course, Assignment_Number

Std_Reference_List = get_Std_Reference_List(Std_ID, Std_Course, Assignment_Number)

FOREACH Reference IN Std_Reference_List
{
    Reference_Title = get_Reference_title(Reference)

    Matching_Reference_From_Lib = get_Matching_Reference_From_Lib(Reference_Title)

    compare_Std_Reference_Lib_List_Save(matching_Reference_From_Lib, Reference)
}

```

Figure 5.9: Compare students reference data with the data received from digital libraries

As illustrated in Figure 5.9, before searching for a given reference in a digital catalog, the student's reference list for an assignment of a given course is obtained by calling a *get* function. For each reference in the student's reference list, the title of the document that is being referred to is extracted. This title is then passed on to the routine that get the matching list of references from the digital catalog. The matching list of references along, with a reference from student's assignment, is passed on to the routine *compare_Student_Reference_Library_List_Save*. This routine compares the list with the reference from student's assignment and saves the result in the database. Extracting matching results from digital catalogs has been of prime interest and is discussed in the later section. For our prototype following method was adopted to get a list of matching data (Figure 5.10).

```

Input: Reference_Title

Url_For_Library = "http://api.mendeley.com/oapi/documents/search/title
    =" + Reference_Title + "?consumer_key=36801";
Request = get_Result_From_Web(Url_For_Library)
Reference_List = deserealize_And_Populate(Request)

Output: Reference_List

```

Figure 5.10: Search in online library

As indicated in Figure 5.10, an API for the digital catalog called Mendeley is called and the title of the reference is sent as a search criterion. This API returns a list of matching references in the form of JSON result set (explained in next section). It contains reference title, authors name, date and record ID of each reference. This result set is converted into a string array, and is returned to the calling function. The calling function takes this list and the reference from the student's reference list for comparison and evaluation. This is indicated in the following pseudocode, Figure 5.11.

```
Input: Matching_References_From_Lib, Std_Reference
Index = get_Index_of_Nearest_Match(Matching_References_From_Lib, Std_Reference)
compare_Std_Reference_Save_Result(Matching_References_From_Lib, Std_Reference, Index)
```

Figure 5.11: Compare Students' Reference with Digital Library Matching Reference List and Save the Result

Pseudocode in Figure 5.11 indicates two most important steps in comparing a reference. First step is to find the nearest match. The student's reference as well as the matching references from the digital catalog are sent to the routine `get_Index_of_Nearest_Match`. This routine returns the nearest matching index of the reference from the digital catalog. This index, along with the matching reference list from digital catalog and student reference, is then forwarded to the next routine, `compare_Student_Reference_Save_Result`. This routine compares references and saves result in a database. Figure 5.12 and Figure 5.13 illustrate the working of these two routines.

```
Input: Matching_References_From_Lib, Std_Reference
FOREACH Lib_Reference in Matching_References_From_Lib
{
    Number_Of_Errors_In_Title = check_Title_Errors(Lib_Reference.title, Std_Reference)
    Errors_In_Name = check_Name_Errors(Lib_Reference.Author_Name, Std_Reference)
```

```

Error_Index_List = Insert( Number_of_Errors_in_Title, Errors_In_Name ,Index)

Increment index
}

IF Error_Index_List.Row > 0
{
    Temp_List = first row from Error_Index_List

    FOREACH Error_Index In Error_Index_List
    {
        IF Temp_List.No_of_Error_in_Title > Error_Index.Title_Error
            Temp_List = Error_Index

        ELSE
            IF Temp_List.No_of_Error_in_Title == Error_Index.Title_Error AND
            Temp_List.Error_in_Name >= 0 AND Error_Index.Error_in_Name == 0
                Temp_List = Error_Index
    }
}

Output Temp_List

```

Figure 5.12 Find the Nearest Match

Before comparing two sets of references, one from the student's coursework and the other obtained through the digital library, it is important to pick the one that matches as best as possible. The routine in Figure 5.12 compares all the reference titles in matching references obtained from the digital catalog with the title of a reference from the students work. It records the differences between these titles and the student's reference title. It further determines if the name of the author of these references are same or different from the student's reference. This information, along with the index of the matching reference list whose data is being compared, is stored in Error_Index_List. Once all the references in the Matching_Reference_List

are processed and the difference in title and name along with its corresponding index number is inserted into the `Error_Index_List`, this list is traversed to get the data of the row that has smallest difference between titles. If there is a case where two references in the `Matching_Reference_List` have same difference between the titles, this routine checks the `Error_in_Name` and selects the row where difference between the names is zero. Finally this routine returns the difference and the index of the row in `Matching_Reference_List` with the given lowest difference. Figure 5.13 shows how this difference helps to compare data.

```
Input: Matching_Reference_from_Lib, Std_Reference, Index_of_Best_Match
IF Index_of_Best_Match.Number_of_Difference_in_Titles < 4
{
    Lib_Record = matching_Reference_from_Lib [Index_of_Best_Match.Index_Nearest_Match]
    Detail_Record = get_a_Detail_Record_from_Digital_Catalog(Lib_Record, Record_ID)
    compare_Authors_Names_Save_Correct_Name(Lib_Record, Std_Reference)
    compare_Date_Save_Correct_Date(Lib_Record, Std_Reference)
    compare_Title_Save_Correct_Title(Lib_Record, Std_Reference)
    compare_Publisher_Save_Correct_Publisher(Library_Record, Student_Reference)
    compare_Page_Number_Save_Correct_Page_Number(Lib_Record, Std_Reference)
    compare_Issue_Number_Save_Correct_Issue_Number(Lib_Record, Std_Reference)
    compare_Online_Identifiers_Save_Correct_Online_Identifiers(Lib_Record, Std_Reference)
}
verify_Format_student_reference_and_Save(Std_Reference)
```

Figure 5.13: Compare Student Reference with a reference from the Digital Catalog

Figure 5.13 represents a straightforward algorithm. If the difference between the title of a reference gathered through digital catalog and the student's reference is less than 4 then compare all the items of student's reference, for example author name, title of book, academic

paper or journal, date, issue number, page number. If a reference to the internet is provided by putting a URL, then the presence of its identifiers such a “Online” and “Date Accessed” are checked. While comparing reference items, care is taken to remove spaces and all special characters, brackets, forward and back slashes. The number of difference of less than 4 was chosen based on several trials to determine best results. It was found that if the difference between the two titles was more than 3 the chances of an incorrect result increase. Once the comparison of two references is completed, or the difference is greater than 3, formatting of the references are checked including duplicate references, alphabetical order and missing items in a reference. While comparing and checking format, results are saved in the database. These results are then picked by a routine to calculate grades (if needed) and to generate feedback reports, as indicated in Figure 5.4 component 9.

Logic for Generating Feedback Report

Once all the references in a reference list of students’ document have been processed and their results have been saved in the database, the next step is to generate the report(Component 9 in Figure 5.4). Following pseudocode illustrate the algorithm adopted to perform this task:

```

Input std_id, std_name, reflat_in_asgmt, std_course, asgmt_num

Result_Document = creat_new_pdf_document()
Open_Document(Result_Document)
Add_Header(Result_Document, std_id std_name, std_course, asgmt_num)

  FOREACH reference in reflat_in_asgmt
  {
    ref_id = get_Reference_id(Reference)
    error_list = getErrorList(ref_id)
    std_Reference = get_std_Reference(ref_id)

    FOREACH error_ID in error_list
    {
      errortype = get_error_type(error_ID)
    }
  }

```

```

        feedback = get_Feedback(errortype)

        suggestion = get_suggestion(error_ID)

        TableRow.AddToColumn (Ref_no, std_Reference)
        TableRow.AddToColumn (feedback)
        TableRow.AddToColumn (suggestion)          }
    }
    Ref_no ++;
}
Result_Document.Table.AddRow(TableRow)
Close(Result_Document)

```

Figure 5.14: Generate Report

Figure 5.14 represents the logic to generate the feedback report for each document that has a reference list. Here a new file is created in a given folder. This file is opened. A header is generated and then the name of the student, student ID, course and assignment number are written as indicated in Figure 5.8. This routine gets the ID of all the references in a document. For each ID in reference ID list its corresponding list of errors is populated from the database. Please note that more than one error can be identified for one reference in a reference list. Furthermore, the text of the given reference is also populated from the given table in the database. For each error in the error list generated for a given reference, the type or category of the error is obtained from database. The categories of errors are already entered into the database. After getting the category of the error, its corresponding feedback content is loaded; these contents were added through the interface shown in Figure 5.6. In the next step, suggested correction for the error is obtained. This correction was stored in the database table while errors were identified in earlier routines. This data, along with the reference number, is written in the document table presented in the feedback report. The above mention procedure is repeated for all the errors identified in the reference list of the document.

Once the report is generated and stored in a folder, it is attached to the email and sent to the students' mailbox. Now that the logic for searching, comparing references and generating

feedback report has been presented, we move on to briefly discuss our experience and the knowledge gained when exploring data extractions from the digital catalogs.

Protocols and Data Extraction Methods for Digital Catalogs

The development of software is a substantial part of our research. Some challenges were faced during this process and help in the understanding of some of the challenges was sought from the IT department of the University of Warwick and other sources. In this section, we highlight some of the challenges encountered, and how they were solved.

Different Protocols to Access Various Online Library Catalogs

In order to validate a reference by the student, it was initially sought in various online library catalogs. The first issue encountered for this work was that various libraries had different protocols to access their servers, indicating that there is no standard protocol for accessing these catalogs online. We began by accessing the Library of Congress. They use protocol z39-50 for this purpose, which is the oldest protocol to access catalogs – many other university library catalogs still use this protocol. The second type of protocol used by the libraries of various universities is the SRU protocol (Search/Retrieve via URL). Many libraries including the British Library are switching to this protocol. The next most popular protocol is SRW (Search Retrieve Web) – this protocol is used for various web services available for this purpose. There are also certain cataloging sites that use other protocols such as SOAP, REST, OAI, etc. Hence it was difficult and time consuming to develop software for accessing all such cataloging services to get the optimum result. Hence, there is no one standard for accessing these catalogs.

Different Formats for Result Sets

Once a database or online catalog is accessed, there is a need to obtain search results from here. Several formats are used by various online catalog servers for returning search

results. The oldest one is the MARC21 format, designed by the Library of Congress (Library of Congress, 2010). MARC21 stands for Machine Readable Catalog and is still being used by the Library of Congress online catalog as well as by some other library sites. Other formats include MODS, DUBLIN CORE, and JSON. MODS stand for *Metadata Object Descriptive Schema* and is a subset of MARC 21 (NISO, 2004). Dublin Core Metadata element sets were first introduced in Dublin Ohio in 1995 at a workshop held jointly by OCLC and National Center for Supercomputing, it is a 'vocabulary of fifteen properties for use in resource description' (DCMI, 2012). JSON stands for JavaScript Object Notation and is easily readable by humans. This indicates that there is a lack of a standard result set format. To read each format, we need a different set of format readers to extract the required result set, thereby complicating the retrieval of the result from different sources.

Different Cataloging Levels

An interesting point discovered during the research was that the majority of library catalog sites do not have article level cataloging i.e. only journals were cataloged and not the articles within those journals (Han, 2012). This issue was encountered while trying to retrieve results for the articles in the journals. We were getting zero results for our article search, no matter which article we tried to trace. After discussing this issue with the staff at the University of Warwick library, we found that most of the libraries (including the University of Warwick library) do not provide article level cataloging. This was a serious issue, as students frequently tend to reference articles.

Next Generation Catalogs

Next generation catalogs (See Chapter 2) are getting exceedingly popular as they do not have the above mentioned discrepancies and various protocols issues. Hence we looked at such

catalogs by OCLC, Thompson Reuters and Mendeley. Mendeley provides access to its APIs for free and the results for the research were acceptable. OCLC offered an API for the developers but it is limited and we are not getting required results since their limited API is not providing results for the articles and papers search.

5.4. Summary

This chapter has encompassed an entire development life cycle of the prototype up to the implementation phase. We have seen how the requirements from the operational model are extracted and then analyzed through the requirement analysis phase. This chapter has presented two main use cases – these are the main scenarios discussed in the operational model of proposed framework.

Based on the requirements for analysis and architectural design, software was built. This design used a web application pattern for its implementation. Major components of the software were identified and the relationships between these components were shown. To complete our discussion about the software solution the implementation of the software was discussed and the main factors for deciding various functionalities were highlighted. Finally some interesting facts about accessing and retrieving data from online digital catalogs were described.

Chapter 6

Evaluation of FESR

6.1. Introduction

The third phase of this research is the evaluation of the proposed pedagogical framework (Chapter 1). This evaluation was carried out with the help of a software solution (Chapter 5). For the evaluation, experiments were conducted to determine the effectiveness of this FESR for the students and teachers of a traditional classroom mode of education and for independent individual learners. Thus, the objective for conducting these experiments was to establish whether the proposed framework (FESR) adds value to the learner, as well as helping the teacher when teaching the concepts and structure of referencing.

This chapter presents the methodology adopted to conduct these experiments, thus evaluating the framework (FESR) and its operational model. It discusses in detail the analysis of the data gathered and how it answers our second research question (**RQ2** in Chapter 1). The next section illustrates the methodology adopted to evaluate the proposed framework. The third section analyses the data obtained through the evaluation mechanism. An analysis of each collected data item is conducted individually (the responses to the questionnaire, the interviews and the information from the documents and reports). The fourth section presents the result and how it answers our second major research question (**RQ2** in Chapter 1). The last section concludes the chapter.

6.2. Framework Evaluation Methodology

To evaluate the proposed framework (FESR), a set of experiments were carried out. The total number of students who participated in these experiments was 35, and the number of tutors/staff members was 2. Thus the total number of participants was 37. Two different categories of experiments were conducted. The first involved a tutored class, i.e. in a module, tutor of a module and their students were the participants in the experiment, and the category of these experiments is termed *tutored experiment*. The second category of experiments was the one in which students and participants get feedback for their individual work. No tutor or supervisor was involved; thus, the category of experiment is termed an *un-tutored experiment*.

The rationale for devising two separate categories in the experiment is based on the fact that students in higher education learn in a classroom environment, as well as in independent modes of learning (such as PhD students). The experiment in the first (tutored experiment) category evaluates aspects such as facilitating staff members in imparting knowledge about references and citations, saving a substantial amount of their valuable time, and identifying how students respond to this mechanism. Thus, we seek to evaluate if the proposed framework is a workable solution for achieving the above mentioned objective, and hence answer one part of our second research question (**RQ2.3** in Chapter 1).

The second (un-tutored) category of experiment aims to highlight the effectiveness of the framework for individuals who want to get feedback about their reference skills and do not wish to involve tutors, supervisors or editors/publishers of a journal or conference. This type of experiment can safely be applied to professionals who wish to improve their documents, especially in terms of references and bibliographies before forwarding to the relevant authorities, and helps in answering some sub questions of our second major research question

(RQ2 in Chapter 1). As discussed in the chapter on software development (Chapter 5), two separate interfaces have been developed for these two types of experiment, and were made available to the relevant participants.

To conduct these experiments, a simple experimental research method was adopted (Chapter 1). Before the start of these experiments a pre test was conducted, a questionnaire was given to all the students participating in the experiment. Two interventions were designed for this experiment. The first Intervention was a training session, along with reading material on referencing for the students. The second intervention used the electronic feedback reports on the reference lists in the students' work. The training session/reading material was aimed to guide students in learning and refreshing their concepts about references and citations. This was a onetime activity, and was not repeated during the period of the experiment. Students, could, however, refer to the guidelines at any time they wished to get help. The second and most important intervention was an electronic feedback report received by students. These feedback reports informed students about the errors detected by an automated system for the reference lists and bibliographies in their documents. This was a regular intervention, and continued till the end of the duration of the experiment. At the end of the duration of the experiment, a post-test was conducted, a second questionnaire was given to the students, and interviews were conducted with the students and the tutors. To verify the learning experience of the students, their documents and feedback reports were also evaluated.

Thus, if O1 symbolizes the pre-test, O2 symbolizes the post-test, X1 symbolizes intervention 1 and X2 symbolizes intervention 2, then the equation for the experiment is

Experiment: O1 X1 X2 O2

where

O1= Questionnaires

X1 = training sessions and reading material

X2 = electronic feedback reports generated by an automated software

O2 = questionnaires, interviews, students' documents and feedback reports

The venue used to perform these experiments was the University of Warwick, and these experiments are explained in detail in the following sub sections.

The experiments specifically evaluated the aspects of the training session, feedback and the effectiveness of RSESS of FESR. Ethical consent was obtained from the University, through the HSSREC, delegated to the Head of Department in Computer Science, dated 2/6/2010 and 28/9/2012.

6.2.1. Tutored Experiments

In this category, two similar experiments were conducted, and two classes were chosen. The subject taught in each class was called "Academic writing skills". The difference between the two classes is that for one experiment, the class chosen was a first year Computer Science class, and this is referred to as *group 1*, whereas the second class was in the final year in the Department of Chemistry and is referred to as *group 2*. The reason for choosing group 2 was to see how non-Computer Science students respond to this experiment.

Participants: The total number of participants in this category was 29, made up of 17 students from group 1, 10 students from group 2 and 2 staff members.

Pre-Experiment

Student data such as their name, ID, course that they are enrolled in and email were uploaded onto the server hosting the RSESS to provide feedback on referencing and citations.

Sets of error types and feedback content were populated through the interface provided on the website for RSESS (Chapter 5).

Since tutors were involved in using the RSESS website to provide electronic feedback to the students, as mentioned in Chapter 5, individual hands-on training sessions were organized for them, whereby they were familiarized with various functionalities of this software. Furthermore, RSESS requires students' submitted assignments in a particular file format in order to be processed i.e. .docx, as well as reference list heading style, therefore guideline document was prepared for the students to familiarize them with technical aspects of submitting assignments for getting feedback reports and was distributed among them through email and as hardcopies.

Procedure

At the beginning of the experiment a pre-test questionnaire was given to the students (Appendix C). After the pre-test, the above mentioned interventions X1 and X2 were made. As X1 intervention the tutors provided reading material and guided students about the referencing skills. After this, a number of assignments were given to the students at periodic intervals (X2). Students received these assignments from their tutor, either electronically, or by hand during the lecture. Students then completed their assignments and submitted them electronically, i.e. through the interface provided to them over the internet or through email. Once the assignments were sent to the tutor, they were uploaded onto the server which was hosting the RSESS website. An interface was provided on the RSESS website to let tutors upload these assignments (Appendix F). Once the assignments were uploaded to the site, tutors would press the "Assessment" button available on the site (Figure 5.7 in Chapter 5), at which point students would start receiving their electronically generated reports in their mail boxes (Figure 5.8 in

Chapter 5). A copy of the reports was also emailed to tutors if desired. This is illustrated in the following diagram. The electronic system used by the tutors for handing assignments and receiving them was either through the email system of the respective departments or the special system developed for this purpose by the computer science department, known as BOSS (Joy, Griffiths and Boyatt, 2005).

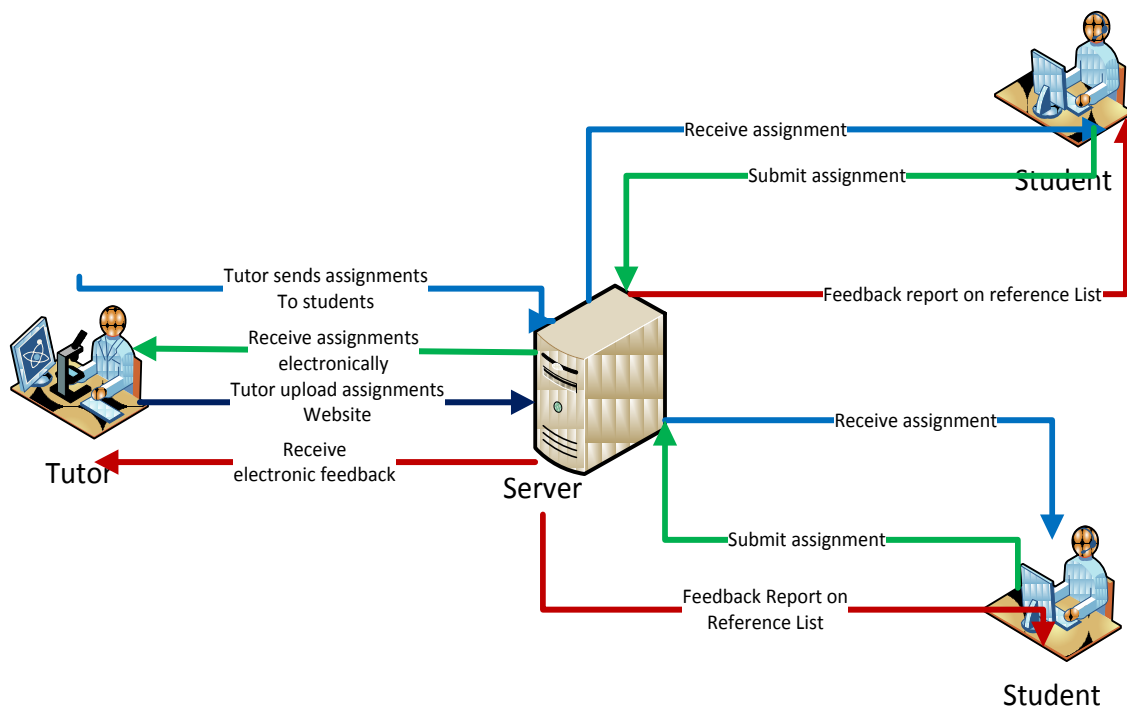


Figure 6.1: Tutored Experiment

Figure 6.1 explains the procedure. Arrows in blue represent first phase for intervention X2, i.e. tutor giving assignments to the student, and student receiving the assignments. Green arrows indicate student submitting assignments to the tutor and the tutor receiving it. Dark blue arrows indicate the task of uploading the assignments on RSESS website, and the red arrows show the feedback reports sent through the website to student and the tutor. At the end of term, students were requested to fill in questionnaire 2(Appendix D), they were further

requested for interviews (Appendix E). Submitted assignments and the reports generated for these assignments were collected for analysis.

6.2.2. Un-tutored Experiment

In this experiment students interacted directly with the RSESS website to upload their documents and receive the feedback report (Figure 5.8). Tutors/supervisors were not involved in this experiment. Students got feedback on their individual task, and were able to correct these errors before final submissions to the supervisor or publishers.

Participants

Participants were 7 PhD students at different phases of their PhD (Computer Science).

Pre-Experiment

Before the start of the experiment, students were contacted and requested to participate. A set of instructions for using the RSESS website was given to the students. They were further provided with directions on how to refresh their referencing skills, and the number of files they should upload to achieve the objective of the experiment.

Procedure

As with the tutored experiments, at the beginning of the experiment, a pre-test questionnaire was given to the students (Appendix C). At the RSESS website, there was a link that, when clicked, took the user to the reference style guide (Figure 5.5). Users of this website were asked to go to this link and revise their concepts about referencing. The link and the instructions for accessing that link formed our first intervention, i.e. X1. As a second intervention (X2) users uploaded their document (See Figure 5.5 in Chapter 5). After a few minutes, they

would receive the feedback report (Figure 5.8 in Chapter 5) on the reference list within their document. Users were requested to upload three such documents in order to view any improvement in their work. Figure 6.2 illustrates the process.

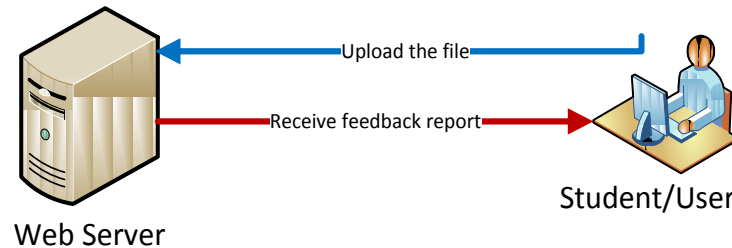


Figure 6.2: Un-tutored Experiment

Figure 6.2 shows the simplicity of intervention X2 for this category of experiment. The blue arrow indicates the first step by the user, i.e. uploading of the documents in order to get feedback on their reference skill. The red arrow indicates the response of the RSESS website i.e. an electronically generated report is sent to the user in their mail box.

The following section discusses in detail the analysis conducted and the results obtained from the data collected through the above mentioned procedures.

6.3. Analysis

As a result of pre-tests and post-tests, as well as the data collected during the experiment for both the categories, substantial information was gathered, as indicated in the above section. To evaluate the framework proposed (FESR) these data were rigorously analyzed.

The data items collected were:

1. Questionnaires;
2. Interviews;

3. Submitted assignments and their corresponding electronically generated reports.

These data items were collected for the three groups (Group 1, Group 2 and Group 3) in the experiments. All the above data items were customized for each group involved in the experiments. For example, pre- and post-test questionnaires have some common questions; however some additional questions have been included, due to differences in each group's course and year of study (Appendix C; Appendix D).

The following subsections explore individual data items obtained in this experimental study.

6.3.1. Analysis on Data Received Through Questionnaires

Two questionnaires were given to the students. The first questionnaire, termed *questionnaire 1*, was developed to determine the current state of student's perceptions and understanding regarding references and citations. Data from this questionnaire were later used to establish the effect of the interventions, especially whether intervention X2 caused any change in the practices of referencing among the participants. The second set of questionnaires was termed *questionnaire 2*, and responses to this questionnaire provided information about the participants' experiences throughout the designated experiment, and their opinions on the feedback reports. The following subsections discuss in detail the analyses of the data received from both questionnaires.

Methodology for Getting Information through the Questionnaire

Standard practices for developing and disseminating the questionnaire were adopted. Thus before starting to develop the questionnaire, the objectives of the questionnaire were identified and questions were developed based on these objectives. After the development of

the questionnaire, a pilot study was done – the questionnaire was given to few individuals, and based on their feedback the questionnaire, was fine tuned. Once the questionnaire was ready for the participants, consent was sought from the department, and the individuals involved and the questionnaires were distributed. These questionnaires were later collected and analyzed. These analyses are described in detail below.

Questionnaire 1

Each group in this experiment had a different educational level and experience of using references and citations. Therefore it was essential to gauge the current level of awareness and understating about references among the participants, and to know about the background of the student’s earlier experience in this regard. The number of questions in questionnaire 1 varied for each group – 11 questions for group 1, 14 questions for group 2, and 29 questions for the un-tutored group i.e. group 3. The types of questions asked were both closed and open ended. Analysis of questionnaire 1 indicates that majority of the participants had experience in developing reference lists in their documents, as indicated in the Table 6.1.

Level of study	Experience of using references	No Experience of using references
First year students (group 1)	10	7
Last year students (group 2)	10	0
PhD students (Group 3)	7	0
Total	27	7

Table 6.1: Experience of Referencing

The major reason for collecting this information is to determine if the proposed framework is effective for students with and without any prior experience of referencing. Statistical analysis indicates that experience is dependent on the level of education, i.e. the computed value of Chi Square (8.8) exceeds the value in the table for $p=0.05$ and $df=2$ (Chi

Square=5.99). Therefore, we can say that a relationship exists between level of study and prior experience of using references. An interesting observation for the last year student group (group 2 – non-Computer Science) is that before the current module, they had been using a reference style called ACS (American Chemical Society). During their current module, they were asked to use a completely different reference style named *Physical Review* (Waldron, Judd and Miller, ed., 1993). Thus it is interesting to see whether a change in the reference style for referencing has an effect on the quality and understanding of referencing by the students. Students from the other two groups (group 1 and group 3) had previously used the Harvard style or a similar reference style such as APA and Chicago respectively.

To gauge the attitude of students toward reference tasks, especially the students in the tutored groups, we asked a few more questions. 8 out of 10 students of group 2 (non-Computer Science) and 16 out of 17 students of group 1(Computer Science) said that they would like to use references in this module because it helped them to understanding the subject. 3 students did not wish to have references in the current module because “it is too boring”, “it does not add to knowledge”, and “from past experience it is clear that no one reads them”. Thus, only 3 students did not think referencing was an important activity; however, the interesting thing was that out of these 3 students 2 were from group 2 and had the experience of using referencing in their coursework. All the participating students in the un-tutored experiment were very positive, and looked forward to doing references in their course of study. This response indicates that the majority of participating students had a positive attitude toward referencing, as indicated in Table 6.2.

Level of study	Yes	No
First year students (Group 1)	16	1
Last year students (Group 2)	8	2
PhD students (Group 3)	7	0
Total	31	3

Table 6.2: Attitude

To further verify that students were aware of the importance of this activity, they were asked “If the time given to submit the assignment is short, but there is a requirement to have reference list, will you miss out in creating the list”. Their responses are shown in the table below:

Level of study	Yes	No
First year students (Group 1)	2	15
Last year students (Group 2)	3	7
Total	5	22

Table 6.3: Importance

The responses were encouraging, as 22 students out of 27 students, i.e. 81% of the students, said that they would not miss out in creating the list of references and would try to accommodate the shortage by dividing the time so that this activity is added to the assignment and would use reference management software. One of these students responded by stating that they would copy and paste references from the given book/document. From these responses we can say that the majority of the participating students knew that referencing was an important activity. An interesting finding, however, is that 15 students out of 17, i.e. 88% of students in their first year (group 1), considered it to be important, while 7 students out of 10, i.e. 70% of students in their third year (group 2 – Chemistry students), regarded it as an

important task, indicating an 18% decrease in the importance of this activity with the increase of level of study, However statistical analysis indicates that the dependency between the domain of study and importance in table 6.3 is very low, i.e. Chi-Square =1.3 at $p < 0.25$. This suggests that the result does not depend on the subjects taken by the participants.

To determine if the participants in the experiment were aware of the risks involved when references are not provided, they were asked “What are the risks associated with not providing a reference list?”, and students could tick more than one option and if desired could add risks not listed in the options. The most popular responses among the students in the tutored experiment (80%) were the risk of losing grades and the risk of being accused of plagiarism, while all the students in the un-tutored experiment identified the risk of being accused of plagiarism and the risk of not acknowledging the source of information. The following table indicates the distribution of the stated risks by the participants.

Risk types	Group 3(Un-tutored (PhD) students)	Group 1(1st year students)	Group 2 (3rd year students)
Risk of losing grades	1 (14%)	14 (82%)	8 (80%)
Risk of being accused of plagiarism	7 (100%)	14 (82%)	8 (80%)
Risk of not acknowledging the source of information	7 (100%)	7 (41%)	6 (60%)
Risk of incorrect data	3 (42%)	5 (29%)	1 (10%)

Table 6.4: Risk

The data in table 6.4 clearly indicate differences and similarities in the perceptions of risk. The majority of the tutored students find losing grades a risk, while very few PhD students consider this to be risky. Both tutored and un-tutored students consider accusation of plagiarism

to be a substantial risk, while the risk of not acknowledging the source of information is perceived as more important by the PhD students (group 3) than by third year chemistry students (Group 2) and considered the least popular risk by the students of the first year of computer science study (Group 1). The above table thus indicates that the level of study and the type of study is dependent on the perception of risks associated with referencing. Accusation of plagiarism is considered to be a risk by the majority of participants in the experiment.

The next aspect we look at is the awareness of the advantages of using references and citation.

Advantages	Group 3(Un-tutored (PhD) students)	Group 1(1 st year students)	Group 2(3 rd year students)
Better understanding of the subject	6 (85.7%)	11 (64.7%)	2 (20%)
Getting better grades	0	11 (64.7%)	8 (80%)
Impressing staff and friends	0	1 (5.8%)	0
Giving credits to those whose ideas we have used	6 (85.7%)	17 (100%)	7 (70%)

Table 6.5: Advantages:

Table 6.5 indicates that the majority of the participants think that the main advantage of using references is to give credit to those whose ideas we have used. The majority of participants in the tutored class considered getting better grades to be an advantage of using references, while the majority of the PhD students and 11 students of the first year class were of the view that the advantage of using references was to get a better understanding of the subject. An interesting aspect was the responses by the *group 2* students, as only 2 of them considered that referencing improved their understanding of the subject. This response suggests

that students in computer science have a better understanding as compared to those in the chemistry department.

As the participants of group 2 (Chemistry department) were in their third year of study, we wanted to know if they wished to have a refresher session or a set of instructions for referencing and citation. 5 students out of 10 stated that they would like to have refresher sessions for referencing because, although they knew about references and citations, they needed to refresh their knowledge, and they also had a few questions about this activity and needed to clear them up. These were very positive responses. However, 5 students did not wish to have any refresher sessions or guidelines, because according to them, it would be a waste of time, as they already knew about the concept and application of referencing. This indicated that 50% of the students were confident about their knowledge of references and citations, while the other 50% thought that there was room for improvement in this domain.

An analysis of the responses of the participants for further questions in questionnaire 1 indicates that students from the tutored experiment had only a vague idea about the reasons for having a particular reference style, as compared to the PhD students from group 3 (students participating in the un-tutored category of the experiment). Furthermore, participants wished to have more feedback from their supervisor on their reference lists and bibliography.

Thus, from this questionnaire, we may see that the majority of students had prior experience of referencing and citations. They were interested in providing references, and showed a positive attitude toward this activity. Furthermore, a majority of the participants considered this activity as important and would refrain from omitting it during their assignments or writing other academic documents. Participants had a fair idea of the risks and advantages of using references. Similar responses were obtained from students during first phase of this

research (Chapter 3), thus indicating that the students in this experiment had the same level of understating as those that participated in phase one. An interesting observation from this questionnaire is that the students in group 2 appeared less interested in this task than the participants in the other two groups. This attitude of the participants from group 2 was reflected throughout this experiment. The answers to questionnaire 1 provided us with a sound base for our experiment, as now we would be able to see if there were any changes in behavior, perception and practice by students after the interventions.

The number of questions asked of the un-tutored students (group 3) was more than for the tutored students; thus, some additional information was gathered from these students, including their experience of referencing at earlier degree programs. Some of this information was also gathered from the tutored students, but was asked in questionnaire 2. Therefore when discussing questionnaire 2, we may refer back to questionnaire 1 for some of the following information for the PhD group.

A question was put to the group 3 (PhD students) regarding the reason for the importance of reference style. The answers to this question indicated an awareness of the reference styles and their value in the referencing task. 3 students responded “because it provides a standard form of representation of references and citations”, 2 students stated “because it is required by the tutor/department”, but only 1 responded “because it is made for the particular domain of knowledge” and a single student considered all the reasons to be important. This indicates that the majority of our PhD students are somewhat aware of the logic behind the use of a particular style.

All the participants wished to get feedback about their references and citations from their supervisor/seniors. 3 students want to get feedback every time they handed over a

document with references and bibliographies, 3 students said that they wanted it often, and 1 student said very often. This indicates that students wanted feedback about their reference list, but that the desired frequency for getting feedback varied from student to student.

We obtained information about some practices associated with references, such as the usage of reference management software by PhD students during their study, the reference styles they use and the number of popular reference sources for their documents. All participants except 1 said that they were using reference management software; three used Endnote, while the other three used Mendeley. One participant also used Jabref, in addition to Mendeley. All the participants used the Harvard style of referencing, and gave the reason that it was recommended by the department. One student also added that they had been using this style for a long time and were familiar with it, and a further student said they did not know why they had to use Harvard style.

The participants were at different stages of their PhD: 3 students were in their first year, 3 students in their second year, while one was in the third year of study. All the participants in their first year used fewer than 50 references in their current academic documents, which is the same as they had done during their pre-PhD study. Similarly the percentage of references from online sources is almost exactly same as during their earlier study. One participant used DOIs, while the other two did not use them in their references.

Among second year PhD students, two used more than 50 references in their academic documents, while one still used less than 50 references. Thus, the number of references in the reference list for 2 participants had increased since their pre-PhD study. The student in their third year had also increased the number of references in their academic documents to more than 50, and also used DOIs. It is interesting to note here that the behaviour of students in using

online reference material (compared to hard copy) appears to remain same, i.e. if they were using more than 50% references from the Internet prior to commencing their PhD study they are using a similar percentage of Internet sources during their PhD study. The final two questions relate to their experience of getting feedback from supervisors, journal publishers, etc. First year PhD students had as yet not submitted any paper. Students in their second and third years of PhD study had submitted one or more conference papers; however 2 students got feedback while one student did not.

Questionnaire 2

Questionnaire 2 was handed to the students as one of the post-tests (Appendix D). The main objective of this questionnaire was to obtain students/participants opinions about various aspects of the experiment, especially the electronic feedback report generated for each document submitted by the students.

Since there were three distinct groups in this experiment, two for the category of tutored experiment (group 1 and group 2) and one for the category of un-tutored experiment (Group 3), there were three sets of questionnaire 2 (Appendix D). Each of these questionnaires was designed based on student's current education level, domain and the mode of receiving the reports. For the first year computer science class in the tutored group (group 1), the total number of questions in the questionnaire was 23; for the third year chemistry class in this category (group 2) a total of 21 questions were included; meanwhile, for the un-tutored group (group 3) a set of 24 questions was put to the participants. For the tutored experiments, questionnaires were divided into three parts. The first part had questions that were common to all students in the class, which included students who did not participate throughout the

experiment and those who did; the second part of the questionnaire aimed to get responses from the students who did not continue with the experiment, and the third part was for those who did participate throughout the experiment.

The total number of filled-in questionnaires returned was 26. Of the 26 participants, 23 agreed that references are an important part of writing academic documents. 2 out of 10 students of group 2 and 1 out of 10 respondents of group 1 were, however, neutral about this fact. This is interesting, since the students of group 2 are in their last year of study and one would hope that these students would be well aware of the fact that this is important. The response to next question is reassuring; we asked the student again: "If the time given to submit the assignment is short, but there is a requirement to have reference list, will you miss out in creating reference list?" A comparison of the number of responses is given in table 6.6 below:

Level of study	Yes		No	
	Pre-test	Post-test	Pre-test	Post-test
First year students (Group 1)	2/17	1/10	15/17	9/10
Last year students (Group 2)	3/10	0	7/10	10/10
Total	5/27	1/20	22/27	19/20

Table 6.6: Importance

Table 6.6 indicates that the level of importance among participants for the task of referencing has increased. During the pre-test, 18.5% of the participants were willing to omit generating the reference list, while by the end of the module this percentage had reduced to 5%. Now 19 out of 20 students are not willing to let go of reference list. A chi-squared test indicates that the improvement is significant (chi-square = 3.158, $p < 0.07$).

To get error free references, it is important to know about the reference style, formatting and purpose of referencing; thus for our study it is imperative to know if students have understood this concept. Responses to this inquiry led to the conclusion that majority of the tutored participants were not very clear, as can be seen in table 6.7. However the un-tutored participants were aware of the reasons for using a particular style, as indicated during our discussion in previous subsection.

Reference Style	Group 1 (1 st year students)	Group 2 (3 rd year students)
Because it is required by the module	10	10
Because it is easy to implement	1	0
Because, in future, this style will facilitate me in developing reference lists and bibliographies for professional journals of my subject domain.	0	1

Table 6.7: Reference Style

The only reason participants appeared to use a particular reference style was that it was asked by their tutor. This indicates that we need to put more effort in explaining the concepts of referencing and reference style to our students. This argument is further supported by the responses from the 3rd year (group 2) students. We asked them is there a difference in referencing style between *American Chemical Society (ACS)* style and *Physical Review Style*? This question was put because according to their (group 2) responses to questionnaire 1, all the students stated that they were using ACS reference style. In this module, they were asked to use *Physical Review* (Waldron, Judd and Miller, ed. 1993) as a style for referencing. All the students of group 2 stated that there was a difference in the style of the two referencing schemes mentioned above; however, when asked what these differences are, very few *knew* the difference and some stated that they did not understand the *Physical Review* style at all. This

response was interesting, as it seemed that the tutor was unable to explain this style to students properly.

Another aspect of referencing is the utilization of resources and tools available for this practice. Therefore, we asked the participants if they used reference management software. The majority of students in the tutored experiment did not use any reference management software. 5 out of 20 students stated that they were using reference management software, while 5 out of 6 PhD students are using reference management software. This indicated that the level of study was dependent on the use of such tools, as confirmed by chi-square test (chi-square= 6.847, $p < 0.033$).

In this experiment intervention X1 is the training session or presentation guidelines in doing the references. For the tutored experiments this intervention was done by the tutors of the two classes. We were interested in knowing how many participants actually received this intervention. This would allow us to see the improvements in students' work. In the first year class (group 1) all the students attended the session on references and citations; however, in group 2, among the 9 students who responded to this question, 3 of them stated that they did not attend refresher sessions, again indicating that not all the participants in group 2 were motivated enough to learn this skill .

To gauge the level of commitment and seriousness among the participants about this experiment, we asked if they had sent their assignment documents to receive electronic feedback. Table 6.8 summarizes the level of interest among the participants who responded to the questionnaire:

Level of study	Interested Participants	Not interested participants
First year students (Group 1)	7	3
Final year students (Group 2)	5	5
PhD students (Group 3)	6	1
Total	16	9

Table 6.8: Commitment to the Experiment

Table 6.8 indicates that the majority of participants, i.e. 64%, were interested in this research, while 36% were not. The level of commitment correlates significantly with the category of experiment (chi-square = 3.847, $p < 0.033$). If we look individually at each group, it is evident that 5 of the 3rd year students (group 2) were not interested. The attitude of this class is evident from some other responses received during this questionnaire as well as from questionnaire 1. The responses from two of the students of group 2 are interesting, as they reported that they “forgot” to do so and are “sorry”. Other responses from the participants are that indicated low interest in this research includes “I am not interested in this research work” or that they don’t need feedback on reference list as they know what they are doing. Some of the students who did not participate this time were interested in getting electronic feedback reports in the subsequent modules, and a majority of these participants were either neutral, or dissatisfied with the feedback they received. We may conclude from these responses that the majority of participants who did not fully participate were disinterested.

Responses to the questionnaire from those who said they participated throughout in the experiment are of prime importance in evaluating the proposed framework (FESR). Since the participants in the tutored experiment did not directly interact with the software, their opinion was based on the electronic feedback received by them through their email. This feedback

report identifies the errors detected by the RSESS when the tutor clicks the assessment button (Figure 5.7 in Chapter 5). The un-tutored participants also received the feedback for the documents they uploaded through the interface provided on the RSESS website (Figure 5.5 in Chapter 5). The responses allow us to determine the perception of students regarding their learning experience. This is indicated in Table 6.9 below.

Responses	Group 3 (PhD Students)	Group 1 (1 st year students)	Group 2 (3 rd year students)
Very useful: I immensely improved my references skills through the feedback	3	0	0
Useful: I learnt the type of mistakes I was making and tried to correct it	1	2	1
Slightly useful: I saw what was wrong with some of the reference work I did	1	5	3
Not useful: there was no difference in my understanding due to the Feedback	1	0	1

Table 6.9: Evaluation of the Proposed Framework

Table 6.9 indicates that the majority of participants found the electronic feedback reports to be useful in learning about reference list development. Participants in the un-tutored group (Group 3) had a better experience in learning than those in the tutored groups (Group 1 and Group 2).

Furthermore, the majority of students were interested in continuing to get electronic feedback on their reference lists, because “Through electronic feedback I know what my mistakes are and what the correct information is” and, as per few other participants, “Electronic feedback helps me to improve my referencing skill”. However, a majority of students in group 2

seemed uninterested in electronic feedback because they thought that “I have learnt all that I needed to learn about references and citation and I don’t need to know any more”.

Finally we asked the participants to provide their opinions about the feedback reports generated for their documents, including the best and worst features in the report. Some of the responses for the best feature are:

- Knowing where I went wrong and how to correct it.
- It was individual to my work.
- Well presented layout.
- Gives step by step indications about errors in my reference list.
- You can see your errors and improve essay grades.
- I like the feature of correcting mistake of references such as telling us about the wrong date of cited documents and also provide the right one.
- The “suggestions” is a good feature to include in the feedback.
- Identifies my mistakes and give correct information, instant feedback.
- It gives prompt reports and provides exact issues to work.

Thus, participants approved the layout and contents of the report. However, some shortcomings and improvements in the report are also identified by the participants. In the following subsection, we analyze additional information obtained from the data collected in this questionnaire from the PhD students (group 3).

Students of Un-tutored Experiment

Participants in the un-tutored group in our experiment were different from those in the tutored groups, because they directly used the software system, i.e. uploaded their files and got

responses in their mail box as electronic feedback. For this reason, they are acting both as a tutor in the tutored experiment as well as a student. Thus, few additional questions were asked of them. These questions were related to the participant's opinion about feedback and how often would they want to have it, whether they should have training sessions and how often do they think sessions should be provided over the period of three years in PhD. They were further asked about the experiment as a whole, the website, and about the return time of feedback reports.

Feedback: All the participants stated that it was very important for them to receive feedback from their supervisor, and they would want to have it quite often, and one participant wanted to have feedback on their reference list every time they submit the document. The reason for wanting to have feedback is stated by 5 participants as "feedback can help me in removing errors from reference list", and 4 participants added that "feedback can help me in improving my referencing skill". One participant responded by adding that "feedback can help me in improving my referencing skill and feedback on references list can help me in the acceptance of my academic papers for journals and conferences". Participants further stated that the feedback reports have exactly what they would wish to have from their seniors/supervisors. These responses support our major sub-component of the proposed framework to improve reference skills, i.e. regular feedback for reference lists.

Training sessions: Another sub-component of the proposed framework is the provision of regular training sessions. We asked the PhD students in the un-tutored group about the importance of training sessions on reference skills during their PhD study. All the participants responded by stating that it was important to them because they improved referencing skills and they would always need this skill as researchers, i.e. they will always need to be proficient

in referencing as it forms part of the academic writing process. This re-enforces the reason for having training sessions as a component of the proposed framework.

Software Solution (RSESS): A sub-component of the third component in the proposed framework is the facilitation of students and staff through a software solution; therefore we asked questions to evaluate the effectiveness and ease of use of the prototype for this software. The reason for this task was to see if the learning curve for students to use this mechanism was easy or difficult. If it was difficult, users would not be inclined to use it, and hence the improvement as proposed in the framework would not be achieved. We asked, in general, how easy it was to use the website. Five out of six participants found the site to be easy or very easy; however, one student thought it was difficult to use. Thus, for the majority of students, the website was quite easy to use.

Specific questions about the website were also asked to get a better understanding of the above responses. We asked whether on the website, there were sufficient instructions provided on the type of documents that could be uploaded there, and all participants agreed that there were sufficient instructions to do so.

Participants were further asked whether there were instructions and links given to indicate where to refresh their knowledge about references and reference style, and all participants said *Yes*. In response to the next question, whether they had visited the site, 5 out of 6 students had visited the link to refresh their referencing skills.

The last question regarding the ease of use of the website was: “How easy it was to upload a document?” 5 students out of 6 said it was very easy, while one student found it to be difficult. From these responses, it is evident that the RSESS website is easy to use and instructions are quite understandable.

Feedback Report: One interesting question asked from the participants in the un-tutored experiment was the time the RSESS website took to generate the feedback report. 2 participants stated that they received their reports within 1 minute after submission of their documents. 2 participants stated that they received their reports in more than a minute, but less than five minutes time. One participant stated that she got her reports in “More than five minutes, but less than ten minutes. My personal email provider is slow”.

About the Proposed framework used in the experiment (FESR): We asked the participants in group 3 for their opinions regarding the proposed solution to identify errors in the references, and how useful they thought this proposed solution had been for them. All the participants were of the opinion that the proposed solution was very useful for them, as it helped them to identify their mistakes in reference lists, and suggested a solution for their mistakes. Another reason given was that it saved their supervisors’ time by providing them with timely feedback.

The above responses indicate that after going through this experiment, students considered this model to be very useful, for the above mentioned reasons.

6.3.2. Interviews

Interviews are one of the major and effective tools in acquiring face-to-face reliable and accurate information about the subject of investigation. We used this tool to gain a deeper understanding of the participants’ experiences and opinions about the experiment and its outcome, and validation of information received through the questionnaires. Please note that the number of interviewees does not have to be large: for example, a study conducted by Schembri (2009) included interviews of 6 students which provided insight into students practices for citation and references. Furthermore, information provided by Baker and Edwards (2012) indicates that a varying number of interviews have been used by researchers. Mason (2010) has

stated that “There is no logical (or theory driven) reason why samples ending in any one integer would be any more prevalent than any other in qualitative PhD studies using interviews”.

As one of the post-tests for the current experiments, interviews were conducted with the participants in both the tutored and un-tutored experiments. For the tutored experiments, interviews were conducted with the tutors as well as the students.

Methodology for Conducting Interviews

Since we had two distinct categories of interviewee, i.e. the tutors and the students, there were therefore two sets of objectives and themes for the interviews. The approach adopted for analyzing these interviews was deductive/Inductive (Chapter 3). Once the objectives and themes were identified, tentative questions were designed to cater for them. However, the number of questions for interviews varied from individual to individual, as discussed in the following sections.

Once the interview questions were ready, participants were contacted and the times for interviews were arranged. The interviews were recorded, and the durations of the interviews varied from participant to participant based on their style of interaction and responses. After completion, the interviews were transcribed and analyzed. Details of both types of interview i.e. tutors and with students are discussed below.

Interviews with Tutors

The number of tutors participating in the interviews was 2 – participants of tutored experiments (Baker and Edwards, 2012). They both teach the subject “academic writing skills” and thus have experience with students regarding their skills of references and citations. The main objective for conducting these interviews was to get teachers’ view point and opinions about the experiment. Thus, the interview revolved around the following themes:

1. Current state of teaching references and citation skills;
2. Views about the proposed framework and experiment;
3. Views about software tool (RSESS Website).

On average, about 20 questions were tentatively developed. The first set of semi-structured interview questions were aimed to get opinions of the tutors about the current state of teaching references and citation skills to the students by the tutors. The second set of questions was aimed at determining tutors' views about the operational model proposed, and tested in the experiment. The third set of questions was aimed to get their feedback on the software tool that was used to implement this model. The duration for each interview was between 15 to 20 minutes.

The responses of tutors regarding the above points helped us in achieving the objectives of the interview and are discussed below in detail.

Current State of Teaching References and Citation Skills

At the start of the interview, tutors were asked for their opinion regarding the general teaching scenario of references and citation. The following points were put to each interviewee, although not necessarily in the same order.

1. Is the current procedure for teaching references and citation adequate?
2. Is the feedback to the student useful and adequate?
3. What is their impression and opinion of the overall quality of referencing work, and approach toward this task, by students?
4. Do you think it is a difficult and time consuming task for the tutors to provide feedback, and why?

In order to evaluate the proposed pedagogical framework it is important to understand the state of current pedagogy for teaching this skill. Since the two participants have been teaching this skill formally to the students, therefore, their opinion about this is taken. The response from first participant tutor, *interviewee 1*, was that the current procedure for teaching references and citation is not good, “no one does it correctly, and they just leave the students on their own. Students then go to the library or look for information in books and internet, and therefore, there is a mixture of various references in students work. This process should be improved”. However, *Interviewee 2* was of the view that it is unnecessary to teach the skill, but it is important for the students to consult the style guide. These responses are interesting as both the tutors agree that reference skills are not taught to the students and students are directed to style guides, books etc. However interviewee 1 states that it is indeed inadequate training for the students in this skill while the other interviewee thinks it is adequate. These were interesting responses, since both these tutors were teaching the course *academic writing skills*.

In addition to training, feedback on referencing has been identified by students as being imperative for learning the skill of referencing (highlighted in the responses to questionnaires to students). Hence we asked our participants about their opinions on this activity. *interviewee 1* said that he did not think that students gained adequate feedback on references in other modules of their course, whereas *interviewee 2* stated that while she could not express a view about other modules, she does provide feedback herself, which she considers to be adequate.

We further asked the tutors about their impression and opinion of the overall quality of referencing work by students. *Interviewee 1* stated that “it is not very good”, and *interviewee 2* elaborated “that students who use style guides generally do well, but those who use electronic

systems, such as Endnote, struggle". The response from interviewee 2 was quite interesting, because reference management software is designed to improve the reference and citation task.

We asked the tutors about their impression and opinion of the overall behaviour (interest/importance level etc.) of students toward this activity. *Interviewee 1* stated that "it is not good, students don't think it is important", and this view was echoed by *interviewee 2* responded in similar fashion by stating that "it is at low interest level among the undergraduate students, but of high importance level for students of social sciences and English at graduate level".

Furthermore, an interesting aspect to explore while trying to understand the current state of teaching referencing to students was to view how comfortable the teachers were in teaching this skill, and whether they faced any problems while providing feedback to their students on referencing. *Interviewee 1* stated that it was very hard for teachers to provide feedback and to find time for marking, for example, and noted that "I have to mark 3000 word essays and they pay 6 pounds an hour for this job, hence not enough incentive for the teachers, and at the most what they can do is say that this is not Harvard etc." *Interviewee 2* also agreed that because of lack of time for hourly paid staff, it was difficult to provide feedback. Both tutors identified lack of time and lack of financial reward as constraints.

From the above responses, we concluded that according to the interviewees, in general, students are not appropriately provided with formal training on the subject of references and citations and are left on their own to find advice. They have low interest levels and their quality of work varies. Furthermore, tutors do not have enough time and incentive to

go into the details of marking and provide comprehensive and useful feedback to the students on referencing skills.

Views about the proposed framework and experiment

Next, we wanted to inquire from our participants, about the proposed framework based on the outcome of the experiment. Therefore, the following points were raised during the interview in this regard.

1. What was their opinion about the proposed solution?
2. Is there any improvement that they wanted in this proposed solution?
3. Should this solution be adopted in Warwick University?

The opinion regarding the proposed solution was interesting. Interviewee 1 was enthusiastic, as the following quotation shows: “Yes it is brilliant, very nice and should be implemented here at Warwick University. The feedback mechanism is very good. Only thing is that in the model you proposed you have added the involvement of the library staff, I think it should be the responsibility of staff members who teach academic writing skill as we did in our current experiment.” His response was encouraging; however, *interviewee 2* declined to answer as she “was not able to get engaged with it”. This was surprising as she was part of the experiment and went through our initial training session which was designed to provide information about the proposed model and hands on experience on the software tool used in this model.

When asked whether the proposed solution needs to be improved, *interviewee 1* said that no improvement were needed in the proposed model, whereas *interviewee 2* stated that the software should be integrated with the BOSS (Joy, Griffiths and Boyatt, 2005) system of the

computer science department. BOSS is an online course management tool developed by the Department of Computer Science at University of Warwick. Through this tool, students are able to upload their assignments and teachers can mark these assignments and maintain their course.

In order to determine the level of confidence of the participants in the proposed solution, the third point was presented to them, i.e. recommendation of the solution to the University of Warwick. *Interviewee 1* was very positive, and said that it should be implemented at University of Warwick. *Interviewee 2* was reluctant to respond, as she has not been fully engaged in the experiment. Furthermore, she considered that uploading students' assignments would add a burden to her work, as she is an hourly paid tutor.

About Software Tool (RSESS Website)

Since the software tool was an important component of the framework proposed, and tutors were involved in using it, it was important to get their feedback and opinion on this tool. For this we asked them the following questions.

1. What is your opinion about the ease of use of the software?
2. How effective is the software in facilitating staff members?
3. What is your opinion about the feedback report provided to the students?
4. Would you recommend this software to be used in Warwick University for students and staff?

Responses to the above questions validate the software tool developed to implement the proposed model of feedback on references and citations.

In response to our first query, *interviewee 2* said that RSESS (the software tool) seemed relatively straight forward, and *interviewee 1* said that the software was very easy to use, and that even a person like him who was not very proficient in computers found it be simple.

These responses were mirrored in the answers to the second question, to which *interviewee 1* said that “it was very useful, it saved an enormous amount of time for the staff members in providing feedback to students, especially to such details”. *Interviewee 2* did not respond to this question.

Interviewee 1 was then shown each screen of the software, and asked about its ease of use and functionality. This was essential in validating the software tool from the tutors’ perspective. For each module of the tool, he responded that it was easy to use, and noted in particular the automatic sending of feedback reports in the assessment module and adding feedback content in the feedback and rubric module as particularly straightforward.

For the administrative module, which consisted of three pages, he considered that each page was very easy to understand and use. He also considered the one-page assessment module as easy to use, including automatically sending feedback reports. The two-page feedback and rubrics module was also easy to use. The above responses therefore validated our tool for feedback from the tutor’s perspective.

Question 3 focused on the reports that were sent to the students, and *interviewee 1* commented on the usefulness for the students and generally good layout etc. Similarly, he responded with a clear “Yes” when asked question 4, “would he recommend this software to the University of Warwick?”.

From this interview, we may conclude that the current system for teaching references and citation is not adequate, and needs reforms. The proposed system is useful enough to be recommended at Warwick University and the software tool developed for this model has served its purpose in saving the time of the tutors, especially since the hourly paid tutors identified that shortage of time while providing feedback to their students is a serious problem.

Interviews with the Students

The number of students participating in interviews was 7, and included participants in both tutored and un-tutored experiments. The total numbers of tentative questions to be asked during the interview of the students from the tutored and un-tutored experiments were 12 and 24 respectively. The reason for the difference in number of questions asked is due to the approach taken during both experiments. Students from the tutored group did not directly interact with the software tool available on the website, while the students from the un-tutored group had direct interaction with the software tool. Therefore, the duration of the interviews for the tutored students was roughly half as compared to the duration of the interviews with the un-tutored group.

The main objective for conducting this interview was to get as much feedback as possible from the participants about various aspects of the experiment. Their feedback helped in evaluating the framework. Both the groups were asked to comment on the feedback reports generated, and the tutored students were asked about their current status and the practices of feedback from their tutor. One of the objectives for interviews with the un-tutored students was to verify their comments about feedback and training sessions mentioned by them in questionnaire 2 and to get an in-depth understanding about the effectiveness of the proposed

framework. The software is validated in the light of the responses from the questionnaires and the interviews. Thus, the following points were raised during this interview:

1. General ideas and opinions about effectiveness of regular feedback for the references and citations task;
2. Opinion about the experiment and its outcome;
3. Opinion about the feedback report.

The following sections show how the objectives of this interview were met.

Feedback, Training Sessions and Resources for Research

The un-tutored participants were asked about their opinion regarding the academic importance of feedback and training sessions, as well as their usage of digital libraries, and the major points raised were:

1. Opinion about regular feedback, in general, and about feedback on reference list/bibliography in particular, and how students deal with feedback;
2. Opinion about regular training sessions on references in general, and how effective they are;
3. Their experience about using reference management software and digital library catalogs.

Opinions regarding feedback, especially feedback on references/bibliographies, are important because feedback is one of the core processes within the proposed model. Since students are the key beneficiaries of the feedback therefore it was important to seek their viewpoint on the matter. All the participants stated that feedback in general is very important because that's how they know what was wrong with their work and they can improve upon it.

All the participants agreed that regular feedback on their task was preferred. One participant said that regular feedback, especially in the first and second year of study, both during undergraduate and post graduate study, was essential. Upon asking about feedback on the reference list and bibliography, all of them stated that they would like to get regular feedback about their reference list from their supervisor, as it was a very important part in academic arena, and finally, if they were not able to do this task appropriately it would be very hard for them to progress. One of the participants added that they had never received any feedback on referencing in their earlier study, or very few teachers ever gave them any feedback on reference lists. These responses re-enforced the information we received during our investigative study (chapter 3), highlighting the needs as well as the shortcomings in providing feedback for referencing.

We further asked our participants, during interviews with them, whether students (in general) heeded the feedback they received from their teachers. This aspect was necessary to determine the motivation level of students in performing this task. The responses were interesting; all the participants agreed that students in the undergraduate study would take feedback seriously if grades were attached to it. For postgraduate students, this may be different as students may wish to enhance their knowledge, and for PhD students it will be very important for them because none of their work will be accepted unless appropriate referencing is done. These responses were in line with the information collected through questionnaires, and resonated during the investigative phase (Chapter 3). Participants further stated that the contents of the feedback also determined if the student would take it seriously, if the content of feedback was adequately clear or is positive student would take feedback seriously otherwise they might not. These responses indicated that the motivation for performing this task varied from one level of study to the other. Most of the time extrinsic motivation, such as grades or

acceptance of academic papers, prompted students to seek references and use it in their work. However, for postgraduate students, intrinsic motivation such as enhancing their knowledge drove them to reference. The most important information from these responses was that the contents of the feedback motivated students to take referencing seriously and to act on the feedback. Thus, well worded comprehensive feedback is important in teaching this skill.

Furthermore, all the participants stated that it was important to have training sessions for referencing skills. They further stated that a training session once a year should be adequate, as this would help them to revisit their reference skills. Four of the participants attended the training sessions provided at the university, and stated that these training sessions could be improved.

The majority of participants stated that they were using reference management software to organize their references, and identified the following reference management systems: Endnote, Mendeley and LaTeX. When asked if they were satisfied with these software tools, the majority said that these systems did have problems; for example, one participant stated that some errors were introduced into their list, while another one stated that the one they were using was not web based, and hence, they were unable to access it at home. Another important aspect related to reference management systems, insofar as these systems would produce a list based on the data we entered or the one they get from digital libraries, and that these data were not always complete or correct, thereby introducing errors in the list. An important question we asked after this information was “despite using reference management software, would you still want feedback from your supervisor on your reference skills?” They said they wished to have this for the above mentioned reasons.

Next, we asked participants about their use of online resources such as digital libraries and catalogs. Most of the participants said they did use those sources to find academic and conference papers, and that they found such sites to be useful.

Thus it is clear that participating students consider feedback and training sessions to be essential for their learning skills, including the skill of developing reference list and bibliographies. The majority of PhD students use reference management software; however they face difficulties and problems in generating lists using such systems. Digital resources are also utilized by these students. Thus, students are well aware of the importance of training sessions and feedback, and of the electronic resources available to them over internet.

Proposed Framework and Tool (RSESS Website)

The opinion of students regarding the proposed framework and software tool is of prime importance. To get their opinion and feedback following points were raised:

1. Opinion and experience about the experiment and the software tool used;
2. Whether they would use this system during their academic tenure and as professionals in general;
3. Whether they learned from this system;
4. Whether they would recommend this system to others.

Tutored students agreed that the system of feedback used in the experiment was good for their education and understanding. Interviewee 2 noted that “it is really helpful. The feedback we got was quite useful as earlier I did not realize that the reference should be in an alphabetical order. The (feedback report) told me. Also it told me I need full stops after date”. The response from interviewee 2 indicated that students learned from the feedback report and endorsed the proposed system of feedback.

When we asked the un-tutored participants about their opinions regarding the experiment and the proposed model that was implemented, and the software tool (RSESS) used for this purpose, their responses were positive; all the participants endorsed the proposed operational model and said that it is a very good idea and should be implemented on a large scale to facilitate other students. One of the interviewees was of the opinion that through this system students' referencing skill will improve. Other interviewees also endorsed the idea, and one said that the software was "useful, easy to use and clear to me". However one of the interviewee stated that the contents at the link for guidelines on referencing could be further elaborated for better understanding.

The above responses indicated that the participants of both categories of the experiment approved of the proposed system for enhancing their referencing skills, and indicated that it would be very useful if applied on large scale.

To further identify whether they thought that this system was useful in the long run, we asked if they wished to continue using such a system during their current study as well as when they obtain their degree and enter professional arena, and all the participants said *yes*. We further asked them whether they would recommend this system to their friends and colleagues the answer was *yes absolutely*. Students in the tutored group were also asked if they would like to use this system next term as well, and both students said *yes*. *Interviewee 2* added that "I think this will be helpful. I don't know, I find it very hard to grasp what need to do with reference. This tool exactly finds what to do to the level of full stop, which is useful".

Next, we asked them if they had learnt from this system, and all the participants said *yes* they did. One participant stated "Yes, I have learnt a lot from it because it gives you detail as well as precise issues in your reference. So yeah I learnt from it e.g. if you forget to put full stop

we just go and put it there. Yes I truly learnt from it. If you note from the three documents I submitted. First one contained errors, in second one it got reduced and the third one reduced further, so I learnt from it". Another said "First I learnt that sometimes reference management software is not perfect so that it has some errors in contents and data. Like once a reference management system told me about the year of publication of a paper. I copied it from internet, but when I checked it from other database I found it should be another year" and further commented that the tool provided him with the correct date and thus he corrected it in his document.

The final question sought to determine if the proposed system in general, and the software in particular, added value to the process of referencing and citation, and we asked the interviewees "despite of using reference management software, would you still want use the tool provided in the experiment for feedback?" All of them said "yes". The reason provided by the participants was that reference management software may have many types of errors; furthermore, while adding reference data manually in the input fields of reference management software, they sometimes put in incorrect data or forget to put data in some fields such as name field or date field. Therefore it was good to have final corrective feedback, i.e. this software should be used as the final last step in developing reference lists and bibliographies.

The above responses indicate that the participants endorsed the proposed framework, especially the tool used to implement the framework. They found it to be easy and useful, and they were of the opinion that they had learnt from this system. Furthermore, they want to use this system despite using a reference management system, because this feedback system identifies the mistakes and suggests the correct solution.

Opinion about the Feedback Report

We inquired about various aspects of the feedback reports that were generated for the reference lists in the documents uploaded by the interviewees during the experiment. The main reasons for asking about the reports were to confirm what the participants have stated in the questionnaire 2 regarding the reports they got as well as to see if there was anything new that they may have to say about it. All the interviewees from the tutored group said that the reports were useful, and the un-tutored group students added that they found the layout and the formatting of the report to be straightforward and simple, and the contents easy to understand. Furthermore as stated by an interviewee, “The return time of the feedback report was very fast”, and that once she received the feedback report she fixed those errors. This indicated that students were trying to improve their referencing skills while using the given tool.

The above information indicated that the interviewees were in general satisfied with the reports they received.

From these interviews, we may conclude that participants in the experiment were of the view that regular feedback and training sessions would improve their referencing skills. The operational model proposed for FESR and the tool developed to implement this model i.e. RSESS helped them in learning the skill of referencing and the reports generated were helpful and clear to them. Finally, it may be seen that this model achieves its purpose of teaching and enhancing the skill of referencing among students.

6.3.3. Analysis of Documents and Reports

Documents included for the purpose of analysis are student’s assignments and other academic documents and corresponding electronically generated feedback reports on reference lists embedded in these documents. These documents are submitted either to the tutors or

directly uploaded into the system. The objective of analyzing these documents is to determine if there are any improvements in referencing practices due to the interventions.

At the beginning of the experiment the expected number of total documents was 119 documents and 119 feedback reports generated through the software used in the experiment. 30 of these documents were expected to be generated by group 2, 68 by group 1, and 21 documents from the un-tutored group 3. At the end of the experiment, it was discovered that the actual number of documents generated was less in number than expected, particularly for the students in group 2. One of the reasons for the decrease in the number of documents is that only 16 out of 27 students in the tutored group submitted their assignments and 6 out of seven participants from group 3 submitted their documents for the experiments. Improvements in the referencing tasks are measured by the decrease in average number of errors per reference in the reference list.

Collecting Documents for Analysis

Each group in the experiment submitted their assignment in a different manner. Students in group 2 initially submitted their assignments in a hardcopy format to their tutors. For this experiment a web interface was developed for them to upload their assignments. These assignments were then uploaded on the RSESS website by the tutors and processed. Thus, only those students who were willing to do the extra work of uploading their assignments participated in the experiment. This explains why 5 students out of 10 said they did not participate.

Participants in group 1 uploaded their assignment on the electronic system (BOSS) developed by the Department of Computer Science (Joy, Griffiths, and Boyatt, 2005). Documents are downloaded from this system and are uploaded onto the RSESS website. Thus,

in most cases, assignments that are missing are due to the fact that students did not submit them or submitted them in PDF format (not supported as yet by the RSESS website).

For the third and final group, documents were directly uploaded onto the RSESS website by the participant students, and thus, no extra intervention was needed to collect these documents.

The reports generated were sent to the students and tutors automatically, and were received in their mailbox. Thus, the mode of collecting reports was the same.

Methodology for Analyzing Documents and Reports

The objective for analyzing documents and reports was to see the number of references made in documents, and the errors generated. Further analyses will evaluate whether students improved their skill of generating a reference list through the proposed framework.

The methodology adopted to analyze these documents was, for each student, to take each document and its corresponding reports and determine the number of references made in the documents and the number of errors generated against these references. This process is continued for all subsequent documents from the student. We will then calculate the improvement factor for those participants who submitted more than one documents. The factors that are looked at are:

1. Number of references in each document;
2. Number of errors generated for each document;
3. Reduction in errors;
4. Types of references in each document;
5. Types of errors generated for each erroneous reference in the document.

These factors provide us with some insights into the claim of students that they have learnt from this experiment.

The types of references in a document are categorized as:

1. Academic papers and Academic e-papers;
2. Academic journals and Academic e-journals;
3. Books and e-Books;
4. Online Documents;
5. Others.

The error types are categorized as:

1. Formatting errors;
2. Incorrect data;
3. Missing data.

Analysis

As a first parse of the analysis of documents and reports, we counted the references in each reference list in each document submitted by each participant in the experiment. Four documents were expected to be uploaded and processed for the students of group 1, 3 documents per student by the students in group 2. And 3 documents per student for the un-tutored experiment group.

Group 1

For group 1, the following table (Table 6.10) summarizes the rates of errors for the files received from students.

Student no.	Assignment 1			Assignment 2			Assignment 3			Assignment 4		
	No. of refs.	No. of errs.	No. of errs. per ref.	No. of refs.	No. of errs.	No. of errs. per ref.	No. of refs.	No. of errs.	No. of errs. per ref.	No. of refs.	No. of errs.	No. of errs. per ref.
1	-	-	-	-	-	-	10	14	1.4	22	21	0.95
2	7	14	2	1	1	1	3	7	2.33	18	35	1.94
3	11	18	1.63	4	4	1	6	10	1.66	18	24	1.3
4	8	28	3.5	1	2	2	5	11	2.2	11	42	3.8
5	10	15	1.5	-	-	-	-	-	-	10	20	2
6	3	4	1.33	5	3	0.6	-	-	-	9	9	1
7	10	19	1.9	3	3	1	-	-	-	21	22	1.04
8	6	7	1.16	1	0	0	9	13	1.44	9	1	0.11
9	-	-	-	4	4	1	7	5	0.71	10	13	1.3
10	9	27	3	4	6	1.5	10	30	3	17	14	0.82
11	4	3	.75	3	6	2	9	13	1.4	16	3	0.18
12	5	5	1	8	11	1.37	7	5	0.71	20	3	0.15
13	-	-	-	-	-	-	-	-	-	24	12	0.5
14	5	5	1	-	-	-	-	-	-	-	-	-
15				2	2	1	4	10	2.5	-	-	-
16	1	0	0	1	0	0	-	-	-	14	17	1.2
17	4	6	1.5	-	-	-	-	-	-	-	-	-
Total	83	151	1.82	27	42	1.12	70	118	1.69	219	236	1.08

Table 6.10: Group 1

The general pattern in the ratios of references and errors is indicated in table 6.10 above. The row labeled as *total* shows the first electronic report given to these students after the first assignment. Hence the average number of reference errors ratio is high. For the second assignment, the ratio of errors to references decreased. However this ratio increases for the third assignment. As the number of references increases, this can be the cause of an increase in the rate of errors. However, the final assignment indicates that although the number of references in this assignment increases to three times that of assignment 3, the ratio of reference and errors has substantially decreased. This indicates that for group 1 as a whole, there is an improvement in their references. Since students reported that they did not get any

feedback from their teacher on referencing, and the only feedback they received was from the electronic reports, we may infer that there was an impact of these reports on overall class performance. This statement may also be supported through the data received from questionnaires and interviews in which students stated that they have learned from the feedback reports. The following graph (Figure 6.3) indicates the learning path of the group as a whole.

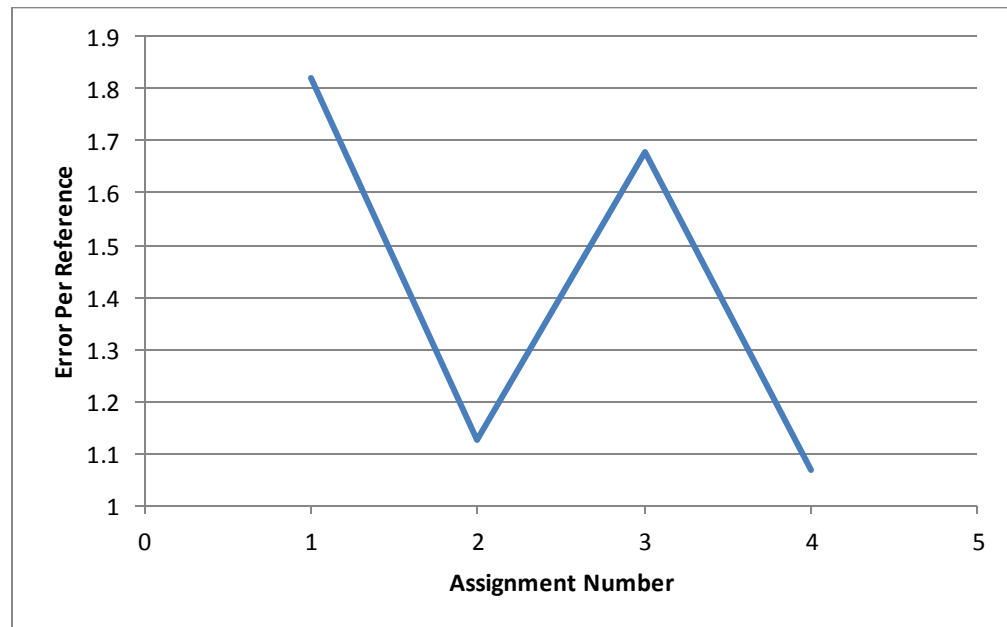


Figure 6.3: Group Performance (Group 1)

Along the x-axis of Figure 6.3 are number of assignments and on the y-axis is the ratio between total errors made and the references reported by the website. The data in Table 6.10 indicate that a total of 7 students submitted their work on a regular basis and received reports. This is also clear from questionnaire 2, in which 7 students out of 10 stated that they actually participated in this experiment. Figure 6.4 below highlights some interesting points.

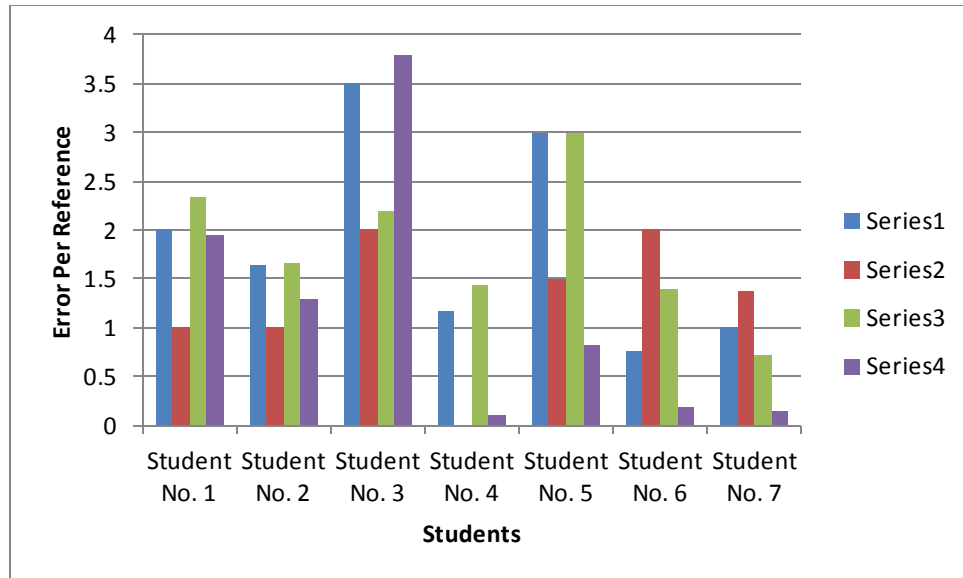


Figure 6.4: Individual Performance (Group 1)

Series 1 of Figure 6.4 is the ratio of reference and errors for assignment 1, i.e. errors per reference in a reference list, series 2 is for assignment 2, etc. The ratio of errors for all except one student has decreased from the start of receiving reports to the end. Four of these students improved substantially, i.e. students 4, 5, 6 and 7. Students 1 and 2 did better than their first attempt; however, interestingly, student 3 actually had more errors in their last assignment than in the first one. On looking at questionnaire 2 it seemed that the student did not consider a certain type of formatting error, i.e. putting a full stop after the date field and thus did not change it at all causing the increase in error numbers. The above data also indicates that the increase in number of references in a reference list also caused the increase in the ratio of errors per reference. However with the feedback reports, this ratio is reduced.

The total number of references processed for this group was 399, and a total of 547 errors were reported. The majority of references were from online sources such as online papers, articles and other documents. Among errors generated electronically, a majority were

formatting errors, followed by missing identifier errors such as missing ONLINE identifier. Errors such as “not in alphabetical order” were also seen frequently. Other errors included incorrect data, such as incorrect date, page number, volume number, etc., and missing data (i.e. incomplete reference).

Group 2

Group 2 has a different background. All the participants had previously used the ACS reference style. In this module they were asked to do referencing using the Physical Review style. The majority of the students did not follow this style of referencing in the current module. Responses from questionnaire 2 indicated that they were less inclined to engage in the task of referencing. The following table (table 6.11) shows the number of references and the errors reported by the software.

Student no	Assignment 1			Assignment 2			Assignment 3		
	No. of refs.	No. of errs.	No. of errs. per ref.	No. of refs.	No. of errs.	No. of errs. per ref.	No. of refs.	No. of errs.	No. of errs. per ref.
1	12	1	0.08	5	1	0.2	-	-	-
2	2	2	1	4	3	0.75	-	-	-
3	3	3	1	3	3	1	-	-	-
4	8	5	0.65	2	2	1	7	6	0.8

Table 6.11: Group 2

Table 6.11 shows that only 1 student handed over three assignments for the experiment, the remaining 3 students submitted only two assignments each.

Figure 6.5 indicates the patterns of error reported and references given in the document.

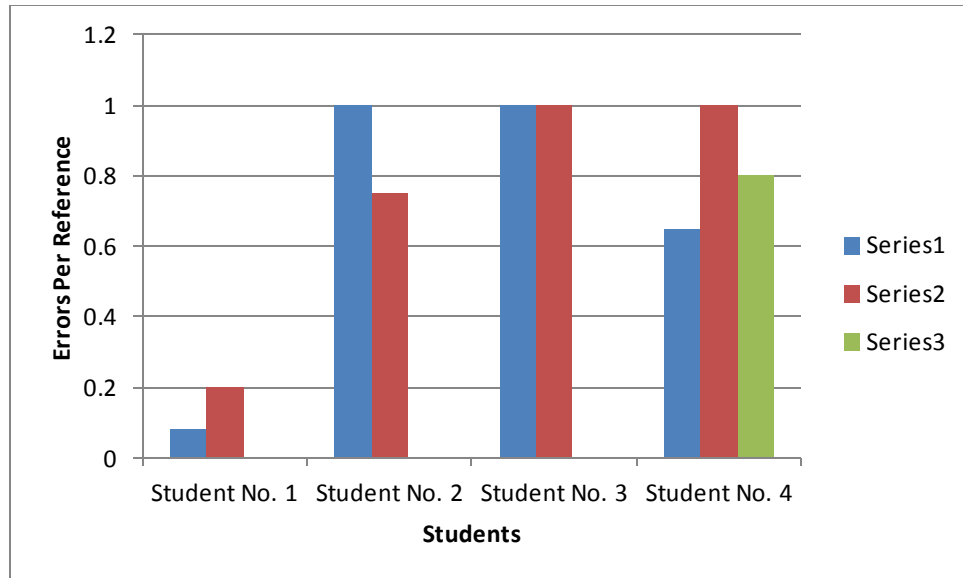


Figure 6.5: Individual Performance (Group 2)

Figure 6.5 shows that of 4 participants, 2 of them seem to be doing better than their previous ratio. One student score remained exactly the same, while for one student it seemed that things were going in the reverse order. Thus from the above data it can be said that for the participants of group 2, only a slight improvement was seen. This result was not un-expected, since from the questionnaires and interviews, it appeared that student of group 2 were not fully motivated to perform this task, the training sessions and guidance was inadequate resulting in poor understanding of the reference style that they were made to follow during this experiment.

Some issues regarding this style (*Physical Review*) of reference have come up during this experiment. The main problem highlighted is that there is no known guidance on referencing *online* material. This appeared to be a substantial problem for the students, as the majority of their references were taken from online sources. This issue caused a great problem for us as well, since we were not able to define exact rules for this category of reference. Certain other

problems, such as the *title* and *journal name* conventions, were not clear from the guidelines available for students. These issues have affected the learning of the given reference style (*Physical Review*) and students at the end did not seem to be acquiring as much skill as needed to use this style. This aspect highlights the importance of clear, comprehensive and detailed guidelines. If the guidelines are vague or unclear, students cannot perform their best. Thus the quality of Intervention X1 is of prime importance, and can form a sound base in improving the skill of referencing.

Group 3

Students in group 3 are unique, as they do not get same assignments as is the case with the students of group 1 and group 2. These students upload their own individual documents. These documents are their annual reports or papers that they have, or intend to submit for conferences etc. Their contribution to the experiment is shown in the following table.

Student no.	Document 1			Document 2			Document 3		
	No. of refs	No. of errs	No. of errs per ref	No. of refs	No. of errs	No. of errs per ref	No. of refs	No. of errs	No. of errs per ref
1	17	24	1.4	15	24	1.6	8	11	1.3
2	19	13	0.68	18	11	0.61	17	6	0.35
3	7	10	1.4	37	47	1.27	-	-	-
4	39	20	0.51	29	20	0.68	-	-	-
5	8	8	1	-	-	-	-	-	-
6	16	41	2.56	-	-	-	-	-	-
Total	106	116	1.09	99	102	1.03	25	17	0.68

Table 6.12: Group 3

The above table indicates that out of 6 participants, 2 of them submitted 3 documents, 2 participants submitted 2 documents, while 2 submitted just one document. The overall performance of this group based on the number of documents submitted is shown in Figure 6.6 below.

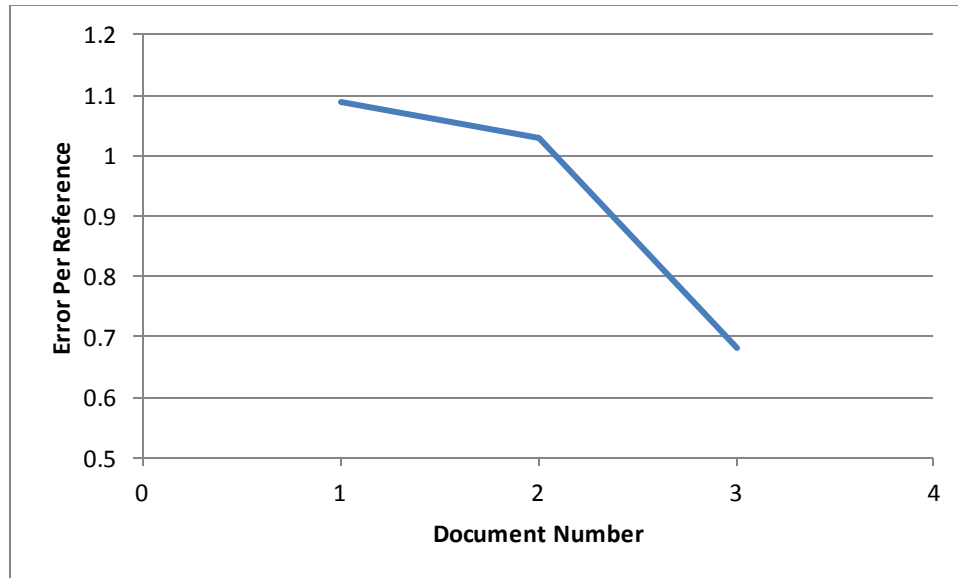


Figure 6.6: Group Performance of group 3

Figure 6.6 indicates an incremental decrease in the number of errors in a reference generated for a given document. This graph suggests that the proposed model implemented in the experiment for the un-tutored students has caused a reduction in the total number of errors per reference. The improvement or otherwise in this task in each participant is indicated in Figure 6.7.

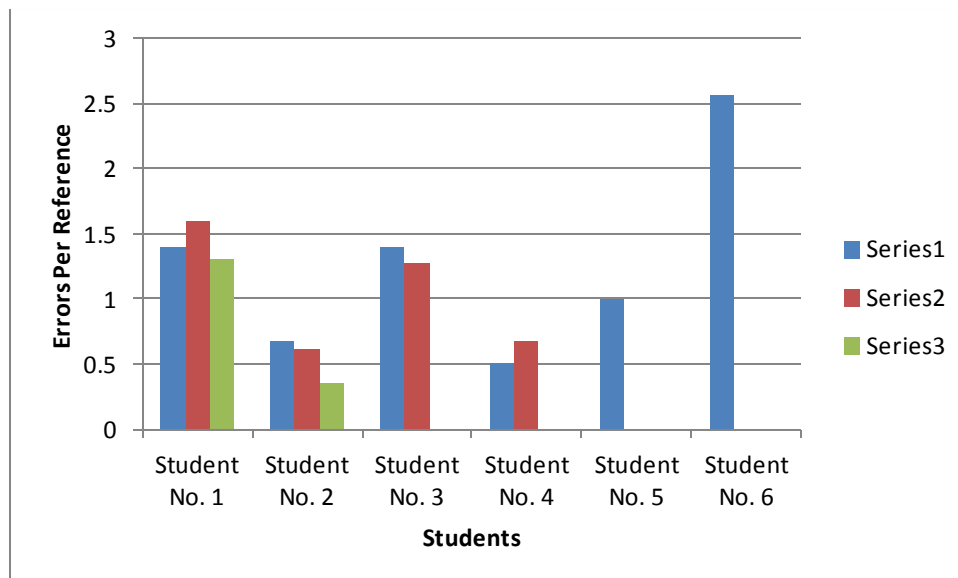


Figure 6.7: Individual Performance (Group 3)

In the legend for Figure 6.7, Series 1 is the ratio of errors and references for document 1, etc. Along the x-axis are the students and along the y-axis is the ratio of errors in a reference. This graph indicates that the students who submitted three documents had reductions in the errors. Of the students who submitted 2 documents, one of them had reduction in errors, while the other one seems to have gotten worse. For the third, there is no way of knowing if they had any improvement as they submitted one document only.

There were a total of 230 references that were processed by the RSESS, and 240 errors were identified for group 3. In contrast to the other two groups, group 3 students use traditional hard copy academic papers and journals as their references instead of the online academic papers and journals. Thus they tend to refer less to online articles and documents. This practice has also been discussed in our earlier chapters (Chapter 3). Error types identified in the reports include incorrect data, such incorrect date, volume number, issue number, etc., and missing data and formatting errors. Other mistakes, such as references not being listed in alphabetical order, have also been observed.

6.4.Result

Experiments were designed and conducted to see the effectiveness of the proposed framework. The salient aspects highlighted in this experiment for this proposed framework are: facilitating tutors in providing timely feedback to students about the referencing, and saving time for the tutors in providing feedback to students. For the students, this framework provides timely and detailed feedback, and improves students' skills in referencing through formal training. In the following sub sections, we discuss whether these salient objectives of the framework are met or not.

6.4.1. Facilitating Staff Member/Tutors in Imparting Referencing Skills to Students

Tutored experiments were designed to evaluate whether the proposed framework facilitates staff members and tutors in imparting referencing skills. The facilities required by the staff members to teach are:

- Providing instant and timely formative assessment for reference lists;
- Providing detailed and comprehensive feedback on reference lists to the students ;
- Uniform and consistent responses to the errors made by the students.

Through these experiments, it may be seen that the software solution help tutors in providing timely feedback on referencing. As stated by the tutors during interviews with them, they consider this as a great facility for them and fully endorse this mechanism. Thus, after uploading assignments on the website, all they need to do is to press a button. The software automatically generates the reports, and sends them to students' mailboxes.

Furthermore, through the RSESS website, tutors are able to add the feedback on various types of errors anticipated in a reference list (See Figure 5.6 in Chapter 5). They enter the contents of the feedback and can make it as comprehensive and easy to understand as possible. The RSESS website provides a very simple and easy to use interface for the tutors to enter these contents. This is explained in the chapter on software development (Chapter 5). The simplicity and ease of use of this interface was mentioned by one tutor in his interview, who said that despite the fact that he is not computer proficient he finds this page very simple and easy to use. Adding the contents for the feedback is a onetime activity, and these contents can be improved with time if desired. The website picks each reference in a reference list and checks for the errors. For each error identified, its corresponding response or feedback is combined,

and eventually provided to the student through email as a comprehensive report. This feature alone facilitates the tutors in imparting the skill, as they don't have to pick each reference and find various errors in the list, develop a report on it and hand it over to students. This aspect is highly endorsed by the tutor.

The next aspect is to provide a uniform and consistent response to the errors made by the students. Each student gets the same feedback response for the error they have made. The contents are the same, and hence every student gets the same guidance for their mistakes. This operational model of FESR provides for this need.

From these results, we may conclude that implementation of FESR helps staff members and tutors to provide timely and comprehensive feedback on referencing.

6.4.2. Save Staff Members'/Tutors' Time

Interviews with the tutors have revealed that the staff members working on an hourly basis are extremely pressed in terms of time. They have a limited amount of time and during that time they have to prepare lecture material, deliver lectures, mark assignments and provide some form of summative and formative feedback to students. Checking of reference lists, especially to such detail, is thus not possible for them. The quality and the method of teaching reference skill even during the module of academic writing is far from satisfactory, and according to both the tutors, the interest level of students is low. From the experiments and the interviews with the tutors it is evident that the proposed framework reduces the burden of checking reference lists many fold, freeing substantial time to the tutors to perform other academic tasks more proficiently.

Thus, the analysis has indicated that tutors are satisfied with the proposed framework. They are of the view that such a framework saves enormous time hence letting hourly paid

tutors, in particular, concentrate on other activities, while students get comprehensive feedback on their referencing task on time. The software tool developed for this purpose for the tutors was approved by them, as they thought it was very easy to use and one does not need special technical skills to operate it. The reports generated by the software for their students are also considered to be quite good, and easily understandable for the students. Thus, from the tutors' perspective, the framework concerned is very effective, and has the potential to be implemented in the University of Warwick for this purpose.

6.4.3. Timely and Detailed Feedback for Students

Both tutored and un-tutored experiments aimed to investigate whether the proposed solution provided timely and detailed feedback to the students. During tutored experiment it was observed that the students whose tutor had uploaded their assignment onto the RSESS website on time and pressed the *assessment* button, received their feedback reports on time, thus the timeliness of these reports was dependent on the efficiency of the tutors in using the software. The most satisfied and pleased with this feature of the FESR framework were the students in the group 3 (un-tutored), as members of this group uploaded their work themselves, and were impressed by the response time, i.e. the time it took to receive the feedback once the file is uploaded. This appreciation is evident from their responses in questionnaire 2, and by the interview sessions the researcher had with them.

Students in all the groups found the feedback reports to be useful to them, though the degree of usefulness varied from student to student, and students further stated that they learnt from these reports. Various examples of how they thought they learnt from these reports were also provided by them. They were of the view that these reports identified what was wrong with the references and suggested a reasonable or correct solution for the mistakes.

Through these reports, they were able to see what was wrong with their reference task and to correct it. These opinions of students were mentioned in their responses to questionnaire two, as well as during the interviews. This information suggests that the proposed framework is effective in providing timely and detailed feedback.

6.4.4. Improves Students' Skill in Referencing

From the data collected during the experiment, especially students' documents and electronically generated reports, it is clear that overall improvement in referencing skill has occurred. It is further seen that the combination of training sessions and feedback reports produces better results. All the groups who attended a training session or studied clear guidelines for referencing have shown a better rate of improvement in referencing skills. It is also clear from the data analyzed that the number of feedback reports received by students affects their learning curve. The greater the number of feedback reports received, the lower are the number of errors generated. This is an important factor, because the FESR framework proposes that for improved referencing skill training sessions and regular feedback reports should be given to the students during every module or year of study. Thus, from our experiment, it is verified that FESR framework may improve the skill of referencing among the student.

6.4.5. Training Sessions

Training sessions form one of the most important subcomponents of the proposed pedagogical framework. Through our research during the first phase of this study it was found that there is a lack of training sessions and refresher workshops for the referencing task which had been provided to the participants in our studies. Thus, in this experiment, this component was embedded for both the tutored groups and the un-tutored group. For the tutored groups,

students wanted to have these sessions and considered them to be an important factor. For the un-tutored group, referencing guidelines were provided on the RSESS website, and students found these guidelines to be of use, stating that they visited the given website to refresh their referencing skill. Hence the experiment results suggest that the training session and guidelines are important components, and these were endorsed by the participants and, as discussed above, document analysis show that they are indeed useful in improving referencing skills. While analyzing data received from group 2, an important aspect highlighted was that student's motivation to perform this task depends on the attitude and training contents of the tutor. The results of this group indicated that since the students were not properly informed about the new reference style, their rate of improvement was low. This is an important factor, and establishes the significance of appropriate training.

The above discussion indicates that the majority of students, both from the tutored groups and the un-tutored group, as well as the tutors, found the proposed pedagogical framework to be useful. They have shown their willingness and interest to continue using it in coming modules, and for un-tutored students, they want to continue using the software in their future work. Tutored students liked the idea of using the interface developed for un-tutored students because this way they can know about their errors before submitting their assignments in the class. Un-tutored students thought this to be of great value, because they considered that this was a useful addition to the current resources that were available to help them improve their references, and even when they used a reference management software for generating the list, they would still want to use the website that implemented the proposed framework.

From the above discussion, we may conclude that main features of FESR have been evaluated. The results show a positive trend i.e. the improvement of referencing skill. This

answers our second research question (**RQ2** in Chapter 1), which asked whether there was a better way to improve the skill of referencing. One tutor of academic writing skill stated that he would recommend this framework to the university, and since he has been teaching the skill of academic writing, including reference list development and is thus a professional expert in this area, his response lends substantial support to these claims.

6.5. Conclusion

The analysis and the result above indicate that the framework proposed for the enhancement of understanding and practices of references skill adds value. Results have shown that tutors approve of this framework, and find it to be a useful and time saving solution. Students feel positively about getting feedback to their individual work and endorse this method, as it shows them exactly where the problem is and what the solution to the problem is. Document analysis shows an improvement in the overall rate of errors in the students referencing task. It is also been indicated that an increase in the number of feedback reports increases student performance in referencing.

Thus, we conclude that the framework FESR has been evaluated from various angles and has been shown to be of value. Some ideas are also been provided by the students and staff to improve the website used for implementing this framework. These are highly valuable, and can be considered in future work.

Chapter 7

Conclusion

7.1. Introduction

The aim of this thesis has been to investigate the causes of errors that occur in referencing and citations within the academic assignments and coursework of students, especially among the students of Computer Science, and to find a practical solution to minimize such errors. This chapter concludes the discussions made in the earlier chapters, and presents inferences and the contributions of this thesis in the field of teaching this skill.

7.2. Discussion and Inference

In Chapter 1 we stated the problem to be investigated by this thesis and divided the problem into separate research questions. Two major research questions (**RQ1 – RQ2** in Chapter 1) were posed for this research work. The first question was “Why do errors creep into citations and bibliographies/reference lists of higher education students' coursework, especially in the coursework of Computer Science students?”. The second research question was “How can errors in references and citations be minimized within the educational arena”. The research activities were designed around these questions and then implemented. Before concluding our thesis, it is important to determine if the research questions have been answered. Therefore, in this section we will highlight how these two main research questions are answered through this extensive research.

Our first research question probed the basic cause of errors in referencing and citations of students in the field of Computer Science. Analysis of the information collected from the

students and teachers indicated that various aspects of teaching this skill were not being properly harnessed. These aspects included motivation, relevancy of this skill for students, issues in the delivery of instructions and the feedback to the students. According to this study motivation level for conducting this task by students is low, which leads to low priority for doing this work and hence students are willing to compromise on the quality of referencing (Chapter 3). Motivation is a key factor in learning theories (Saks and Haccoun, 2010); thus, this factor is missing while developing curriculum and designing instructions for referencing skills, moreover, this research has indicated that the lack of motivation is being aggravated by the lack of responses from teachers. Students are greatly influenced by the manner in which their teachers act and react while imparting education (Merrow, 2011). Hence, if teachers do not indicate an obvious interest in the better quality of referencing by providing timely and appropriate summative and formative feedback, students will deem this work as of low value. Furthermore, the curriculum and the method of instructing students for this skill need improvement, including facilitating tutors in evaluating references. These findings provided answers to our first research question.

As in any systematic problem solving approach, once the problem is identified, the next step is to determine its solution (Parker, 1995). Hence, as a next step of our research, a unique and practical solution was proposed. This solution aimed to resolve the issues pertaining to the overall pedagogy adopted in higher education to teach referencing and thereby focusing on answering our second research question (**RQ2** in Chapter 1).

An interesting outcome of this research is the realization of various aspects of teaching skills of referencing and the highlighting of corresponding pedagogical approaches, such as behaviorist pedagogical approaches, as well as cognitive and humanistic approaches to cater

each of these aspects. This is a unique approach, and aims to cater the aspects of relevance, motivation, ethical values as well as retention and understanding of this skill set. Moreover, keeping in view various modes of education such as traditional, blended and online learning modes, a facilitation mechanism through software is proposed.

Based on these considerations the proposed pedagogical framework has three main components, *motivation/values*, *instruction/interaction* and *facilitation/re-enforcement*. These components are explained in chapter 4. The interesting aspect of these components is the communication that occurs between them. The component of *motivation/values* informs the second component, i.e. *instruction/interaction* as what motivational aspect needs to be emphasized and employed while teaching this skill. Students should be taught in such a way that both intrinsic and extrinsic motivations are invoked, thus contributing to better referencing skills. The *Instruction/interaction* component uses the pedagogical approaches mentioned above to devise effective instructional design. It is worth mentioning that the curriculum may also be updated in the light of issues highlighted in Chapter 3. Feedback provided to the students may also be given in the light of the motivational concerns and pedagogical requirements. Thus, instructions and feedback should be informative, enhancing students' cognition and providing them with a sense of satisfaction. This component is, indeed, the core of the framework; however to make this component most effective, it should be practiced through the third component termed *facilitation/re-enforcement*. This component utilizes software technology to facilitate in imparting knowledge about referencing and feedback to the students and re-enforcement of the concepts using spaced repetition (Chapter 4).

The next step in solving problems is the evaluation of the proposed solution. For the evaluation of the proposed framework, two categories of experiment were designed. The first

category involved a group of students headed by a tutor, and the second category dealt with un-tutored students (Chapter 6). Both groups of stakeholders (students and tutors) approved the proposed model and considered it to be an effective pedagogy for teaching and learning about referencing and citation. Prototype that evolved from this research (Chapter 5) was also considered to add value to the knowledge and practice of references. To determine whether or not the quality of the submitted references had improved, the students' assignments and documents were checked for frequency of errors. An improvement in the referencing skills was found in the work of students belonging to both the tutored and the un-tutored groups (Chapter 6) – thus answering our second major research question (**RQ2** in Chapter 1).

Hence we may conclude that the research work answered both research questions. The proposed framework is strongly supported by the combination of tested theories of learning. It fulfills the purpose of providing timely, comprehensive feedback to students. Our evaluation showed that despite the limitations in the prototype, an improvement in the students' referencing work was recorded. Thus, it is anticipated that the students learning referencing through this pedagogical framework will produce better referencing in their academic writings as professional.

7.3. Research Contribution

There are four main contributions of this research study. First of all, the research study highlights the causes of errors in the academic documents of students in higher education. This is important because several studies conducted earlier indicated that there were issues and problems in referencing done by students and professional scholars. Through a thorough scientific research approach, this study has identified problems pertaining to the practices of

referencing and citation. Based on these findings, it is hoped that many educational institutes will look into their academic procedures and methods of teaching this skill.

The second contribution of this research work is the introduction of a unique and practical pedagogy for teaching this skill. This new pedagogy has been presented here in the form of a pedagogical framework, and its corresponding operational model for teaching the referencing skills. By following this framework and operational model, students may carry this skill into their professional life. Because of the educational components embedded in the conceptual framework for this model, students will retain the concepts of this skill – thus producing better reference lists, in text citations and bibliographies for their journal/conference papers. This, in turn, will help publishers to evaluate and correct the submitted papers. Furthermore better referencing will also help in producing better and more accurate measures of ranking academic/research papers and journals – thus making the entire procedure of bibliometric measures more reliable. More reliable bibliometric measures will allow researchers to take into account the knowledge that has great impact on the subject of their interest, and can build better knowledge and procedures as well as greater discoveries and inventions – thus the benefits of such a framework are far reaching. Furthermore, an interesting contribution of this thesis is that it defines various aspects of learning about referencing such as behaviorist, cognitive and humanistic aspects. This is a unique approach, and has not been defined in this manner earlier. Thus, it is the third contribution of this thesis.

The fourth contribution of this research is the concept of software. Although it is still a prototype, evaluation of the system provides evidence that software with such features help to teach referencing skills to students in a traditional classroom environment as well as to those who are working in environments where no immediate tutor is available. Therefore this

software is very useful to students in an e-learning environment. It will also be of use to PhD students who have to submit their documents with reference lists and need feedback to ensure that their reference lists and bibliographies are error free. Additionally, it would be of use to undergraduate or postgraduate students who wish to check reference lists within their documents to ensure that they will get better grades in assignments. This software is equally useful for professionals who need to verify whether their reference lists are in order. The contribution of this software thus extends from the domain of educational institutes into the professional arena. Authors of books, academic papers and other documents can easily check and get feedback on their reference lists. Since this software is web-enabled and hosted on a web server, universities and colleges can put this software on their websites and thus significantly improve the quality of their education and scientific research.

7.4. Future Work

The first area in which this research could be enhanced is the development of the software tool itself. During our research work, both students and tutors wished to use a full production mode of the software tool. Many ideas regarding its usability and operations were provided by both groups of stakeholders. Enthusiasm and willingness to use this software suggest a great need for the development and deployment of this software for students and staff members. This software has the potential to be utilized by scholars and authors of various domains of knowledge and in different geographical locations. There is an enormous potential for research to develop this software – especially with regards to extracting data from files of different formats, as well as retrieving data from large next-generation catalogs and “big data” available for referencing and linking of referred data (Teets and Goldner, 2013). One method to extract such data would be to utilize the concepts of text and data mining techniques.

In addition to the research pertaining to optimum solutions for extracting references from next generation library and students files, the online instructions and guideline component, illustrated in Figure 5.1 may be enhanced by using Intelligent Tutoring System, *ITS* (Tchounikine, 2011). The domain of *ITS* is a combination of artificial intelligence, educational psychology and the subject specialists. It is generally agreed that this system has four modules, namely, Knowledge Expert Module, Student Module, Tutors Module and an Interface Module (Lytras and Naeve, 2006). Through these modules, it is possible to teach students using the pedagogy proposed in the framework. There is great potential for research in this area especially for including the aspects of dialogue and affect. By dialogue, we mean that the tutoring system shall be able to have a meaningful interaction with the student - either through text or audio/video mode. By affect, we mean that the tutoring system shall be able to determine the emotional state of the student while learning the concepts and principles of referencing. This can be done by interpreting students' facial expressions, audio and movements of their eye. After detecting students' emotional state, an ITS can adjust the content or have dialogue to engage and motivate students, thereby bringing their attention to the subject matter. One of the functionalities built generally into such systems is to record and keep track of students' progress. If a student appears to be less engaged or deviates from learning the topic, ITS can try to bring the student back on track. Hence, future work in this direction may lead to better referencing skills.

Furthermore, the concepts of *gamification* can be utilized when designing content and exercises for teaching references online (Kapp, 2012). *Gamification* is a relatively new teaching concept. It is defined as "the use of game design elements in non-game contexts" (Deterding *et al.*, 2011). It comes from the word "game", and engages student through interactivity and immediate feedback. Behaviorist pedagogy may be conveniently implemented through

gamification due to its design structure, i.e. with the concept of reward in the form of scores/points, letting students see how much progress they have made and getting them into the habit of performing the task, thus utilizing the concept of operant conditioning (Weiten, 2013). Furthermore, the cognitive aspect of teaching may also be made possible through this technique, since students are intrinsically motivated to perform certain tasks. Finally, games may be seen as fun and enjoyable; thus if *gamification* is done appropriately students would love to learn and practice referencing. Hence the instructional module of operational model can be enriched by utilizing *gamification*. The instructional module may also be enriched by using both the concepts, i.e. ITS and *gamification*, and may also provide an adaptive learning environment to the learner. Hence, by incorporating the above mentioned techniques it is anticipated that effective results may be achieved. However the interesting challenges would then be to develop intelligent content for the instruction module.

Furthermore, as identified in Chapter 2, errors in referencing are a global issue; therefore this software should be able to recognize as many reference styles and file formats as possible, and to provide feedback accordingly. Moreover, instructional contents might also be in several languages, both for text, and if audio is involved, then it is recommended that audios in deferent languages shall also be employed.

The administrative component in the instructional module (Figure 5.1) can also be upgraded. Currently, students' data have to be entered by the tutor. As educational institutes are progressing toward automation of their administrative task, students' data are being stored and retrieved from databases. Therefore, administrative component should have the capability to extract data directly from such databases through application interfaces (APIs).

For the feedback module (Figure 5.1), the feedback reports may also be enhanced by providing information about the progress of the student in referencing, and by comparing current results with previous ones, thereby sensitizing students about the type and number of errors they have been making. It should also highlight the occurrences of plagiarism in the given document. Furthermore another interesting idea would be for the software system to provide information about the references that the students could have incorporated into their academic document to make their work more authentic. One suggestion for doing this could be to use text mining techniques to extract and analyze the text from the user's document (Song and Wu, 2009), and then, based on the analysis, to suggest references to the user by getting relevant data from next-generation library catalogs. This data can be obtained by developing a recommendation engines (Ricci *et al.*, 2011). Doing this may help users to obtain the relevant references and to incorporate them into their documents. Moreover, the reports may be made visually more pleasant and user friendly through various techniques and coloring, and in addition, the reports might be sent to the email address of the students, or could be made available online for them to review them.

Secondly, the research conducted in this study may be extended into the avenues highlighted in Chapter 1, such as bibliometrics and publishing. Furthermore, whilst this research work was related to the causes of errors in the referencing and citations by students, it could also be extended to include various issues pertaining to the errors in the references cited by authors of academic papers and books. This research could thus help professional scholars and writers to determine why errors are introduced into their work and then try to determine a feasible solution for eliminating such problems. Solutions may include raising awareness of the benefits of correct references and citations, as well as about the potential risks of incorrect citations. Furthermore, a comparative study of the two studies (current study and that for

professional authors) can also be conducted to gain a better understanding of the issue and devising solutions.

Another extension of this research work would be to follow and evaluate the progress of individuals who have used the proposed framework for the enhancement of their references and citations. Thus, students who graduate after receiving the training in references and citation skills through the new pedagogy introduced in current research study could be followed up to identify whether or not their references and citation skills remain satisfactory, and whether or not they continue to be good at referencing throughout their professional life.

One interesting phenomenon observed during the experiments was that after receiving the first feedback report, students' referencing skills deteriorated, but after that they continued to improve with each additional feedback report received. In this study, we are not able to explain this phenomenon. A study may be conducted to investigate this behavior.

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Appendix A: Questionnaires for investigative study (Chapter 3)

A.1: Students Questionnaire

Questionnaire Reference Citation Practices

Name (optional):

Today's Date:

Gender:

Age:

Department:

Student of: (a) Undergraduate (b) Post graduate Year of Study (e.g. 1st, 2nd, 3rd):

Institution:

Country:

*Please note that this questionnaire aims to collect data about current reference citation practices. The data provided will be used for research purpose only and is confidential. It will take less than 5 minutes to answer the questions.

Please circle the option that seems most accurate to you.

1. Have you attended any course (module)/seminar/workshop about technical writing or thesis writing skills?
 - a. Yes
 - b. No

2. Do you know what is meant by reference citation?
 - a. Yes
 - b. No

If your answer to question number 2 is 'No' please note the following information:

*** Citation or Reference citation is the process of referring to the scholarly (or otherwise) work that has been published in journals, books, conference proceeding, reports etc. Sometimes unpublished work are also referred to.**

3. Have you ever cited reference in your submitted work?
 - a. Yes
 - b. No

If your answer to question number 3 is “No” Please go to question number 14.

4. How important is reference citation in your submitted work i.e. assignments/thesis/projects?
 - a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important

5. How often do you get negative feedback/remarks from your instructor about the cited reference in your submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

If your answer to the above question is ‘e’ please go to question number 7.

6. If you get a negative feedback about the cited references in your work, how often do you try to improve your reference citation skills?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

7. How often do you get positive feedback/remarks from your instructor about the cited references in your submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

8. How often do you get grades/marks for reference citation in your submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom

- e. Never
9. After citing the references in your work, how often do you recheck it for any possible error?
- a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never
10. Is there more than one format/method/style for citing reference?
- a. Yes
 - b. No
11. Do you know whether any reference management software exists to help manage the citations of the reference in your work?
- a. Yes
 - b. No

If your answer to the above question is 'No' please go to question number 14.

12. Do you use any reference management software to cite and list references in your work?
- a. Yes
 - b. No

If your answer to the above question is 'No' please go to question number 14.

13. Which of the following reference management software do you use? You may circle more than one software mentioned below
- a. Aigaion
 - b. Beboop
 - c. BibDesk
 - d. Bibioscape
 - e. BibSonomy
 - f. BibTeX
 - g. Bibus
 - h. Bookends
 - i. CiteULike
 - j. Connotea
 - k. EndNote
 - l. I, Librarian
 - m. JabRef
 - n. Jumper 2.0

- o. Mendeley
- p. Papers
- q. Pybliographer
- r. rebase
- s. RefDB
- t. Reference Manager
- u. Referencer
- v. RefWorks
- w. Scholar's Aid
- x. Sente
- y. Wikindx
- z. Zotero
- aa. J!Research
- bb. Any other software, please mention:

14. While citing a reference, how important is it to write the correct name of the author of the cited reference?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
15. While citing a reference, how important is it to write the correct title of the cited paper/book/report?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
16. While citing a journal reference, how important is it to write the correct volume number of the journal in which the cited paper is published?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
17. While citing a book reference, how important is it to write the correct edition number of the cited book?
- a. Very important

- b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
18. While citing a reference, how important is it to write the correct page number of the cited paper/book/report?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
19. While citing a reference, how important is it to write the correct date the cited paper/book/report was published?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important
20. While citing a reference, how important is it to use the required citation format/method/style?
- a. Very important
 - b. Important
 - c. Neither important nor unimportant
 - d. Unimportant
 - e. Not at all important

Please indicate how strongly you agree or disagree with the following statements by circling one appropriate choice.

21. References are cited in the submitted work to avoid plagiarism.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
22. References are cited in the submitted work to impress the reader about your knowledge of the subject.
- a. Strongly disagree

- b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
23. References are cited in the submitted work to give credit for the idea or work, that you have used in your assignment/thesis/project, to the author of the cited reference.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
24. References are cited in the submitted work to support your idea or work.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
25. References are cited in the submitted work to get good grades.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree
26. References are cited in the submitted work so that the reader of the submitted work can read the contents of the cited reference by actually accessing it.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly Agree

Thank you for taking your time out and filling in the questionnaire.

Instructions for the submission of the questionnaire(if not submitted online)

After filling in this questionnaire, it can be returned through email at s.k.toor@warwick.ac.uk or the hard copy of completed questionnaire can be left at the reception of the Computer Science department of Warwick University or in room No. 329.

A.2: Staff/Tutors Questionnaire

Questionnaire
Reference Citation Practices

Name (optional): Today's Date:
Gender: Years/Months of Teaching Experience:
Department:
Institution Country:

***Please note that this questionnaire aims to collect data about current reference citations practices by students. The data provided will be used for research purpose only and is confidential.**

It will take less than 5 minutes to answer the questions.

Please select the option that seems most accurate to you

1. Have you previously taught one or more courses that require the students to cite and list references in their submitted work (assignments/projects/thesis)?
 - a. Yes
 - b. No

2. Are you currently teaching a course that requires the students to cite and list references in their submitted work (assignments/projects/thesis)?
 - a. Yes
 - b. No

If your answer to question number 1 and 2 is "No" Please go to question number 26, otherwise please continue to question number 3.

3. How often do/did you ask students to cite references in their assignments/projects/thesis?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

4. How often do/did the students come to you to clarify their concepts about citing and listing of references?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

5. How often do/did you provide the feedback to the students about their reference citation practice?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

6. How often do/did you provide the feedback to the students about their reference citation practice?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

7. How often do/did you provide grades/marks for the student's cited references in their submitted (Formative or Summative) work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

8. What percentage of the overall score do/did you allocate for reference citation and it's listing (for Formative and Summative work)?
 - a. 0%
 - b. 1- 5%
 - c. 6– 10%
 - d. 11 – 15%
 - e. 16- 20 %
 - f. More than 20%

9. How often do/did the students provide incorrect author names while citing and listing the references in their submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

10. How often do/did the students provide incorrect page numbers of a paper/book/report while citing and listing the references in their submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

11. How often do/did the students provide incorrect titles of the papers/books/reports while citing and listing the references in their submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

12. How often do the students provide an incorrect volume number of the journal from which the paper is cited in their submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

13. How often do/did the students provide an incorrect date of publication of the papers/books/reports of the cited reference in their submitted work?
 - a. Very often
 - b. Quite often
 - c. Occasionally
 - d. Very seldom
 - e. Never

14. How often do/did the students use Reference Management Software for citing references in their assignments/thesis/projects?

- a. Very often
- b. Quite often
- c. Occasionally
- d. Very seldom
- e. Never

15. How often do/did you encourage students to use Reference Management Software?

- a. Very often
- b. Quite often
- c. Occasionally
- d. Very seldom
- e. Never

16. How often do you use Reference Management Software for your scholarly work?

- a. Very often
- b. Quite often
- c. Occasionally
- d. Very seldom
- e. Never

17. How often do/did you guide students to consult online tutorials/quizzes to improve their reference citation skills

- a. Very often
- b. Quite often
- c. Occasionally
- d. Very seldom
- e. Never

18. Do you know about any existing assessment software or website(s) for grading referencing and citation exercises within students assignments/projects

- a. Yes
- b. No

If your answer to the above question is “Yes”, please proceed to question no. 19, otherwise proceed to question no. 22

19. Please provide name(s) of the assessment software and/or link(s) to the website(s).

Ans. _____

20. Do you use one or more of these assessment software/website(s) for assessing students work

- a. Yes

b. No

21. If the answer to the above question is **“No”** then proceed to question no. 22, otherwise rate how useful you think assessment software/website(s) are as compared to manual marking?

- a. Very useful
- b. Useful
- c. Neither useful nor useless
- d. Useless
- e. Absolutely useless

22. Do you know about any existing software or website(s) for providing feedback about referencing and citation exercises within students assignments?

- a. Yes
- b. No

*If the answer to the above question is **“Yes”**, please proceed to question no. 23, else proceed to question no. 26.*

23. Please provide name(s) of these software and/or link(s) to the websites.

Ans. _____

24. Do you use one or more of these software/website(s)?

- a. Yes
- b. No

25. If the answer to the above question is **“No”** then proceed to question no. 26, otherwise, rate how useful do you think these software/websites are as compared to manual feedback method?

- a. Very useful
- b. Useful
- c. Neither useful nor useless
- d. Useless
- e. Absolutely useless

Please indicate how strongly you agree or disagree with the following statements by clicking one appropriate choice

26. Students commit errors in reference citation and its listing because it is a very complicated/difficult task for them to understand.

- a. Strongly disagree
- b. Disagree
- c. Neutral

- d. Agree
 - e. Strongly agree
27. Students commit errors in reference citation and its listing because they do not have sufficient resources to understand the process of reference citation and its listing.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly agree
28. Students commit errors in reference citation and its listing because they are not aware of the importance of this activity.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly agree
29. Students commit errors in reference citation and its listing in order to mislead or cheat their teacher.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly agree
30. Students commit errors in reference citation and its listing because they have not studied any course/module, such as technical writing skills.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly agree
31. Students commit errors in reference citation and its listing because they assume that no one reads it.
- a. Strongly disagree
 - b. Disagree
 - c. Neutral
 - d. Agree
 - e. Strongly agree

32. Based on your teaching experience, please provide any additional comment or information regarding the practices of citing references by students.

Ans. _____

33. Based on your teaching experience, please provide any additional comment or information regarding the practices adopted/should be adopted by teachers to assess and improve student's reference citation practices.

Ans. _____

Thank you for taking your time out and filling in the questionnaire.

Instructions for the submission of the questionnaire (if not submitted online)

After filling in this questionnaire, it can be returned through email at s.k.toor@warwick.ac.uk or the hard copy of completed questionnaire can be left at the reception of the Computer Science department of Warwick University or in room No. 329.

Appendix B: Interviews for investigative study (Chapter 3)

B.1: Interview with students for the investigative study

Interview type: Semi structured

Venue: Teaching Grid, Main library.

Time/Date: 4:00 pm on 16th March 2011

Logistics: 1. Dictaphone

2. Papers

3. Pencil/Pen

4. Furniture

Objective of the interview with students: The main objective of this interview is to understand students' viewpoint on various aspects of reference and citation practices.

This broad objective is divided further into following sub objectives:

1. To understand what their general perceptions are about referencing and citation work
2. To understand how they choose and manage their references
3. To understand problems faced by students during this activity
4. To understand what their expectations are from their mentors in this regard
5. To understand their viewpoint about reference management software
6. To understand why they make certain errors

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we get.

Tentative questions to achieve each objective.

1. To understand what students' general perceptions are about referencing and citation work.

Q.1 Why do you think students are asked to cite references?

Q.2 For how long have you been citing references?

Q.3 What was your motive for providing references in your work?

Q.4 Which style of referencing did you use in your project and why?

Q.5 How will you describe your experience in this regard?

2. To understand how they choose and manage their references

Q.1 How do you select and collect your references?

Q.2 How do you arrange your references in your work?

Q.3 What are your favorite sources for references and why?

Q.4 What is your opinion about references from internet?

3. To understand problems faced by students during this activity

Q.1 In your opinion how cumbersome or difficult is this task?

Q.2 Are there any specific problem(s) you face during this activity i.e. selecting, collecting and inserting references in your course work?

4. To understand what their expectations are from their mentors in this regard

Q.1 Do you think your teachers could have helped you in a better way to cop these issues?

Q.2 What is it that you think they could have done for you in this regard?

Q.3 Are you satisfied with the amount of feedback and support you received from your teacher?
In either case, why?

5. To understand their viewpoint about reference management software

Q.1 In your opinion how widely is reference management software known by students?

Q.2 What is your opinion about these software?

Q.3 Are there any anxieties associated with utilization of these software?

6. To understand why students make certain errors

Q.1 Why in your opinion, errors are introduced while referring to internet sites and web pages?

Q.2 Do you think, students in general are aware of the fact that they make error while they cite reference?

Q.3. What in your opinion are the causes of these errors?

B.2: Interview with Teachers for the investigative study

Interview type: Semi structured

Venue: Teaching Grid, Main library.

Time/Date:

Logistics: 1. Dictaphone
2. Papers
3. Pencil/Pen
4. Furniture

Objective of the interview with staff: The main objective of this interview is to understand teachers' viewpoint on various aspects of students' referencing/citation practices.

Aspect that we will be looking for are:

1. From teachers perspective, how do students perceive this activity
2. Opinion of teachers regarding methodology of marking and feedback for the referencing task of students
3. Opinion of the teachers about automated solution for assessing references and citation work by students

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we get.

1. From teachers perspective, how do students perceive this activity

Q.1 Have you given assignments/project work/thesis work to the students in which they are required to cite references?

Q.2 What is your impression/opinion about the overall quality of referencing work by students?

Q.3 What is your impression/opinion about the overall behavior (interest/importance level etc.) of students toward this activity at the undergraduate level?

Q.4 What is your impression/opinion about the overall behavior(interest/importance level etc.) of students toward this activity at the postgraduate level(separating MSc. From PhD)?

Q. 5 Do they come to you for guidance in this matter?

2. Opinion of teachers regarding methodology of marking and feedback for the referencing task of students

Q.1 Do you provide grades/marks for referencing work of students?

Q.2 If no to Q 1. then why not?

Q.3 If yes to Q 1, then, what is the current method of marking referencing work of students?

Q.4 If **yes** to Q 1, then, how satisfied are you with this method?

Q.5 Do you provide feedback to students about their referencing work?

Q.6 If **no** to Q.5, then, why not?

Q.7 If yes to Q.5, then, what is the current method of providing feedback to students about their referencing work?

Q.8 If yes to Q 5, then, how satisfied are you with this method of feedback?

Appendix C: Pre-Test Questionnaires for Evaluation Phase (Chapter 6)

C.1: Experiment: Group 1- Pre-Test Questionnaire

References and Citations

Questionnaire

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic tasks. The purpose of this questionnaire is to get information about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guideline and rules of the department are followed and ethical consent has been granted for this activity.

Name: _____ **Date:** _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issues or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q.1 Have you ever used references and citations in your earlier study/modules?

- a. Yes
- b. No

Q.2. Would you like to use references and citations in this module?

- a. Yes
- b. No

Q.3. If the answer to Q.2 is **No**, then, please provide the reason for it. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing No as an answer to Q.2 in the space provided in option **f** (Others).

- a. It is too difficult

- b. It is too boring
- c. It does not add to my knowledge
- d. Because I don't know what references and citations is
- e. from my past experience it is clear to me that no one reads them
- f. Others: _____

Q.4. If the answer to Q.2 is **Yes**, then, please provide the reason for it. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **Yes** as an answer to Q.2 in the space provided in option **e** (Others).

- a. It helps in understanding the subject
- b, It is Fun
- c. it impresses my teachers and friends
- d. It is easy
- e. Others (Please specify) _____

Q.5. If the time given to submit the assignment is short, but there is a requirement to have reference list, will you miss out in creating the list

- a. Yes
- b. No

Q.6. If the answer to the Q.5 is **No**, how will you manage to have the references in the assignment ? Please tick one or more options from the list given below. You may provide additional reason(s) for choosing **No** as an answer to Q.5 in the space available at option f (Others).

- a. I will divide the time so that this activity is added to my assignment
- b. I will reduce the contents of the assignment so that time is left for this work

- c. I will use reference management software to do the task in a quicker way
- d. I will request the tutor for more time
- e. I will copy references from the given book/document and past it
- f. Others (please specify) _____

Q.7. What are the risks associated with not providing a reference list? Please tick one or more options from the list given below. You may provide additional risk(s) in the space available at option e (Others).

- a. Risk of losing grades
- b. Risk of being accused of plagiarism
- c. Risk of not acknowledging the source of information
- d. Risk of incorrect data
- e. Others (Please specify): _____

Q. 8 What are the advantages for providing references and citations? Please tick one or more options from the list given below. You may provide additional advantage(s) in the space available at option e (Others).

- a. Better understanding of the subject
- b. Getting better grades
- c. Impressing staff and friends
- d. Giving credits to those whose ideas we have used
- e. Isotheres(Please specify) _____

Q.9.What is/are the disadvantage(s) of not putting correct page number while referencing an article from a journal. Please tick one or more options from the list given below. You may provide additional reason(s) as an answer in the space available at option e (Others).

- a. No disadvantage
- b. Reader of my document will not be able to trace the document I am referring to
- c. I might lose grades
- d. It will mean that the date I have provided is also incorrect
- e. Others (Please specify): _____

Q.10 Why is it important to use a particular reference style? Please tick one or more options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option e (Others).

- a. Because it is required by the tutor/department
- b. Because it provides a standard form of representation of references and citations
- c. Because it looks nice on my document
- d. Because it is made for the particular domain of knowledge
- e. Others(Please specify): _____

Q.11. What is/are the advantage(s) of putting the correct date? Please tick one or more options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option e (Others).

- a. We know the date at which the knowledge/data was made available to us
- b. It helps in extracting the document which we have referred to
- c. It makes the reference look good
- d. It has no advantage
- e. Others (Please specify): _____

End of questionnaire. Thank you for completing it.

C.2: Experiment: Group 2- Pre-Test Questionnaire**References and Citations****Questionnaire**

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic task. The purpose of this questionnaire is to get your opinion about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guidelines and rules of the department are followed and ethical consent has been given for this activity.

Name (Optional): _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issues or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q.1 Have you ever used references and citations in your earlier study/modules?

- a. Yes
- b. No

Q.2. Would you like to use references and citations in this module?

- a. Yes
- b. No

Q.3. If the answer to Q.2 is **No**, please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **No** as an answer to **Q.2** in the space provided in option **f** (Others).

- a. It is too difficult
- b. It is too boring
- c. It does not add to my knowledge

- d. Because I don't know what references and citations are
- e. from my past experience it is clear to me that no one reads them
- f. Others: _____

Q.4. If the answer to Q.2 is **Yes**, please tick one or more options from the list given below. You may provide additional reason(s) for choosing Yes as an answer to Q.2 in the space provided in option **e** (Others).

- a. It helps in understanding the subject **8/8**
- b. It is Fun
- c. it impresses my teachers and friends
- d. It is easy
- e. Others (Please specify) **2/8** _____

Q.5 Would you like to have a refresher session or a tutorial on references and citations?

- a. Yes
- b. No

Q.6 If the answer to Q.5. Is **Yes**, please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing Yes as an answer to Q.5 in the space provided in option **f** (Others).

- a. I have never heard about references and citation and would like to know.
- b. I am not clear about the concepts and reasons for references and citations
- c. I know about references and citations but need to refresh my knowledge
- d. I know about references and citations but I have few questions about this activity and need to clear them

e. It will help me in getting full benefit from the module

f. Others (please specify) _____

Q.7 If the answer to Q.5. Is **No**, please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **No** as an answer to Q.5 in the space provided in option f (Others).

a. It will be the waste of time as I already know about the concept and application of it

b. It might confuse me

c. I want to spend my time to understand the contents of the current module only

d. Because my friends don't want to attend such a tutorial

e. Others (please specify) _____

Q.8. If the time given to submit the assignment is short, but there is a requirement to have reference list, will you miss out in creating the list

a. Yes

b. No

Q.9. If the answer to the Q.8 is **No**, how will you manage to have the references in the assignment ? Please tick one or more options from the list given below. You may provide additional reason(s) for choosing **No** as an answer to Q.8 in the space available at option f (Others).:

a. I will divide the time so that this activity is added to my assignment

b. I will reduce the contents of the assignment so that time is left for this work

c. I will use a reference management software to do the task in a quicker way

d. I will request the tutor for more time

e. I will copy references from the given book/document and past it

f. Others (please specify) _____

Q.10. What are the risks associated with not providing a reference list? Please tick one or more options from the list given below. You may provide additional risk(s) in the space available at option e (Others).

- a. Risk of losing grades
- b. Risk of being accused of plagiarism
- c. Risk of not acknowledging the source of information
- d. Risk of incorrect data
- e. Others (Please specify): _____

Q. 11. What are the advantages for providing references and citations? Please tick one or more options from the list given below. You may provide additional advantage(s) in the space available at option e (Others).

- a. Better understanding of the subject
- b. Getting better grades
- c. Impressing staff and friends
- d. Giving credits to those whose ideas we have used
- e. Others (Please specify) _____

Q.12. Do you know about various styles for references and citations?

- a. Yes
- b. No

Q.13 If the answer to the Q.12 is **Yes** then do you know which style of referencing you used?

- a. Yes
- b. No

Q14. If the answer to the Q.13 is **Yes** then which style of referencing have you used? Please tick one or more options from the list given below: You may provide additional reference styles in the space available at option f (Others).

- a. Harvard
- b. MLA
- c. APA
- d. Chicago
- e. Physical Review
- f. Others(Please specify)

C.3: Experiment: Group 3- Pre-Test Questionnaire

References and Citations

Questionnaire

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic tasks. The purpose of this questionnaire is to get information about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guideline and rules of the department are followed and ethical consent has been granted for this activity.

Name: _____ **Date:** _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issue or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q.1 Have you ever used references and citations in your earlier study/modules i.e., your Pre-PhD study? Please circle one of the following options.

- a. Yes
- b. No

If the answer to Q.1 is No, please go to Q.9, else continue from the following question i.e. Q. 2:

Please note that the questions from Q.2 to Q.8 are about the study time prior to the start of your current PhD. i.e. Pre-PhD. Study time.

Q.2. If the answer to Q.1. is Yes, how much did you looked forward(to develop a reference list during your earlier study. Please circle one of the following options.

- a. Eagerly looked forward to develop the reference list
- b. Looked forward to develop the reference list
- c. Neutral
- d. Did not look forward to develop a reference list
- e. Did not want to develop a reference list

Q.3. Did you get any training session or workshop for reference / bibliography list development in your earlier study? Please circle one of the following options.

- a. Yes
- b. No

Q. 4 Which reference style(s) did you use in your last study period i.e. before starting current PhD degree.

Ans: _____

Q.5 Why did you use the reference style mentioned in Q.4?

Ans: _____

Q.6 On average how many references did you use in your documents? Please circle one of the following options.

- a. Less than 10
- b. Less than 50 and greater than 10
- c. greater than 50

Q.7 On average how many references were from the online sources? Please circle **one** of the following

- a. Less than 10%
- b. Less than 50% and greater than 10%
- c. greater than 50%

Q.8 Did you use reference management system for developing your reference list in the earlier study period? Please circle **one** of the following

- a. Yes
- b. No

Please note that the following questions refers to your experience and observations during your current PhD. Study

Q.9 Have you used references and citations during your **current PhD study**? Please circle **one** of the following

- a. Yes
- b. No

Q.10. Have you attended any workshop or academic writing course that teaches you about references and citation practice at Warwick University? Please circle **one** of the following

- a. Yes
- b. No

Q.11. During your current PhD study how much do you look forward to develop a reference list. Please circle **one** of the following options.

- a. Eagerly looked forward to develop the reference list
- b. Looked forward to develop the reference list
- c. Neutral
- d. Did not look forward to develop a reference list
- e. Did not want to develop a reference list

Q.12 What are the risks associated with not providing a reference list? Please circle **one** or **more** options from the list given below. You may provide additional risk(s) in the space available at option **e** (Others).

- a. Risk of losing grades
- f. Risk of being accused of plagiarism
- g. Risk of not acknowledging the source of information
- h. Risk of incorrect data
- i. Others (Please specify): _____

Q. 13 What are the advantages for providing references and citations? Please circle **one** or **more** options from the list given below. You may provide additional advantage(s) in the space available at option e (Others).

- a. Better understanding of the subject
- b. Getting better grades
- c. Impressing staff and friends
- d. Giving credits to those whose ideas we have used
- e. Others(Please specify) _____

Q.14.What is/are the disadvantage(s) of not putting correct page number while referencing an article from a journal. Please circle **one** or **more** options from the list given below. You may provide additional reason(s) as an answer in the space available at option e (Others).

- a. No disadvantage
- b. Reader of my document will not be able to trace the document I am referring to
- c. I might lose grades
- d. It will mean that the date I have provided is also incorrect
- e. Others (Please specify): _____

Q.15 Why is it important to use a particular reference style? Please circle **one** or **more** options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option e (Others).

- a. Because it is required by the tutor/department
- b. Because it provides a standard form of representation of references and citations
- c. Because it looks nice on my document

d. Because it is made for the particular domain of knowledge

e. Others (Please specify): _____

Q.16. What is/are the advantage(s) of putting DOI? Please circle **one** or **more** options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option f (Others).

a. I don't know

b. I can search a document online by giving its DOI

c. It leads to the correct and updated online source

d. It makes the reference look good

e. It has no advantage

f. Others(Please specify): _____

Q.17 Do you wish to get feedback from your supervisor/senior on the reference list/ bibliography that you develop within your academic document? Please circle **one** of the following options..

a. Yes

b. No

Q.18. How often do you wish you get a feedback on the reference list? Please circle **one** of the following options.

a. Every time I submit my document

b. Very often

c. Often

d. Not very often

e. Never

Q.19. If you have any comment regarding your experience of compiling /developing of reference list, and/or any suggestions for improving this skill please do provide it in the following space. If you need additional space you may attach sheets to this questionnaire before handing it over

Ans: _____

If your answer to Q.9 was No, this is the end of the questionnaire. Thank you for completing it.

If your answer to Q.9 is Yes, Please continue to answer the following questions.

Q.20. Do you use a reference management software tool to develop references and bibliographies for your documents during PhD study? Please circle **one** of the following

- a. Yes
- b. No

Q.21. If the answer to **Q. 20** is **Yes**, then, please provide the name of the reference management software used by you for this purpose.

Ans: _____

Q.22 If the answer to **Q.20**. is No, then why not. Please circle **one** or **more** options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option f (Others).

- a. I was never informed about any reference management software
- b. It is hard to learn to use reference management software
- c. It is difficult to manage and use reference management software
- d. I don't feel any need to use reference management software
- e. I don't trust the output from the reference management software
- f. Others: _____

Q.23 During your **current PhD study**, which reference style(s) do you use in your academic documents?

Ans: _____

Q.24 Why do you use the reference style mentioned in Q.15?

Ans: _____

Q.25 On average how many references do you use in your documents? Please circle one of the following.

- a. Less than 10
- b. Less than 50 and greater than 10
- c. greater than 50

Q.26 On average how many references are from the online sources? Please circle one of the following.

- a. Less than 10%
- b. Less than 50% and greater than 10%
- c. greater than 50%

Q. 27 Do you use DOI (Digital Object Identifier) while referencing online sources, such as e-books, e-Journals? Please circle one of the following.

- a. Yes
- b. No

Q.28 Have you submitted academic paper(s) for the conference(s) and/or journals? Please circle one of the following.

- a. Yes
- b. No

Q.29. If the answer to Q.27 is Yes, then, please explain whether this feedback identified any problem and issue regarding your reference list, and was that feedback useful for your future academic papers?

Ans: _____

_____.

End of questionnaire. Thank you for completing it.

Appendix D: Post-Test Questionnaires for Evaluation Phase (Chapter 6)

D.1: Group 1- Post-Test Questionnaire

References and Citations

Questionnaire 2

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic tasks. The purpose of this questionnaire is to get information about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guideline and rules of the department are followed and ethical consent has been granted for this activity.

Name: _____ **Date:** _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issue or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q.1. How important is the task of references and citations? Please circle **One** of the following options.

- a. Very important
- b. Important
- c. Neutral
- d. Not important
- e. Totally unimportant

Q.2. If the time given to submit the assignment is short, but there is a requirement to have a reference list, will you miss out creating the list? Please circle **One** of the following options.

- a. Yes

b. No

Q.3. If the answer to the Q.2 is **No**, how will you manage to have the references in the assignment ? Please circle **one** or **more** options from the list given below. You may provide additional reason(s) for choosing **No** as an answer to Q.2 in the space available at option f (Others).

- a. I will divide the time so that this activity is added to my assignment
- b. I will reduce the contents of the assignment so that time is left for this work
- c. I will use a reference management software tool to do the task in a quicker way
- d. I will request the tutor for more time
- e. I will copy-and-paste references from the given book/document
- f. Others (please specify) _____

Q.4. Why did you use the reference style '**Harvard**' in your assignments? Please circle one or more options from the list of reasons given below. You may provide additional reason(s) in the space provided in option e (Others).

- a. Because it is required by the module
- b. Because it is easy to implement
- c. Because I have been using this style in past modules
- d. Because, in future, this style will facilitate me in developing reference lists and bibliographies for professional journals of my subject domain.
- e. Others (please specify) _____

Q.5. Did you use a reference management software tool to develop references and bibliographies for the assignments in this module? Please circle **One** of the following options.

- a. Yes
- b. No

Q.6. If the answer to Q. 5 is **Yes**, then, Please give the name of the reference management software used by you for this purpose.

Ans: _____

Q. 7 Did you attend the session / tutorial, or read instruction(s) on references and citations, given during this module? Please circle **One** of the following options.

- a. Yes
- b. No

Q.8. How often do you refer to a Website or data available online in your assignments? Please circle **one** of the following options.

- a. Very often
- b. Often
- c. Not very often
- d. Rarely
- e. Never

Q. 9. How often do you refer to a books or articles from an academic journal in your assignments? **Please circle one of the following.**

- a. Very often
- b. Often
- c. Not very often
- d. Rarely
- e. Never

Q.10.What is/are the disadvantage(s) of not putting correct page number while referencing an article from a journal. Please cirde one or more options from the list given below. You may provide additional reason(s) as an answer in the space available at option e (Others).

- a. No disadvantage
- b. Reader of my document will not be able to trace the document I am referring to
- c. I might lose grades
- d. It will mean that the date I have provided is also incorrect
- e Others(Please specify): _____

Q.11. What is/are the advantage(s) of putting the correct date? Please circle one or more options from the list of reasons given below. You may provide additional reason(s) as an answer in the space provided in option e (Others).

- a. We know the date at which the knowledge/data was made available to us
- b. It helps in extracting the document which we have referred to
- c. It makes the reference look good
- d. It has no advantage
- e. Others(Please specify): _____

Q.12. Did you submit/upload your assignments/references and bibliographies in word format for electronic feedback? Please circle **One** of the following options.

- a. Yes
- b. No

If the answer to Q.12 is Yes Please go to Q. 16. If the answer to Q.12 is No, please continue with Q.13:

Q.13. Why did you **NOT** submit your assignments for electronic feedback? Please circle one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **No** as an answer to Q.12 in the space provided in option e (Others).

- a. I am not interested in this research work
- b. I did not want to spend time in submitting the MY ASSIGNMENT IN Word format
- c. I don't need any feedback on my reference list as I know what I am doing
- d. I did not know about this activity
- e. Others (please specify) _____

Q. 14 Would you like to submit your work for electronic feedback in coming modules?

- a. Yes, because _____
- b. No, because _____

Q.15. How satisfied are you with the non-electronic feedback you have received for your referencing? Please circle one option from the list of options given below.

- a. Very satisfied
- b. Satisfied
- c. Partially Satisfied
- d. Neutral
- e. not Satisfied

If the answer to Q.12 was No, this is the end of the questionnaire. Thank you for completing it.

If the answer to Q.12 is Yes, Please continue to answer the following questions.

Q.16. Please provide the reason for submitting your assignments in word format for electronic feedback. Please circle one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **Yes** as an answer to Q.12 in the space provided in option **e** (Others).

- a. It was suggested by the tutor of our Module
- b. I was curious about this electronic feedback
- c. I wanted to improve my reference skill through the electronic feedback
- d. I wanted to contribute to the research work that is being conducted by the researcher
- e. Others (please specify) _____

Q. 17. How useful was the electronic feedback on your reference list/bibliography? Please circle one option from the list given below.

- a. Very useful: I immensely improved my references skills through the feedback
- b. Useful: I learnt the type of mistakes I was making and tried to correct it
- c. Slightly useful: I saw what was wrong with some of the reference work I did
- d. Not useful: there was no difference in my understanding due to the feedback

Q.18. Would you like to receive electronic feedback on reference list/bibliography in the coming modules? Please circle **One** of the following options.

a. Yes

b. No

Q.19. If the answer to Q.18 is **Yes**, then, please provide the reason for it. Please circle **one** or **more** options from the list of reasons given below. You may provide additional reason(s) for choosing Yes as an answer to Q.18 in the space provided in option **e** (Others).

a. Electronic Feedback helps me to improve my referending skill

b. Through electronic feedback I know what my mistakes are and what the correct information is

c. Electronic Feedback keeps me motivated

d. Electronic Feedback keeps me in the habit of providing correct reference list

e. Others (please specify) _____

Q. 20. If the answer to Q.18 is **No**, then, please provide the reason for it. Please circle one or more options from the list of reasons given below. You may provide additional reason(s) for choosing No as an answer to Q.18 in the space provided in option **d** (Others).

a. I have learnt all that I needed to learn about references and citation and I don't need to know any more

b. I did not learn anything from the feedback about references,

c. It was difficult to understand the contents of the feedback therefore I will not like to continue receiving such feedback

d. Others (please specify) _____

Q.21. Please identify best features of the electronic feedback report.

Ans. _____

Q.22. Please identify worst features of the electronic feedback report.

Ans. _____

Q. 23. What improvements(s) would you suggest for the electronic feedback report?

Ans. _____

End of questionnaire. Thank you for completing it.

D.2: Group 2- Post-Test Questionnaire

References and Citations

Questionnaire 2

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic tasks. The purpose of this questionnaire is to get information about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guideline and rules of the department are followed and ethical consent has been granted for this activity.

Name (Optional): _____ **Date:** _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issues or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q.1. How important is the task of references and citations?

- a. Very important
- b. Important
- c. Neutral
- d. Not important
- e. Totally unimportant

Q.2. If the time given to submit the assignment is short, but there is a requirement to have a reference list, will you miss out creating the list?

- a. Yes
- b. No

Q.3. If the answer to the Q.2 is **No**, how will you manage to have the references in the assignment? Please tick one or more options from the list given below. You may provide additional reason(s) for choosing **No** as an answer to Q.2 in the space available at option f (Others).

- a. I will divide the time so that this activity is added to my assignment
- b. I will reduce the contents of the assignment so that time is left for this work
- c. I will use a reference management software tool to do the task in a quicker way
- d. I will request the tutor for more time
- e. I will copy-and-paste references from the given book/document
- f. Others (please specify) _____

Q.4. Why did you use the reference style '**Physical Review**' in your assignments? Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for in the space provided in option e (Others).

- a. Because it is required by the module
- b. Because it is easy to implement
- c. Because I have been using this style in past modules

d. Because, in future, this style will facilitate me in developing reference lists and bibliographies for professional journals of my subject domain.

e. Others (please specify) _____

Q.5. Did you use a reference management software tool to develop references and bibliographies for the assignments in this module?

a. Yes

b. No

Q.6. If the answer to Q. 5 is **Yes**, then, Please give the name of the reference management software used by you for this purpose.

Ans: _____

Q. 7 Did you attend the refresher session / tutorial, or read instruction(s) on references and citations, given during this module,?

a. Yes

b. No

Q.8. Is there a difference in referencing style between **American Chemical Society (ACS) style** and **Physical Review Style**?

a. Yes

b. No

Q. 9. If the answer to Q.8 is **Yes**, then please specify one or more differences between the two styles.

Ans: _____

Q.10. Did you submit/upload your references and bibliographies for electronic feedback?

c. Yes

d. No

If the answer to Q.10 is Yes Please go to Q. 14. If the answer to Q.10 is No, please continue with Q.11:

Q.11. Why did you **NOT** submit your list of references and bibliographies for electronic feedback? Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **No** as an answer to Q.10 in the space provided in option **e** (Others).

- a. I am not interested in this research work
- b. I did not want to spend time in submitting the reference list
- c. I don't need any feedback on my reference list as I know what I am doing
- d. I did not know about this activity
- e. Others (please specify) _____

Q. 12 Would you like to submit your work for electronic feedback in coming modules?

- a. Yes, because _____
- b. No, because _____

Q.13. How satisfied are you with the non-electronic feedback you have received for your referencing? Please tick one option from the list of options given below.

- a. Very satisfied
- b. Satisfied
- c. Partially Satisfied
- d. Neutral
- e. Not Satisfied

If the answer to Q.10 was No, this is the end of the questionnaire. Thank you for completing it.

If the answer to Q.10 is Yes, Please continue to answer the following questions.

Q.14. Please provide the reason for submitting your list of references and bibliographies for electronic feedback. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing **Yes** as an answer to Q.10 in the space provided in option **e** (Others).

- a. It was suggested by the tutor of our Module
- b. I was curious about this electronic feedback
- c. I wanted to improve my reference skill through the electronic feedback
- d. I wanted to contribute to the research work that is being conducted by the researcher
- e. Others (please specify) _____

Q. 15. How useful was the electronic feedback on your reference list/bibliography? Please tick one option from the list given below.

- a. Very useful: I immensely improved my references skills through the feedback
- b. Useful: I learnt the type of mistakes I was making and tried to correct it
- c. Slightly useful: I saw what was wrong with some of the reference work I did
- d. Not useful: there was no difference in my understanding due to the feedback

Q.16. Would you like to receive electronic feedback on reference list/bibliography in the coming modules?

- a. Yes
- b. No

Q.17. If the answer to Q.16 is **Yes**, then, please provide the reason for it. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing Yes as an answer to Q.16 in the space provided in option **e** (Others).

- a. Electronic Feedback helps me to improve my referending skill
- b. Through electronic feedback I know what my mistakes and what the correct information is
- c. Electronic Feedback keeps me motivated
- d. Electronic Feedback keeps me in the habit of providing correct reference list
- e. Others (please specify) _____

Q. 18. If the answer to Q.16 is **No**, then, please provide the reason for it. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing No as an answer to Q.16 in the space provided in option **d** (Others).

- a. I have learnt all that I needed to learn about references and citation and I don't need to know any more
- b. I did not learn anything from the feedback about references,
- c. It was difficult to understand the contents of the feedback therefore I will not like to continue receiving such feedback
- d. Others (please specify) _____

Q.19. Please identify best features of the electronic feedback report.

Ans. _____

Q.20. Please identify worst features of the electronic feedback report.

Ans. _____

Q. 21. What improvements(s) would you suggest for the electronic feedback report?

Ans. _____

End of questionnaire. Thank you for completing it.

D.3: Group 3- Post-Test Questionnaire**References and Citations****Questionnaire 2**

My name is Saba Khalil Toor. I am a research scholar and am researching on references and bibliographic tasks. The purpose of this questionnaire is to get information about this task. Please be assured that the information provided by you will be totally confidential and will be stored in an anonymous manner. Please note that all ethical guideline and rules of the department are followed and ethical consent has been granted for this activity.

Name: _____

Date: _____

Year of Study: _____

Department: _____

Please read the questions carefully. For any issues or concern in this matter do contact me at S.K.Toor@warwick.ac.uk.

Q. 1 How important is the task of references and citation for academic documents (Books, papers, articles etc) from your domain of knowledge? (Please circle **One** of the following options):

- a. Very Important
- b. Important
- c. Slightly Important
- d. Neutral
- e. Un-important

Q.2 In your opinion, how important is it for you to receive feedback from your supervisor, regarding reference list in your academic document? (Please circle **One** of the following options):

- a. Very Important
- b. Important
- c. Slightly Important
- d. Neutral

- e. Un-important

Q.3 How often would you like to receive feedback on your reference list, from your supervisor? (Please circle **One** of the following options):

- a. Always
- b. Very often
- c. Often
- d. Sometimes only
- e. Never

Q. 4 Why do you want to receive feedback about the reference list within your academic document from your supervisor? (Please circle **One** or **more** of the following options, you may provide additional reasons at the space provided at option **d**):

- a. Feedback can help me in removing errors from reference list
- b. Feedback can help me in improving my referencing skill
- c. Feedback on references list can help me in the acceptance of my academic papers for journals and conferences
- d. Others (please specify) _____

Q. 5. In your opinion, how important it is to have one or more training sessions on referencing skills during your PhD. Study? Please circle **One** of the following options provided below. Kindly provide the reason for your choice in the space provided adjacent to the option:

- a. Very Important: Because _____
- b. Important: Because _____
- c. Slightly Important: Because _____
- d. Neutral: Because _____
- e. Un-important: Because _____

Q.6.To improve referencing skill, it is proposed that there should be training sessions on referencing skill followed by regular feedback. This feedback should be provided through an automated solution(software) to get timely response. In your opinion, how useful is this proposed mechanism of enforcing referencing skill through an electronic medium? (Please circle

One of the following options. Please provide the reason for your choice in the space provided adjacent to the choice):

a. Very useful: Because _____

b. Useful: Because _____

c. Neutral Because _____

d. Not useful: Because _____

e. Useless: Because _____

Q.7. On the website available at <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> , were there instruction provided on the type of documents that can be uploaded here? (Please circle **One** of the following options):

- a. Yes
- b. No

Q.8 On the website available at <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> , were there instructions and link given to indicate where you can go to refresh your knowledge about references and reference style? (Please circle **One** of the following options):

- a. Yes
- b. No

Q.9. If the answer to Q.8. is **Yes**, Then, did you visit the link provided at <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> website to refresh your reference skills? (Please circle **One** of the following options. Please provide the reason for your choice in the space provided adjacent to the choice):

a. Yes: Because _____

b. No: Because _____

Q.10. On the website available at <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> , How easy it is to upload your document? (Please circle **One** of the following options):

- a. Very easy
- b. easy
- c. slightly easy
- d. Neither easy nor difficult
- e. Difficult

Q.11 In general, how easy was it to use the website available at <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> to get feedback about reference list in your academic document? (Please circle **One** of the following options):

- a. Very easy: Very simple layout of the screen, everything is clear and un-complicated.
- b. Easy: It was easy to see where to enter data and upload my files
- c. slightly easy: It was slightly easy to see where to enter my details and how to upload file
- d. Neither easy nor difficult: It was neither easy nor difficult to understand instructions and how to enter my data, including uploading my file
- e. Difficult: I found it difficult to use the given website

Q. 12 How many files did you upload on the given web site to receive report for the reference lists? (Please circle **One** of the following options):

- a. One file
- b. Two files
- c. Three files
- d. Four files
- e. More than four files

Q. 13. How many reports have you received for all the documents submitted by you? (Please circle **One** of the following options):

- a. Only once:
- b. Twice
- c. Three times
- d. More than three times
- e. Never

Q.14. On average, how soon did you get a report on the reference list for the document you uploaded at the website <http://saba.dcs.warwick.ac.uk/application/webform2.aspx> ? (Please circle **One** of the following options):

- a. Less than a minute
- b. More than a minute, but less than five minute
- c. More than five minutes, but less than ten minutes
- d. More than ten minutes

Q. 15. How useful was the electronic feedback on your reference list/bibliography? Please circle **one** option from the list given below:

- a. Very useful: I immensely improved my references skills through the feedback
- b. Useful: I learnt the type of mistakes I was making and tried to correct it
- c. Slightly useful: I saw what was wrong with some of the reference work I did
- d. Not useful: there was no difference in my understanding due to the feedback

Q.16. Would you like to receive electronic feedback on reference list/bibliography in future?

- a. Yes
- b. No

Q.17. If the answer to Q.16 is **Yes**, then, please provide the reason for it. Please circle one or more options from the list of reasons given below. You may provide additional reason(s) for choosing Yes as an answer to Q.16 in the space provided in option **e** (Others):

- a. Electronic Feedback helps me to improve my referending skill
- b. Through electronic feedback I know what my mistakes are and what the correct information is
- c. Electronic Feedback keeps me motivated
- d. Electronic Feedback keeps me in the habit of providing correct reference list
- e. Others (please specify) _____

Q. 18. If the answer to Q.16 is **No**, then, please provide the reason for it. Please tick one or more options from the list of reasons given below. You may provide additional reason(s) for choosing No as an answer to Q.16 in the space provided in option **d** (Others):

a. I have learnt all that I needed to learn about references and citation and I don't need to know any more

b. I did not learn anything from the feedback about references,

c. It was difficult to understand the contents of the feedback therefore I will not like to continue receiving such feedback

d. Others (please specify) _____

Q.19. Please identify best features of the electronic feedback report:

Ans. _____

Q.20. Please identify worst features of the electronic feedback report.

Ans. _____

Q. 21. What improvements(s) would you suggest for the electronic feedback report?

Ans. _____

Q. 22. Do you think that the reason provided by you in Q.4. for feedback from your supervisor can be achieved using the automated solution provided at website <http://saba.dcs.warwick.ac.uk/application/webform2.aspx>? (Please circle **One** of the following options. Please provide the reason for your choice in the space provided adjacent to the choice)

a. Yes: Because _____

b. No: Because _____

Q.23. How important is it to have accurate formatting of a reference in a reference list i.e. according to the reference style prescribed by the university, department or publisher? (Please circle **One** of the following options. Please provide the reason for your choice in the space provided adjacent to the choice):

- a. Very Important: Because _____
- b. Important: Because _____
- c. Slightly Important: Because _____
- d. Neutral: Because _____
- e. Un-important: Because _____

Q.24. What is/are the disadvantage(s) of not putting correct page number while referencing an article from a journal. Please circle **one** or **more** options from the list given below. You may provide additional reason(s) as an answer in the space available at option e (Others):

- a. No disadvantage
- b. Reader of my document will not be able to trace the document I am referring to
- c. I might lose grades
- d. It will mean that the date I have provided is also incorrect
- e. Others (Please specify): _____

End of questionnaire. Thank you for completing it.

Appendix E: Interviews for Evaluation Phase (Chapter 6)

E.1: Interviews with group 1

Interview type: Semi structured

Venue: Library

Time/Date:

Logistics: 1. Dictaphone

2. Papers

3. Pencil/Pen

4. Furniture

Objective of the interview with students: The main objective of this interview is to understand students' viewpoint on various aspects of reference citation practices in general and feedback form in particular.

Aspect that we will be looking for are:

1. General ideas and opinion about references and citations
2. General idea and opinion about the pilot experiment
3. About the feedback format/contents and delivery process

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we get.

1.General ideas and opinion about references and citations

Q.1. Why do you think, you are asked to do referending?

Q.2. Why do you think, you were asked to do referencing in Harvard style?

Q.3. Did you use reference management software?

Q.4. If the answer to Q.3. is **yes**, then which reference management software did you use?

Q.5 If the answer to Q.3. is No , then why did you not use reference management software?

Q.6. Do you think there is a disadvantage of not using references?

2.General idea and opinion about the experiment

Q.1 What do you think about the over all process of sending references and getting feedback for it?

Q.2. Do you like the process of sending coursework files and receiving individual feedback on your work?

Q.3. If the answer to Q.2. is yes, then why?

Q.4. if the answer to Q.2. is No, then why not?

Q.5. Would you like this process to be improved? If yes then how?

3.bout the feedback format/contents and delivery process

Q.1. What is your general opinion about the feedback report received through email?

Q.2. What is your opinion about the layout of the electronic-feedback/report?

(is it good bad etc.....)

Q.3. Do you like the way errors are reported in the feedback form?

Q.4. Do you think the layout for the error report needs to be changed?

Q.5. Can you suggest a better layout for the error reporting table in the feedback form?

Q.6. Do you think the contents of the error report are easily understandable?

E.2: Interview for group 2

Interview type: Semi structured

Venue: Chemistry department Common area

Time/Date:

Logistics: 1. Dictaphone

2. Papers

3. Pencil/Pen

4. Furniture

Objective of the interview with students: The main objective of this interview is to understand students' viewpoint on various aspects of reference citation practices in general and feedback form in particular.

Aspect that we will be looking for are:

1. General ideas and opinion about references and citations

2. General idea and opinion about the pilot experiment

3. About the feedback format/contents and delivery process

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we receive.

1. General ideas and opinion about references and citations

- Q.1. Why do you think, you are asked to do referencing?
- Q.2. Why do you think you were asked to do referencing in Physics review style?
- Q.3. Did you use reference management software?
- Q.4. If the answer to Q.3. is yes, then which reference management software did you use?
- Q.5. If the answer to Q.3. is No, then why not?
- Q.6. Do you think there is a disadvantage of not using references?

2. General idea and opinion about the pilot experiment

- Q.1. What do you think about the over all process of sending references and getting feedback for it?
- Q.2. Do you like the process of sending files and receiving individual feedback on your work?
- Q.3. If the answer to Q.2. is yes, then why?
- Q.4. If the answer to Q.2. is No, then why?
- Q.5. Would you like this process to be improved? If yes then how?

3. About the feedback format/contents and delivery process

- Q.1. What is your general opinion about the feedback report received through email?
- Q.2. What is your opinion about the layout of the electronic-feedback/report?
(is it good bad etc.....)
- Q.3. Do you think the information about grades is not clear
- Q.4. Do you like the way errors are reported in the feedback form?
- Q.5. Do you think the layout for the error report needs to be changed?
- Q.6. Can you suggest a better layout for the error reporting table in the feedback form?
- Q.7. Do you think the contents of the error report are easily understandable?

E.3: Interview with group 3

Interview type: Semi structured

Venue: Department of Computer Science, University of Warwick

Time/Date:

Logistics: 1. Dictaphone
2. Papers
3. Pencil/Pen
4. Furniture

Objective of the interview with students: The main objective of this interview is to understand students' viewpoint on various aspects of reference citation practices in general, their idea/opinion about the concept of regular and timely feedback and feedback form in particular.

Aspect that we will be looking for are:

1. General ideas and opinion about effectiveness of regular feedback for the references and citations task for students
2. General idea and opinion about the experiment
3. About the feedback format/contents and delivery process

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we receive.

1. General ideas and opinion about effectiveness of regular feedback for the references and citations task for students

Q.1. How important do you think is the idea of providing feedback to the individual on their task, especially in the field of academics? And why?

Q.2. In your opinion, will regular feedback on the reference list in your document improve your referencing skill? Why?

Q.3. In your opinion, generally, do students heed the feedback they receive from their supervisors?

Q.4. In your opinion, will regular refresher sessions on referencing skill improve your referencing skill?

Q.5. Do you use reference management software?

Q.6. If yes, then, despite using reference management software, would you still want feedback from your supervisor on the reference skill?

Q.7. Do you think effort needs to be made to improve referending skill?

Q.8 If the answer to Q.7. is Yes , then why? And if the answer to Q.7 is No, then why not?

Q.9. How helpful are digital libraries and reference management software in improving reference skill?

2. General idea and opinion about the experiment

Q.1 What do you think about the over all process of sending your work containing references and getting feedback for it?

Q.2. Do you like the process of sending files and receiving individual feedback on your work?

Q.3. If the answer to Q.2. is **yes**, then why?

Q.4. if the answer to Q.2. is **no**, then why not?

Q.5. What do you do with the feedback report after you receive it?

Q.5.(a) Would you like to use such a system during your academic work here?

Q.6. Would you like to use such a system even after this study?

Q.7 Did you learn/will you learn from such a feedback model?

If yes. Why? If Not, why not?

Q.8 Would you like to recommend such a system to your colleagues?

Q. 9. Would you like this process to be improved? If yes then how?

3. About the feedback format/contents and delivery process

Q.1. What is your general opinion about the feedback report received through email?

Q.2. What is your opinion about the layout of the electronic-feedback/report?

(is it good bad etc.....)

Q.3. Do you like the way errors are reported in the feedback form?

Q. 4. Do you think the layout for the error report needs to be changed?

Q.5. Can you suggest a better layout for the error reporting table in the feedback form?

Q.6. Do you think the contents of the error report are easily understandable?

Q.7. Would you like to suggest enhancements in the proposed system an software?

E.4: Interview with the teachers

Interview type: Semi structured

Venue: Department of Computer Science

Time/Date:

Logistics: 1. Dictaphone
2. Papers
3. Pencil/Pen
4. Furniture

Objective of the interview with staff: The main objective of this interview is to get feedback on the experiment done in last term.

Aspect that we will be looking for are:

1. From teachers perspective , how do students perceive this activity
2. Opinion of teachers regarding the proposed solution
3. Opinion of the staff about the working and effectiveness of the software

In order to achieve these objectives some tentative questions are phrased. However as this is a semi structured interview few questions might be added or removed based on the responses we receive.

1. From teachers perspective , how do students perceive this activity

Q.1. Do you think the current procedure for getting student acquainted with references and citation is adequate?

Q.2. In general, in various modules, do you think students get adequate feedback on their referencing task?

Q.3. What is your impression/opinion about the overall quality of referencing work by students?

Q.4. What is your impression/opinion about the overall behavior(interest/importance level etc.) of students toward this activity at the undergraduate level?

Q.5 What is your impression/opinion about the overall behavior(interest/importance level etc.) of students toward this activity at the postgraduate level(separating MSc. From PhD)?

Q. 7. Do you think teachers find it hard to provide regular feedback on referencing ? if so then why?

2. Opinion of the staff about automated solution for assessing references and citation work by students

Q 1. Do you think that the proposed solution is effective? If yes then how and if no then why not?

Q.2. If yes to Q.1 then would you like this proposed solution to be adopted at Warwick University?

Q.3 Do you think that this proposed solution needs to be improved? If so then how? And if no then why not?

Q.4. What is your opinion about the experiment?

Q.5. From your perspective, how will you rate the outcome of this experiment? Did it achieve its goal?

Q.6 Do you think it had a positive effect on the understanding of the subject by the students?

3. Opinion of the staff about the working and effectiveness of the software

Q.1 What is your opinion about the usefulness of a software such as the one introduced during the experiment?

Q.2. Was the software introduced during the experiment useful in helping students in improving the task of references and citation?

Q.3. How effective is the software in facilitating staff members?

Q.4. What is your opinion about the feedback report provided to the students?

Q.5. Would you recommend this software to be used in Warwick University for students and staff?

Appendix F: Screen Shots From RSESS

F.1: Uploading Assignment Information

ASSIGNMENT DATA

Please Add/Edit/Delete assignment data i.e. assignment number and its short description

Course

	Assignment id	Assignment number	Assignment dsc
Edit Delete	5	1	Writing a critique of a technical document
Edit Delete	6	2	Abstracts
Edit Delete	7	3	Scientific posters

To add a new assignment, please use following fields, and then press Add button

Assignment Number

Assignment Description

Figure F.1: Upload Assignment Information

Information about the assignments of a module is added through this interface. This information is utilized while uploading student's assignment file on the server and later while generating feedback report.

F.2: Uploading Students Assignment

UPLOAD ASSIGNMENT(S)

Please Upload students assignment:

Course

Sudent ID

Assignment Number

No file chosen

Figure F.2: Upload Student's Assignment

Through this screen (Figure F.2), tutors upload students' assignments along with all the necessary information. This information includes the name of the course for which the assignment is being uploaded, ID of the student whose assignment is being uploaded, the number of the assignment and the file that contains the assignment of the student. Reference list from the uploaded file is later evaluated when the assessment button is pressed, as indicated in Figure 5.7.