Chapter - V

Summary and Conclusion
CHAPTER V

SUMMERY AND CONCLUSION

An overview of the present research including the introduction, Need, Context and Importance of the Study, Statement of the Problem (Title of the Study, Objectives of the Study, Hypotheses Formulated for the Study, Variables Considered for the Study and Delimitations of the Study), Operational Definitions of the Key Terms, Tools Used for Data Collection, Sampling Details, Design and Procedure, Statistical Techniques Used for Analysis of the Data, Major Finding of the study, Discussion, Educational Implications of the Study, Suggestions for Further Research are presented in this chapter.

5.1 INTRODUCTION

One of the topics in today's societies related to educational researches is how the students learn the subjects. As our world is developing so fast, the educational researchers and specialists are trying to find the ways for coinciding learning improvements with development improvements. The mankind will grow along with learning and can afford this to its abilities (Azizi & Yeshodhara, 2013 b).

The self-regulated learners are those who regularize their learning ability effectively and help themselves through different methods (Schunk, & Zimermen, 1994). From visionary point of view, the self-regulated learner uses wide Cognitive and Metacognitive Strategies for their successful education. Also he/she is able to adjust his/her goals and motivations, proportionate with educational environment and effort properly for reaching to it (Schunk, 1994). These people can manage and control
arrangement of their educational activity and if it is necessary for reaching to their learning goals, they take advisable decisions (Butler, & Winne, 1995). Totally, researchers approve the importance of self-regulate in relation to prosperity education e.g. Pintrich and De Groot (1990) and Latifian (1998) have shown that students who were using more statement from Self-Regulated Strategies have better intrinsic motivation, self-confidence perception and better AA.

The recent studies in relation to Cognitive and Metacognitive Strategies have demonstrated that the person’s ability for learning depends on how much he/she uses these Strategies. More usage of these will be more successful for learning subjects.

In the educational sphere, most specialists agree that when Information and Communication Technology (ICT) is properly utilized, it fosters and enhances teaching and learning. The Internet has broken down barriers of communication access from anywhere in the world. It is fast, reliable and does not have restrictions on content or format (except in certain countries). It also has a limitless range of facilities which assist users to access the almost infinite information on the net. It has changed the nature of publishing. The Internet offers the opportunity to access up-to-date research reports and knowledge globally in topics as diverse as science and technology, business and finance, music and the arts. Thus, it has become an important Component of electronic services in academic institutions and thereby an invaluable tool for learning and research. For Internet resources to be used effectively, students and scholars need to develop a set of new skills that include Strategies for searching relevant materials, skills in evaluating the quality of documents found, knowledge of web design, skills in using discussion forums and chat rooms, as well as basic understanding of how to send e-mail attachments (Newezeh, 2010).
5.2 NEED AND IMPORTANCE OF THE STUDY

Learning is one of the most important factors of the advancement. Human beings gain his/her success in the light of leaning. There are many factors that affect the learning of which, use of SRLS and IC are found significant in the present context of computer age and thus are considered for the research study.

SRL is a theory which has been applied and investigated in many areas especially in academic learning. Research in self-regulated academic learning areas include student grades, university classes, computer use, Internet use, web-based courses, mathematics, language of literature, science, nutrition, accounting, and agriculture (Zimmerman, & Schunk, 2001; Zimmerman, 2001). Considerable research has demonstrated a positive relationship between Self-Regulation Strategies and AA. The measurements for Self-Regulated academic learning are also developed in many ways: self-reporting questionnaires (Pintrich et al., 1991; Wolters et al., 2003); structured interviews (Zimmerman, & Martinez-Pons, 1986, 1988); and teachers' ratings (Zimmerman, & Martinez-Pons, 1988; Winne, & Perry, 2000).

On the other hand, the AA is dependent on several factors. One of the decisive factors in AA, is using of Learning Strategies. Learning Strategies are some processes that help individuals to learn "how to learn", "how to advance their learning issues," and "how do deeply and effectively to their learning." Learning Strategies include a broad range of Strategies. One of these Strategies is Self-Regulated Learning (SRL), which consists of three Components: Cognitive Strategies, Metacognitive Strategies and Management Strategies. This concept has been introduced in recent years and many studies have been devoted to it (Zimmerman, & Martinez-Ponz, 1990).
The Internet seems to influence the quality of life through social individuals, consumer, leisure, economic, and community well-being (Cairncross, 1997; DiMaggio, Hargitti, Neuman, & Robinson, 2001; Israel, 2000). The Internet’s influence stems from the ease and convenience it provides to access many benefits in the context of many life domains (e.g., social life, work life, leisure life, and education life). Some authors suggested that the Internet has positive effects on AA through the use of educational software, and the provision of useful information (Borzekowski, & Robinson, 2005; Jackson et al., 2006); others suggest that the Internet provides positive effects on socialization as it stimulates the closeness of existing interpersonal relationships by reducing restrictions of time and location (Lenhart, Madden, & Hitlin, 2005; Lenhart, Rainie, & Lewis, 2001).

The importance of this study is the fact that today the Internet is pervasive in the lives of individuals, institutions, and societies especially in India. The last few decades have witnessed a dramatic increase in the use of the Internet and an unprecedented proliferation of computer-based technology. Computer technologies and the Internet bring social changes in modern society. Since computers have become a common instrument of daily living for a vast proportion of our society, the Internet has a significant influence on quality of life (Azizi, & Yeshodhara, 2013a). However, as found in research India is one of the fastest growing countries in Internet use; adolescents and youths are more involved in Internet achievements than adults.

Studies about the use of Internet and AA were examined using the motives of Internet use (Choi et al., 2004), attitude of the students' Internet use (Ebersole, 2000), online time management (Terry, 2002), supporting tools for self-regulatory skills in Web-based learning environment (Niemi et al., 2003), the advantages for self-regulated learners on the Internet (Hargis, 2000), and Internet uses and technology (Young, 2001;
Reisberg, 2000). The results of these studies showed that improved computer skills, better time management, and more positive attitudes of Internet use improved AA, while Internet use among students positively influences academic learning (Zenon, 2006).

Learner Progress is a complex phenomenon learning to one's AA and is affected by several factors like learner related factors such as age, gender, martial states, Socio Economic Status (SES), Study habit, Learning Strategies/styles; parent related factors such as parents’ education level, parental profession and Parental income; Family related factors - ordinal position, family type; teacher related factors, instructional facilities available etc. Of these factors, much research has been done on SRLS and its influence on AA. However, in this age of computer and ICT, sensible advances in computers and Internet usage in India, have lead the students community towards better learning. Today the Internet plays an important role in the storage, distribution, search and exchange of information and communication between the students. Students can have access to required information on websites, databases and virtual libraries with less cost in any place and any time. As such, the Internet can play an important role in the academic progress of students of higher education level.

The review of related literature also indicated that much research has not been focused on college students regarding the usage of SRLS and Internet facilities in relation to their AA. Thus the present study is initiated.

Considering the importance and necessity of SRLS and IC in the achievement and academic performance, the present study examines the level of using SRLS and IC among bachelor degree science students. The findings of this study may highlight the relationship between IC and AA of students, Administrators and teachers can inform students about the role of Internet in improving their AA. Furthermore, they can
encourage students to use the Internet to increase their knowledge, and provide more Internet facilities for science students. Also by determining relationship of SRLS with AA, students can plan for better, easier and deeper learning to leading to better AA among college students.

5.3 STATEMENT OF THE PROBLEM

5.3.1 Title of the Study

The present study is taken up with a purpose to assess the level of Self-Regulated Learning Strategies and the level of Internet Competency of B.Sc Degree Students studying in Mysore city Degree colleges and to relate them to their AA. It is also attempted to study which of the above said two variables is the most contributing one to their AA. Thus the present study is entitled "Self-Regulated Learning Strategies and Internet Competency of Bachelor Degree Science Students in relation to their Academic Achievement".

5.3.2 Objectives of the Study

The study was undertaken with the following objectives:

1. To assess the level of Self-Regulated Learning Strategies in total and Scale wise among B.Sc Degree Students with different combination of subjects- Physics, Mathematics and Computer Science (PMCs), Physics, Chemistry and Mathematics (PCM), Chemistry, Botany and Zoology (CBZ).

2. To assess the level of Internet Competency in total and Component wise of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ.
3. To find out the difference between / among the following categories of Students in the Self-Regulated Learning Strategies in total and Scale wise.

(a) Male and Female Students

(b) Students with different combination of subjects - PMCs, PCM and CBZ.

4. To find out the difference between / among the following categories of Students in the level of Internet Competency in total and Component wise.

(a) Male and Female Students

(b) Students with different combination of subjects - PMCs, PCM and CBZ.

5. To study the relationship between the Self-Regulated Learning Strategies and the level of Academic Achievement of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ.

6. To study the relationship between the level of Internet Competency and the level of Academic Achievement of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ.

7. To identify which of the following variables predict the Academic Achievement of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ.

(a) Self-Regulated Learning Strategies

(b) Internet Competency.

5.3.3 Hypotheses of the Study

With respect to the objective in 3 to 6, following hypotheses were formulated.

H1. There is no significant difference between Male and Female Students of B.Sc Degree in Self-Regulated Learning Strategies in total and Scale wise.
H2. There is no significant difference among the B.Sc Degree Students with PMCs, PCM and CBZ combinations in Self-Regulated Learning Strategies in total and Scale wise.

H3. There is no significant difference between Male and Female Students of B.Sc Degree in the level of Internet Competency in total and Components wise.

H4. There is no significant difference among the B.Sc Degree Students with PMCs, PCM and CBZ combinations in the level of Internet Competency in total and Component wise.

H5. There is no significant relationship between Self-Regulated Learning Strategies of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ and their Academic Achievement.

H6. There is no significant relationship between the level of Internet Competency of B.Sc Degree Students with different combination of subjects- PMCs, PCM and CBZ and their Academic Achievement.

5.3.4 Variables Considered for the Study

The following are the variables considered for the study:


II) Criterion Variable / Dependent Variable: Academic Achievement.

III) Background Variable: a) Gender (Male and Female) b) Combination of Subjects (PMCs, PCM and CBZ).
5.3.5 Delimitations of the Study

The proposed study is delimited to only 3 combinations of subjects under B.Sc Degree: 1. Physics, Mathematics and Computer Science (PMCs) 2. Physics, Chemistry and Mathematics (PCM) 3. Chemistry, Botany and Zoology (CBZ).

Internet Competency Scale constructed by the investigator is not standardized. However, it has been attempted to establish reliability and validity for the Scale.

5.4 OPERATIONAL DEFINITIONS OF THE KEY TERMS

5.4.1 Self-Regulated Learning Strategies

In this study, SRLS are represented through scores on part II of Motivational Strategies for Learning Questionnaire (MSLQ) ie this Learning Strategies (LS). Learning Strategies part includes the following 9 Scales: Rehearsal, Elaboration, Organization, Critical Thinking, Metacognitive Self-Regulation, Time and Study Environment, Effort Regulation, Peer Learning and Help Seeking which are measured separately on the respective Scales.

(a) Rehearsal

Rehearsal Strategy involves reciting or naming items from a list to be learnt. This Strategy is best used for simple tasks and activation of information in working memory rather than acquisition of new information in long-term memory.

In this study Rehearsal Strategy is assessed by items 8, 15, 28, 41 of part II and is represented by the scores on these items.
(b) Elaboration

Elaboration Strategy includes paraphrasing, summarizing, creating analogies, and generative note-taking. These help the learner integrate and connect new information with prior knowledge (Pintrich et al., 1991).

In this study Elaboration Strategy is assessed by items 22, 31, 33, 36, 38, 50 of part II and is represented by the scores on these items.

(c) Organization

Organization Strategy includes clustering, outlining, and selecting the main idea in reading passages. Organizing is an active, effortful endeavor which should result in better performance.

In this study Organization Strategy is assessed by items 1, 11, 18, 32 of part II and is represented by the scores on these items.

(d) Critical Thinking

Critical Thinking refers to the degree to which students report applying previous knowledge to new situations in order to solve problems, reach decisions, or make critical evaluations with respect to standards of excellence.

In this study Critical Thinking Strategy is assessed by items 7, 16, 20, 35, 40 of part II and is represented by the scores on these items.

(e) Metacognitive Self-Regulation

Metacognition refers to the awareness, knowledge, and control of cognition. In MSLQ, only control and self-regulation aspects have been considered, not the knowledge aspect. There are three general processes that make up Metacognitive self-regulatory activities: planning, monitoring, and regulating. Planning activities include
goal setting and task analysis; Monitoring activities include tracking of one's attention as one reads, and self-testing and questioning.

In this study Metacognitive Self-Regulation Strategy is assessed by items 2, 5, 10, 13, 23, 24, 25, 26, 30, 45, 47, 48 of part II and is represented by the scores on these items.

(f) **Time and Study Environment**

Time management involves scheduling, planning, and managing one's study time. This includes not only setting aside of time to study, but the effective use of that study time, and setting realistic goals. Time management varies in level, from an evening of studying to weekly and monthly scheduling. Study environment management refers to the setting where the student does her/his class work.

In this study Time and Study Environment Strategy is assessed by items 4, 12, 21, 34, 39, 42, 46, 49 of part II and is represented by the scores on these items.

(g) **Effort Regulation**

Effort management is self-management, and reflects a commitment to completing one's study goals, even when there are difficulties or distractions.

In this study Effort Regulation Strategy is assessed by items 6, 17, 29, 43 of part II and is represented by the scores on these items.

(h) **Peer Learning**

Peer Learning means learning with classmate or friends who are pursuing same tasks or goals. Dialogue with peers can help a learner clarify course material and reach insights one may not have attained on one's own.
In this study Peer Learning Strategy is assessed by items 3, 14, 19 of part II and is represented by the scores on these items.

(i) Help Seeking

Help Seeking refers to the students’ ability to seek the support of others. This includes both peers and instructors. It is an ability to identify someone to provide them with some assistance when they don’t know something (Pintrich et al., 1991).

In this study Help Seeking Strategy is assessed by items 9, 27, 37, 44 of part II and is represented by the scores on these items.

5.4.2 Internet Competency

Internet Competency is the ability of an individual to use the Internet properly. It is a combination of knowledge and skills of using the Internet to improve performance.

In this study, the level of Internet Competency is represented by the score on the Internet Competency Questionnaire, which includes six subscales with the following Components: Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management and Information Search.

(a) Computer General Knowledge

Computer General Knowledge means knowledge about the following: printer, scanner, webcam, security software (Antivirus software, Firewall, etc), multimedia softwares, Operating System on a computer (Windows XP, Windows 7, Windows 8, etc), application softwares (Graphics software, Office suite, etc), dictionary software on a computer, word to PDF, power point software, excel software, peripherals in
computer (printer, scanner, etc), portable storage device (flash memory, pen drive, etc) and permanent storage (CD and DVD).

(b) Computer General Ability

Computer General Ability consists of the following: Ability to use printer, scanner, webcam, security software (Antivirus software, Firewall, etc) use multimedia softwares, install Operating System on a computer (Windows XP, Windows 7, Windows 8, etc), install application softwares (Graphics software, Office suite, etc), Uninstall application softwares, use dictionary software on a computer, word to PDF, convert PDF to word, use word software, use power point software, use excel software, install peripherals in computer (printer, scanner, etc), connect portable storage device (flash memory, pen drive, etc), transfer data into permanent storage (CD and DVD), compress files, unzip the compressed files, boot the system, do Trouble shooting in different contexts, use software local language, and install plug and play hardwares (mouse, keyboard, monitor, etc).

In this study Computer General Knowledge and Computer General Ability is measured by items 1 to 23 and is represented by the scores on these items.

(c) Communication and Collaboration

Communication and Collaboration includes the following: Ability to create an e-mail account, compose e-mails, send e-mails, receive e-mails, reply e-mails, forward e-mails, Ability to interpret features of an inbox (from, date, subject and size), interpret features of a new message (To, Carbon Copy and Blind Carbon Copy), attach a file to an e-mail, download an attachment, use address book to send e-mails, sign out from e-mail, create and use group addresses for e-mails, use the text chat, use the audio chat,
use the video chat and use the social networks (Facebook, Google+, LinkedIn, Academia.edu).

In this study Communication and Collaboration is measured by items 24 to 40 and is represented by the scores on these items.

(d) General Webpage Using

General Webpage Using includes the following: Ability to use a web browser (Internet Explorer, Mozilla Firefox, Google Chrome etc), use a search engine (Google, Yahoo, Bing, etc), access a specific website by entering the exact address, use online helps for system problems, use additional browser functions (refresh and history), navigate within a website using basic browser software functions (back, forward, up and down), use the features of a browser (stop, search, home buttons, address bar and loading status), use site map in a web page and use link in web page (hypermedia and hypertext).

In this study General Webpage Using is measured by items 41 to 49 and is represented by the scores on these items.

(e) Information Management

Information Management includes the following: To organize bookmarks or favorites for important websites, to configure the Internet browser (clear history and set security levels), Ability to copy documents, delete documents, create files, save documents in computer, retrieve documents, edit documents, rename documents, recognize "save" and "save as" in documents, create new folders and move a file to a folder.

In this study Information Management is measured by items 50 to 61 and is represented by the scores on these items.
(f) **Information Search**

Information Search includes the following: Abilities to use advanced search techniques (AND, OR, NOT, +, -, "", *), ability to refine search terms by using selection criteria (languages, file format and domain), ability to download a file from the Internet, upload a file on the Internet, use Google Scholar/Scirus for scientific information, differentiate between keyword and field searching (subject, author, publisher and title), find videos through search engines (YouTub, etc), find images through search engines (Google Images, etc), search an online library catalogue, use a database electronic Encyclopedias (Britannica, Wikipedia, etc) and access information from e-resources (e-books, e-journals, e-dissertations, etc).

In this study Information Search is measured by items 62 to 72 and is represented by the scores on these items.

5.4.3 **Academic Achievement**

AA is the extent to which students have achieved their educational goals (Academic Achievement, n.d.).

In this study AA is represented by σ score computed on total marks obtained by the students on previous semester exams (first 6 semester) of B.Sc Degree programme.

5.4.4 **Bachelor Degree Science Students (B.Sc Degree Students)**

These are the Students studying in final year B.Sc Degree programme with Physics, Mathematics, Computer Science (PMCs); Physics, Chemistry, Mathematics (PCM); Chemistry, Botany, Zoology (CBZ) Combinations. It is represented as Bachelor of Science (BS.c) Degree Students throughout the thesis.
5.5 SAMPLING DETAILS

5.5.1 Population of the Study

The population of this study includes final year students of 9 degree colleges affiliated to UOM and located in Mysore city (Karnataka State) - Yuvaraja College, Maharani Science College For Women in J.L.B. Road, Govt. First Grade College in Kuvempunagar, Govt. First Grade College for Women in Vijayanagara, Saradavilas College in Krishnamurthypuram, Mahajana First Grade College in Jayalakshmipuram, Teresian College in Siddharthanagar, MMK and SDM College for Women in Krishnamurthypuram and NIE Science College in Vishveswaranagar having science subjects in different combinations as PMCs, PCM and CBZ. All these colleges are categorized into 4 different type – UOM, Govt., Pvt. aided and Pvt. unaided.

Two colleges (Mallamma Marimallappa Science and BBM College and ST. Josephs First Grade College) were excluded from the population, as there were no students in the final year B.Sc program. Although total No. of colleges is 11, the total number of Colleges constituting the population of the study is only 9. Total number of the students studying in the final year B.Sc with PMCs, PCM and CBZ combinations was 754 (PMCs- 234 Students, PCM- 323 Students and CBZ- 188 Students).

5.5.2 Sample of the Study

Convenience sampling technique was used to select 4 colleges in Mysore city. One college was selected under each type of college: UOMCC, Govt. College, Pvt. Aided and Pvt. Unaided College. All the 4 Colleges constituting the sample of the study are affiliated to UOM. Proportionate random sampling technique was used to draw final year students from different types of colleges giving representation to their gender and different combination of subjects. Totally 254 Students were selected according to the
table of Krejcie and Morgan (Hassanzadeh, 2003) - PMCs 64 Students, PCM 120 Students and CBZ 70 Students.

5.6 TOOLS USED FOR DATA COLLECTION

Following tools are used for the collection of data on different variables of the study.

<table>
<thead>
<tr>
<th>Variable Measured</th>
<th>Tools Used</th>
<th>Developed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Competency (IC)</td>
<td>Internet Competency Scale</td>
<td>Researcher (2013)</td>
</tr>
<tr>
<td>Gender, Combination of Subjects and Types of Colleges (Background variable)</td>
<td>Demographic Data Sheet</td>
<td>Researcher (2013)</td>
</tr>
<tr>
<td>Academic Achievement (AA)</td>
<td>College Records (Marks Register)</td>
<td>Total marks obtained by the student on first 6 semester examinations of B.Sc program-converted into σ scores</td>
</tr>
</tbody>
</table>

5.6.1 Motivational Strategies for Learning Questionnaire (MSLQ)

The Motivational Strategies for Learning Questionnaire (MSLQ) was used in this study to assess the self regulated Learning Strategies. This tool was designed at Research National Center of Michigan University (1986) to improve teaching and learning in high schools. Then it was extended to collegiate courses in order to measure the orientation of Students motivation and use them for learning. This tool consisted of two sections: i) Motivation  ii) Learning Strategies.

The Motivation section (part I) consisted of 31 items spread over 6 Scales and 3 main Components. a)Value Components 1. Intrinsic Goal Orientation Scale 2. Extrinsic Goal Orientation Scale 3. Task Value Scale, b) Expectancy Components 4. Control of
Learning Beliefs Scale 5. Self-Efficacy for Learning and Performance Scale, C) Affective Components 6. Test Anxiety Scale. Learning Strategies section (part II) consisted of 9 Scales with total 50 items. Thus in total MSLQ has 15 Scales and these can be used together or singly. The Scales are designed to be modular and can be used to fit the needs of the researcher or instructor. The instrument is designed to be given in class and takes approximately 20-30 minutes to administer.

In this study, only LS section (part II) was used. In this part, there are 2 Components- i)Cognitive and Metacognitive Strategies ii)Resource Management Strategies- and it has 9 Scales, each consisting of multiple items- Rehearsal Scale, Elaboration Scale, Organization Scale, Critical Thinking Scale, Metacognitive Self-Regulation Scale, Time and Study Environment Scale, Effort Regulation Scale, Peer Learning Scale and Help Seeking Scale. In total, this part of questionnaire (Learning Strategies) included 50 items. Each item has 7 levels of responses as given below:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all true of me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very true of me</td>
</tr>
</tbody>
</table>

If student thinks the statement is very true of her/his, the box of 7 is to be crossed (✗), if a statement is not at all true of student, the box of 1 is to be crossed (✗). If the statement is more or less true of student, find the number between 1 and 7 that best describes him/her. In this study Cronbach alpha reliability coefficient in total was found out and it was 0.93.

5.6.2 Internet Competency Scale (ICS)

The Internet Competency Scale used in this study to assess the level of IC was constructed by the researcher. To begin with IC Scale with 67 items was prepared by the researcher. Then it is subjected to scrutiny and discussion with the guide and few other subject experts based on the opinion and suggestion of them, a few items were
restructured, some items were deleted and a few more items were added to the Scale to have 75 items and the Scale. It was subjected to pilot study on a small group of 50 students selected from one of the colleges in Mysore city; and the Scale was finalized. This Scale consisted of 6 Components- Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management, Information Search. Each Component consisted of multiple items. In total, this Scale consisted of 72 Items. Cronbach alpha coefficient was calculated to represent its reliability and it was found to be 0.97 for the whole Scale.

5.6.3 Demographic Data Sheet

A data sheet with items to elicit demographic details like Gender, Combination of Subjects, Type of College, Previous semester average marks (G.P.A.), Parent's monthly income, Father's Education, Father's job, Mother's Education, Mother's job and Locality of residence was prepared by researcher and it is called Demographic Data Sheet.

5.7 DESIGN AND PROCEDURE

This is a correlational study with descriptive/analytical research and survey method. It also involves prediction of most contributing variables to the AA of B.Sc Degree Students through regression analysis. The investigator personally visited all the selected colleges and administered the above said tools to the final year B.Sc Degree Students. The Students were instructed how to respond to the tool namely Motivational Strategies for Learning Questionnaire - part II Learning Strategies and IC Scale. Further clarifications were offered on the questions/doubts raised by them and they were requested to cooperate with the Investigator for successful completion of the research.
Time required to complete MSLQ - part II was between 12-18 minutes and for IC Scale was between 20-25 minutes. The responses of the Students to both the tools were scored as per the directions given in the manual. The data obtained was tabulated and analyzed using appropriate statistical techniques.

5.8 STATISTICAL TECHNIQUES USED FOR ANALYSIS OF THE DATA

To analyse the data obtained, the following statistical techniques were employed in the present investigation. The analysis was done using SPSS (Statistical Package for Social Science) version 15.0:

1. Descriptive statistics like Mean, Standard Deviation, frequency and percentage have been employed to analyze the data descriptively.

2. Inferential statistics like Independent samples t-test, one way ANOVA, Duncan's Multiple Range Test, Pearson correlation coefficient and Multiple Regression analysis were used to test the hypotheses formulated.

The relevance of the above statistical techniques is given below:

The Independent Samples t-test in the present study was applied to find out the difference between independent Means of two groups categorized on the basis of gender (Male and Female) in different variables selected for the study i.e. SRLS and IC.

Analysis of variance one way in the present study was employed to find out the differences among students with different combination (PMCs, PCM and CBZ) in different variables selected for the study i.e. SRLS and the level of IC.

Duncan's Multiple Range Test employed in the present study wherever F-value is found to be significant.
Pearson Product-Moment Correlation Coefficient was used to find out the relationships between SRLS and AA of students, and the level of IC and AA of students.

Multiple Regression was used to test whether SRLS and IC contribute significantly to the AA, and also to predict which of the two variables is most to the AA of students.

5.9 MAJOR FINDINGS OF THE STUDY

5.9.1 Descriptive Analysis

Descriptive analyses of the data collected for this study revealed that:

✓ Majority of students have exhibited average level of SRLS in total and in all its Scales.
✓ Majority of students have exhibited average level of IC in total and in all its Components.

5.9.2 Inferential Analysis

Testing of hypotheses formulated in the present research revealed that:

✓ The Mean scores of Female students is higher than that of Male student in the case of SRLS in total and in the following Strategies - Rehearsal, Elaboration,
Organization, Critical Thinking, Metacognitive Self-Regulation, Time and Study Environment, Peer Learning and Help Seeking.

✓ There is no significant difference between Male and Female students in Effort Regulation Strategy.

✓ There is no significant difference among the students of PMCs, PCM and CBZ combination in SRLS in total and in the following Strategies of SRL- Organization, Metacognitive Self-regulation, Peer Learning, Time and Study Environment, Critical Thinking, Rehearsal, Help Seeking and Elaboration.

✓ There is significant difference among the students of PMCs, PCM and CBZ combination in Effort Regulation Strategy.

✓ There is significant difference between the Mean scores of CBZ students and PCM combination. The Mean score of PCM students is higher than that of CBZ students in the case of Effort Regulation Strategy.

✓ There is significant difference between Male and Female students in IC in total and its Components- Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management, and Information Search.

✓ The Mean scores of Male students is higher, compared to Female students in case of IC in total and its Components- Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management, and Information Search.

✓ There is significant difference among the students of PMCs, PCM and CBZ combination in IC in total and its Components- Computer General Knowledge, Computer General Ability, General Webpage Using and Information Search.
There is significant difference between Mean scores of PMCs and PCM students in the case of IC in total and its Components - Computer General Knowledge, Computer General Ability, General Webpage Using and Information Search. PMCs students have exhibited higher Mean score when compared to PCM students with regard to IC in total and its Components Computer General Knowledge, Computer General Ability, General Webpage Using and Information Search.

There is no significant difference among the students of PMCs, PCM and CBZ combination in (i) Communication and Collaboration (ii) Information Management Components of IC.

There is significant positive relationship between SRLS in total and as well as the following Strategies of SRL- Organization, Metacognitive Self-regulation, Peer Learning, Effort Regulation, Critical Thinking, Rehearsal, Help Seeking, Elaboration and AA of B.Sc students.

There is no significant relationship between IC SRL Strategy of Time and Study Environment and AA of B.Sc students.

There is no significant relationship between IC Components in total as well as its Components- Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using and Information Management and AA of B.Sc students.

There is significant negative relationship between Information Search Components of IC and AA of B.Sc students.

SRLS is found to be the better predictor of AA (G.P.A.) of B.Sc students but not the IC.

Among the Strategies of SRL, only (i) Elaboration and (ii) Effort Regulation Strategies are found to be the predictors of AA (G.P.A.) of B.Sc students.
Among the Strategies of SRL, Metacognitive Self-regulation, Peer Learning, Time and Study Environment, Critical Thinking, Rehearsal, Help Seeking, and Organization Strategies are not the predictor of AA (G.P.A.) of B.Sc students.

5.10 DISCUSSION OF THE FINDINGS

The findings of the present study on "SRLS and IC of Bachelor Degree Science Students in Relation to their AA" have been discussed here at length:

It is found from this study that the higher percentage of students from all combinations of subjects - PMCs, PCM and CBZ are at average level in SRLS in total and all its Scales, with little variation among the Scales and also in IC in total and all its Components with little variation among the Components.

Both the above findings could be explained like this. It seems there is no deliberate effort on the part of teachers to promote SRLS among students and enable them to perform better. As most of the students are interested in learning and determined to achieve their goal is to complete the degree without their knowledge about SRLS, they might have used different Strategies as the occasion demanded.

This study revealed that there is significant difference between Male and Female students in SRLS in total and in Strategies- Organization, Metacognitive Self-Regulation, Peer Learning, Time and Study Environment, Critical Thinking, Rehearsal, Help Seeking and Elaboration Strategies. The Female students seem to be at higher level compared to Male students in all the above said Components. In other words, Females as compared to Males are better in using SRLS. This finding supports the results of studies conducted by Walter, 2012; Ahmad et al., 2012; Saad et al., 2012 which reported the difference between Male and Female students in Learning
Strategies. Walter (2012) revealed that Male students responded more positively to project and problem-based courses with changes evidenced in motivation Strategies and Resource Management. Female students exhibited lower responses in Resource Management in these two types of courses. Ahmad et al. (2012) showed that girls' AA was found better than the boys' AA; boys were reported better than girls on measure of Self-efficacy for SRL. Saad et al. (2012) showed that there is a difference between Males and Females as to the use of SRLS. Females outperformed Males in both AA and the use of SRL Strategies. This difference may be attributed to the fact that Females exhibit more interest to SRLS, sensitivity to learning, responsibility towards learning, and determination to achieve better. This has also been reflected in the results of the examinations of Secondary School Leaving Certificate (SSLC), Pre-University Course (PUC) and other higher education levels, where in girls fare better than boys in all these examinations. It is commonly accepted fact that girls are better in language ability. As such they will be better in paraphrasing, summarizing analogy long term memory, Organization of ideas, reading comprehension etc. Thus they think well and plan, monitor and regulate their learning. This might have influenced female students to go for all the SRLS except Effort Regulation.

Another finding of this study showed that there is no significant difference between Male and Female students in Effort Regulation Strategy. This means that boys and girls do not differ in using the Effort Regulation Strategy. The finding of this study is corresponded with the findings of Yukselturk and Bulut, 2009 who found that there is no significant Mean difference between Males and Females with respect to motivational beliefs, SRL variables and achievement in programming. Effort Regulation refers to self management and commitment to complete one's study goals. Irrespective of the gender, all students are committed to reach their goals ie getting degree with high
percentage. Therefore, no difference his found between Male and Females with respect to Effort Regulation.

It is found that there is no significant difference among the students of PMCs, PCM and CBZ combination in SRLS in total and its Strategies - Organization, Metacognitive self-regulation, Peer Learning, Time and Study Environment, Critical Thinking, Rehearsal, Help Seeking and Elaboration except in the case of Effort Regulation, where in significant difference was found among the students of PMCs, PCM and CBZ combination. This means that the students of PMCs, PCM and CBZ do not differ in the case of Effort Regulation. The students of PCM as compared to PMCs and CBZ combination are found higher in Effort Regulation Strategy. Contrary to this, Robert (2003) revealed that the employment of SRL behaviors differed between humanities and technical courses.

Absence of difference between male and female students in SRLS could be explained like this all the subjects under selected combinations (PMCs, PCM and CBZ) being science subjects consist of more or less same competencies and skills to master. As such the students of all the 3 combination are required to use same Strategies. Further, Mathematics being more abstract demands higher commitment to achieve better. As such the students of PCM combination may stand slightly higher than the other 2 combinations in Effort Regulation.

Further, it is found that there is significant difference between Male and Female students in IC in total and its Components- Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management and Information Search. The Mean scores of Male students in IC Component is higher compared to Female students, which means that the Male students have higher level of Internet Competency than the Females students. Males'
Internet usage included Information Search, friends chat, social networking attention, emails, downloading and uploading data, and the computer usage included application softwares, files and Information Management, etc.

This finding is consistent with the findings of (Kim, 2011; Gross, 2004; Haythronthwaite & Wellman, 2002; Morahan-Martin, 1998; Subrahmanyam, Greenfield, Kraut, & Gross, 2001; Jupiter Communications, 2000; Kraut et al., 1996; Jennings & Wartella, 2004 & Lenhart et al., 2005) who reported the difference between boys and girls in IC. Kim (2011) indicated that South Korean boys and girls differed in the ways that they used the Internet. Girls were more likely to use the Internet to watch online education classes and blog more frequently and longer than boys, whereas boys were more likely to use the Internet for playing Internet games than girls. Same studies showed that boys use Internet more frequently, for longer and for a wider variety of uses than girls do (Gross, 2004; Haythronthwaite & Wellman, 2002; Morahan-Martin, 1998; Subrahmanyam et al., 2001); boys tend to spend more time alone online than girls engaged in gaming. (Jupiter Communications, 2000; Subrahmanyam et al., 2001; Kraut et al., 1996); girls use text messaging more frequently than boys (Jennings & Wartella, 2004; Lenhart et al., 2005); and are more likely to be involved in other online social interactions, such as using e-mail, than are boys. How email is used also differed by gender. For example, girls tend to use e-mail to exchange small talk and engage in relationship-building communications and boys tend to use e-mail for instrumental communication. Many have reported the difference between girls and boys in IC in term of the purpose of Internet use, time spent on Internet. But, this study indicated that the boys are better than girls in IC. This difference is quite natural as majority of boys are interested in establishing social relationship and enlarging their mental horizon, they
spend more time on Internet and become competent in all the Components of Internet usage.

There is significant difference among the students of PMCs, PCM and CBZ combination in IC in total and its Components- Computer General Knowledge, Computer General Ability, General Webpage Using and Information Search. This means that the students of PMCs, PCM and CBZ combinations differed in the level of IC and its Components mentioned above. PMCs students have exhibited higher level of IC when compared to CBZ and PCM students. The finding that PMCs students exhibit higher level IC compared to PCM and CBZ students seems to be quite natural. Computer Science students are exposed to both theory and practice of different aspects of computer technology and its usage and are required to master all the competencies including IC. As such, they prove better than the other students in IC.

Further there is no significant difference among the students of PMCs, PCM and CBZ combination in Communication and Collaboration and Information Management Components. This implied that the students of all the two combinations do not differ in the Internet Components of Information Management and Communication and Collaboration. This finding may be quite natural as PMCs students are more exposed to the Internet/computer usage through practicals in Computer Science when compared to PCM and CBZ students. In this computer age, it is very much required for many to have electronic communication; and so also for science students. Science students (irrespective of their subjects) need to establish electronic communication and collaborate with many Organizations/agencies to promote their research and share the knowledge worldwide. As such, all the Science students are required to develop the Components of Communication and Collaboration as well as Information Management,
which entails organizing, retrieving and maintaining and thus there will be no difference among the students of different combinations.

It is found that there is significant positive relationship between AA and SRLS in total as well as its Strategies- Organization, Metacognitive Self-Regulation, Peer Learning, Effort Regulation, Critical Thinking, Rehearsal, Help Seeking, Elaboration. Whereas no relationship is found between AA and usage of Time and Study Environment Strategy. This result is on par with the results of studies by Mcghee, 2010; Puzziferro, 2008; Harring-Hendon, 1989; Saad et al., 2012. Mcghee (2010) showed that there is low correlation between SRL and AA. Puzziferro (2008) showed that the Time and Study Environment and Effort Regulation Strategy were significantly related to performance. Harring-Hendon (1989) reported that self-directed learning was essential for higher AA in distance education programs because it involves the learner extensively in self-directed or SRL. Saad et al. (2012) revealed that there is a strong relationship between the use of SRL Strategies and students’ AA. Many research studies have proved that SRLS are very useful in promoting meaningful and effective learning, which in turn results in higher AA. Same thing has been confirmed with this study too.

There is no significant correlation between AA and IC in total as well as its Components, Computer General Knowledge, Computer General Ability, Communication and Collaboration, General Webpage Using, Information Management. This finding is on par with the results of studies by YangKim, 2009; Adegoke 2013; Puzziferro, 2008; & Jackson et al., 2006. YangKim (2009) reported no statistically significant correlation between Internet use and AA. Total Internet access was highly correlated to nonacademic related Internet browsing. Adegoke (2013) indicated that most of the students, who have access to the Internet, browse more for non-educative
information (socio-networking sites). The relationship between Internet browsing and students' achievement in Agricultural Science is through positive, it is not significant. Puzziferro (2008) found that online technologies self-efficacy scores are not correlated with students' performance. Jackson et al. (2006) indicated that children who used the Internet more had higher scores on standardized tests of reading achievement and higher grade point averages 6 months, 1 year, and 16 months later than did children who used it less. Older children used the Internet more than did younger children, but age had no effect on the academic performance benefits of Internet use. Pearson correlation showed that Information Search Component of IC is significant and negatively correlated with AA. This means that more and more time they spend on Information Search, they go lower and lower in AA as they are not able to concentrate on academic learning and vice versa. This result is similar with the results of Lim (2005) who showed that there is correlation between the frequency of use of the Internet for schoolwork and the literacy level of the participants in computer, Internet and information literacy, and also their innate ability. This negative correlation may be due to the fast that those who are good in IC spend more time on the Internet games, chatting with friends and Entertainment in Facebook, Twitter, Google Plus, LinkedIn and watch of videos and pictures and other hobbies; cannot concentrate on academic subjects, thus resulting in lower achievement.

It is found that the SRLS is the better predictor than IC and contribute significantly to AA of students. This finding corresponded with the findings of Al-Khatib, 2010 & Pintrich & De Groot, 1990. Al-Khatib (2010) who revealed that intrinsic goal orientation, self-efficacy, test anxiety, and Metacognitive SRL were found to be significant predictors of college students' performance. Pintrich and De Groot
(1990) revealed that self-regulation, self-efficacy, and test anxiety emerged as the best predictors of academic performance.

Further Multiple Regression indicated that among the Strategies of SRL, only (i) Elaboration and (ii) Effort Regulation Strategies are found to be the predictors of AA (G.P.A.) of B.Sc students. This finding is consistent with the findings of Kesici & Erdogan (2009) who reported the college students' Rehearsal and Elaboration Strategies were found to be significant predictors for their Mathematics anxiety.

5.11 EDUCATIONAL IMPLICATIONS

The implications of the findings of the study are discussed below:

This study inferred that SRLS predict AA of college students; use of different Strategies by the students lead to effective learning of a subject. But it is found that most of the students are at average level in SRLS and IC. Hence, it is very important that the students are to be exposed to different SRLS for which teachers try to provide such environment and encourage them for better learning particularly, and also provide more and more opportunities to use Internet for academic purpose.

Students should be taught how to evaluate their learning progress and be given opportunities to do so. Typically, in schools students have their learning evaluated for them by teachers. But self-regulation is a cyclical process in which students in colleges regulate themselves, check their progress, and adjust their approach as needed. Students need opportunities for self-evaluation because they may not do it automatically and it affects their motivation and SRL.

Developmental factors must be taken into account in teaching students to be better self-regulated learners. Self-monitoring is best kept simple for young children,
such as by having them use a check list or count how many problems they have completed. With development, students can implement more elaborate self-regulation Strategies; however, they are apt to benefit from instruction showing how to evaluate progress in areas where progress may be difficult to assess, such as writing ability or reading comprehension, etc.

Motivational variables also should be included in self-regulation programs. Developing effective self-regulation Strategies takes time and effort, and students may not be motivated to self-regulate unless they see benefits compared with their usual approaches. They also may not feel self-efficacious about improving their self-regulation. Providing students with progress feedback linking Strategy use with improved performance can raise their self-efficacy and motivation and enhance their self-evaluations of progress.

Learning in schools and colleges typically is focused on academic content. SRL skills do not develop automatically, but these skills will benefit students for life-long learning. Therefore, it behooves teachers and parents to help students develop their self-regulatory competencies and encourage them to practice using them in all facets of their lives.

Students may discover effective SRLS on their own, they benefit from sound instruction and models that explain and demonstrate Strategies. This does not imply that strategy instruction programs must be formally structured, but some guidance to students is important especially in the early stages of learning. As students become more proficient they are better able to construct effective Strategies on their own and, as Zimmerman and Kitsantas found, pursue outcome rather than learning process goals.
Self-regulation should be taught in conjunction with an academic subject and not separately. Students benefit from seeing how they can use, what they learn. Many self-regulation Strategies are generic and can be applied to different content, but their implementation typically will vary depending on the content area. Thus self-monitoring is a general strategy but what students self-monitor will vary depending whether they are reading passages in text, writing essays, or solving problems in geometry. When general Strategies are taught it is important also to show students how the strategy can be adapted for use with other content (Azizi & Yeshodhara, 2013b).

Further this study points to the need for quite a wide range of possible research areas into Internet information literacy before we can integrate the use of the Internet into the curriculum. Possible areas for future research include reading Strategies and comprehension using the Internet; the relation between social capital and habitus and use of the Internet; network infrastructure and use of the Internet in the classroom; the safe use of the Internet; alternative assessment using the Internet; and the provision of resources for disadvantaged students and differentiated instruction using the Internet.

To educate and prepare the younger generation to work in the 21st century and to be able to face the challenges of the future, we need to undertake research into the designing of classroom activities making use of Internet information skills to learn discipline specific knowledge. This issue and self-directed, engaged learning using the Internet will be the focus for research in differentiated instruction and Internet information literacy.

The colleges should have a separate and more funding and the other measurable support for an information literacy agenda. Technological infrastructure needs to be implemented to enable better utilization of the online resources being subscribed.
There is a need to develop tutorials related to database search skills such as navigating the database, searching specific interfaces, etc., and Internet skills such as web browser navigation, communication on the Internet, web search tools, web search Strategies, evaluation of web resources, using subject-based portals, and gateways, etc (Azizi & Yeshodhara, 2013a).

Further it is attempted to suggest some fruitful ways based on the finding of this research to help students and colleges affiliated to UOM.

The colleges affiliated to UOM should execute the training courses of SRLS for students of Bachelor degree, especially for Male students. In order to increase the level of motivation and abilities to gain the necessary knowledge and skills to learn better and easier.

Teaching faculty of colleges affiliated to UOM should emphasize the importance of Effort Regulation Strategy in SRL for students in any subject.

The Colleges affiliated to UOM should organize more training courses based on Internet and computer use in all the subjects.

It is further recommended that the colleges affiliated to UOM also must take initiative to provide facilities for students and encourage them to develop IC to enhance their performance.

To increase the AA of college students, they should learn to make optimal use of SRLS and IC. To encourage this culture, colleges should provide congenial atmosphere and necessary facilities such as beneficial books, booklet, and educational CDs, etc. Primarily, a computer lab which is well equipped with Internet facility and trained staff should be established in all the colleges.
5.12 SUGGESTIONS FOR FURTHER RESEARCH

Following topics have been suggested for further research:

1. A comparative study between developed countries and developing countries with respect to the use of SRL and the level of IC among the students in universities.

2. The same study could be extended to the students of master degree and Ph.D degree.

3. Other research should be focused on the virtual, online, distance courses and open universities.

4. An experimental study could be taken to see the effectiveness of SRLS and IC of Bachelor Degree Science students on their AA.

5. This study could be extended to the students of other disciplines like: Technical Science, Engineering and Humanities, etc.

6. Since the data of this study were collected from one city in India (Mysore) the generalization of the findings is limited. Therefore, it is necessary to expend the data sources to include the larger populations, specially a national sample in India.