CHAPTER 6

DISCUSSION
6.0 DISCUSSION

This chapter has been organized as a discussion of results of various experiments as a part of enhancing the effectiveness of e-Learning Framework.

6.1 DISCUSSION ON SRL SURVEY RESULT

The results of the principal component analysis done using SPSS Statistics on SRL Survey responses of the college students revealed the important factors that contribute self-regulation among students. The results indicated that the Total Variance was accounted for by five components which accounted for 53.997 percent of the total variance noticed. Also, it is imperative that Self-Regulation is a critical factor for the students doing online courses, which has a strong influence on enhancing the learning outcome of online students. It can be inferred from the results that the items grouped under each factor are strongly correlated. Subsequently, the five components are named as:

- Goal Setting and Planning
- Self-Improvement
- Self-Monitoring
- Overt change in behavior and
- Self-Evaluation.

It is interesting to note that the factors identified, match the Self-regulated Learning strategies as advocated by Zimmerman, 1990. It also compares with research outcome of Kathryn, L. et al. (2001) who developed a Self-Regulation Model which was governed by four principles namely prepare, organize, monitor and evaluate. The results also matched the research work which was done by David J. Nicol (2006) and Jansen, R.S. et al. (2016) and Hui-Ru Shih et al.
The experimental results proved the importance of the inclusion of self-regulation features in online courses and it is a dominant force to be reckoned with in implementing an online course design. In order to foster self-regulation in online courses, it is recommended to incorporate the following instruction principles advocated by Merril, M. D. (2009), and Margaryan et al. (2015):

- The demonstration principle
- The application principle
- The task-centered principle
- The activation principle
- The integration principle

The discipline like Self-regulation has to be inculcated by the learners for the online courses and students’ perception and feedback for the course design need to be taken into consideration. The supporting system should embed the features of some Good Quality Frameworks like Online Instruction and learning devised by Stewart, B.L. et al. (2013). Clear instructions, easy access to course components, and use of instructional materials without technical difficulties are some of the features which are strongly recommended by many authors. The experimental results prove the hypothesis H2 that Self-Regulation positively influences Student Empowerment.

### 6.2 DISCUSSION ON SENTIMENT ANALYSIS

In e-Commerce, Consumer feedback is deemed as a gold standard which is expressed in text form as product or service reviews. In e-Learning getting student feedback helps to understand their sentiments, and opinions on their experiences in the online courses. These help faculties and course administrators, who can take important decisions on making improvements in course web sites. The sentiment analysis performed on the student feedback reported positive
attitude.

The experimental study by Ortigosa, A. *et al.* (2014) concluded that the students’ sentiments towards an online course, could serve as a feedback to teachers, where face-to-face meeting is not frequent. The above study was based on sentiment analysis done on the Facebook users’ interactions involving text messages. Different methods used in sentiment analysis such as N-Grams, Sentiment Tree construction using Recursive Neural Tensor Networks, visualizing sentiments using word clouds provided vital information on student needs, expectations and satisfaction level. This helped faculties to make improvements in Course Web sites with the aim of ensuring that the course contents are up to date and that satisfy the needs of the wider student community. According to Joseph Turian (2013), sentiment analysis is a tool to stay in the market as well as to fight competitors. The experimental results match the researchers’ works: Bhuiyan, T. *et al.* – Customer sentiments; Cambria, E. *et al.* (2013) – Complex decision choices; Wen, M. *et al.* (2014) – Students’ sentiments from forum posts.

The following conclusions are arrived at based on the experimental result:

- Student Feedback on the e-learning Site reflects the voice of the students.
- Student needs and level of satisfaction can be understood by analyzing the text data.
- Sentiment Analysis is the technique used for analyzing different aspects of text feedback received.
- It helps to understand the needs of the students as well as the quality of the website.
- Faculties can use this information for improving the website content.

The experimental results prove the hypothesis H1 that the student sentiments positively impact student empowerment.
6.3 DISCUSSION ON WEB USAGE ANALYSIS

The results of web usage pattern analysis revealed that it is an important tool that can be used by faculties to understand the behavioral pattern of online learners and plan interventions with the aim of enhancing student engagement and retention. It can be inferred from web usage statistics of the course website, the access level reaches peaks during the end semester exam periods, that happens during the months May and November each year (Figs 5.8 and 5.9). These results help the prediction of engagement of students in the online learning process for future based on web access patterns observed. Both a linear and polynomial curve fits help prediction of the engagement of which the polynomial fit is more accurate. By using web analytic charts, faculties can make a visual assessment of how the learners interact with the web pages. Faculties could judge whether the layout is optimal for what the learners to accomplish on the page as desired and planned by the faculty. It helps the faculties to know whether the learners are able to see the content in the desired fashion. It makes faculties came to know whether learners are able to find what they are looking for and whether the users are viewing the postings of the faculties needing some action. Faculties can interpret how the students are engaging in the online learning site in temporal or other dimensions.

It can be inferred from web analytic reports taken for the prototype website using which, faculties can plan interventions like improving the website so that it is current, introducing novelty in the website, improve look and feel, catering to real needs of students by way of providing instructional resources which are difficult for the students themselves to find. The experimental results match research findings of Filva, D.A. et al. (2014) who used Google Analytics in a Moodle e-Learning environment and affirmed that it will be useful to detect dropouts or disengagements throughout the course. This research work
empirically proved the usefulness of web analytics in tracking online students by the faculties to enhance retention. Many researchers highlight the importance of Learning Analytics in the same lines as inferred from the results of the present study to track the online students’ web usage patterns with the aim of planning interventions and taking corrective actions to reduce disengagement and improve student learning outcome (Roman Gravier, P. et al. (2013); Escobar, A.E. et al. (2014); Bakharia, A. et al. (2016); Bull, S. et al. (2016); and Crossley, S. (2016).

In the present study, Google Analytics was used to track the online users who are accessing the experimental prototype website. Since Google Sites has been used for design and implementation the experimental website, Google Analytics easily fit into the experimental prototype. However, some researchers reported the difficulty and complexity involved in configuring Google Analytics in Moodle platform (Filva D.A. et al., 2014); Conde, M.A. et al., 2015). The experimental results prove the hypothesis H5 that the web usage analysis positively impacts faculty empowerment.

6.4. DISCUSSION ON SOCIAL NETWORKING

The absence of direct interaction with faculties and peers, have introduced a severe limitation on the student engagement in the online educational settings. Many research studies stated students need to take up and come out successful in online courses by enhancing their self-regulation traits by way of adoption to various self-regulating learning strategies (Zimmerman 1990, 2008). Social networking sites help to enhance the autonomy and self-directed abilities of online students. Experimental results of this research study have identified social networking as an important factor that contributes to the empowerment of online students who can collaborate in the virtual space with their peers, faculties and professional experts. Most of the current research studies on Social Networking
Sites mainly deal with e-commerce area helping consumers in taking correct decisions related to online purchasing. There is little research work done to identify the needs of the students who were engaged in Social Networking activities. This research work has fulfilled this research gap and added new knowledge in identifying the key determinant factors that explain the eWOM behavior of university students and consequent student empowerment resulting in the improvement in their personal efficacy. This is a first approach and contribution on Social Media usage by college students especially meant for bringing practical insights for empowering students towards improving their academic and social skills.

The Principal component analysis of the LinkedIn Usage responses had identified three important latent factors on Social Media usage by students. These factors were Expert Opinion seeking, Notification of Profile changes, and Networking with Professionals. A theoretical model was proposed, highlighting the relationship among five latent constructs consisting of exogenous and endogenous constructs. The relationship between latent constructs and observed variables is depicted in Figure 5.12 graphically. The rectangles represent the indicator items and the ellipses represent the latent constructs. By referring to Table 5.9 and Figure 5.12, it can be inferred that the factor loading for each latent construct was high and it reflects that there is a good model fit. Also, the proposed model reflects reality and fits well into the theoretical predictions as indicated by the fitness indices. The Confirmatory factor analysis conducted on the Survey responses revealed that an excellent model fit was achieved as per the fitness indices reported by the SEM analysis done using software AMOS. Ultimately the model helped to predict the enhancement of student empowerment by using Social Media. The determinant factors on student empowerment and the role of eWOM communication and Social Media usage were empirically tested
and validated. Future work involves testing for scalability by performing experiments on a larger target group. Also, this research method can be extended to students belonging to different universities in different countries. The results, obtained in this research work is comparable to the results of other researchers. Al-zedjali, K.H. et al. (2014) made a study on motivations for using social networking sites by college students and the results of their study revealed that most learners’ perception was SNS are useful for education and their use enhances learning. Ozyurt, O., et al. (2016) studied how Facebook usage helped to enhance the learning experience of students Computer Programming at Introduction to Programming and Algorithms Course. The results revealed that Facebook has positive effects such as cooperative and collaborative learning environment, an increase in motivation as well as negative effects such as causing distractions. Ainin, S. et al. (2015) studied the impact of Facebook usage on academic performance and their findings reveal a strong relationship between academic performance and Facebook usage by students. A pilot study undertaken by Al-Rahmi, W.M. et al. (2014) on the impact of Social Media on Academic Performance identified three predictors for collaborative learning success namely, Interaction with peers, Interaction with teachers, and engagement. According to Mehmood, S. et al. (2013), a high percentage of students found Social Networking Sites, a way to search for information. The SNS provided them a sense of belonging to an academic community and avenues for peer to peer and student to teacher interactions. The experimental results prove the hypothesis H3 that the social networking positively impacts student empowerment.

6.5 DISCUSSION ON RESULTS OF MOOC PERFORMANCE

MOOC performance studies by researchers have become imperative in recent times, in order to understand and enhance retention rates of MOOC courses. This experimental study made an analysis of the performance of Harvard and MIT
courses. The study revealed that in spite of very low completion rates of MOOCs as reported in the literature as well of this present study, the positive aspect of MOOCs is its global reach and the universal motto of access by all. Also, it has been experimentally validated that, the student characteristics also play a vital role in completing the course successfully. There is experimental evidence for students’ success in MOOC which relies on efforts taken by students in consistently accessing the online course materials. This has been proved in his research study based on high performance by the experimental group students who have consistently engaged in the course web site in contrast to the control group students with low engagement. The results of this experimental study match with research work that was done by Aparicio, M. et al. (2017). The researchers proposed a theoretical model which is an extension of Delone and Mclean Information Systems Success Model 1992. The researchers have found the success of e-Learning portals also depended on characteristics of students such as grit and perseverance in pursuing the course without quitting by adopting appropriate learning strategies.

According to Ho, A.D. et al. (2013), in spite of massive registrations happening in such courses, only very few participants complete the course successfully (5%). Around 35% of the registrants never engaged in the course, and 55% of the registrants engaged with less than 50 percent of the course content, and only 5% of the participants engaged with more than half the course content. Ho, A.D. et al. (2015) made further studies on the MOOC phenomena and reported that 68 courses have an enrollment of 1.7 million participants in the first three years. The initial MOOC emphasis was on large enrollment, low certification rate, and well-educated registrants. They categorized MOOC participants as online viewers, online explorers, and online certifiers. They warned that MOOC will lose its significance if control is exercised to restrict the
participants in order to improve the retention rates. Their analysis revealed the existence of a strong correlation between certified and explored states of online learners. Ho, A.D. et al. (2015) opined that overall certification rates alone cannot become a useful target metrics for MOOCs. According to them, learning takes place due to the participants’ efforts and involvement with the course. The experimental results prove the hypothesis H9 that the student engagement positively impacts student learning outcome.

6.6 DISCUSSION ON MULTI-FACULTY MODEL RESULTS

The experiments on the multi-faculty model were done by forming the experimental groups in three types in order to study the effect of online Portal “PIAZZA” on variances due to faculties and Gender. The classifications are grouped as “PIAZZA Effect”, “Faculty Effect” and Gender Effect. The results of experiments done on the Multi-Faculty model, it has been proved that there is a significant difference between the academic success of the students accessing the online portal “PIAZZA” and those students not accessing. These results match research work done by Gencturk, A.T. et al. (2017) who did experimentation to find the effects of Web 2.0 technologies in Programming Languages course on the academic success. The independent variable of research is the learning method supported by face-to-face and cooperative learning method supported by face-to-face and with web 2.0 technologies. The dependent variable is the academic success. It has been experimentally proved by the researchers that the students of the experimental group reported more academic success than the students of the control group. According to Wilson, D. et al. (2011), the experimental results on online versus traditional, online completers had earned significantly greater college credit hours than face-to-face completers (F=2.76, df =3/97, p < .01). Wong, W.K. et al. (2016) made a study on E-Learning versus
traditional Learning among Electronic Engineering students. Their study revealed that there is a significant difference between the online version of the course on operational amplifiers and traditional teaching method for the same course. The students performed better in the online version of the course.

It can be inferred that females (Both in control and experimental groups) contributed a higher score than males and thereby contributed to an improvement in the total mean score. First, it can be inferred that there is an improvement in the Mean score of the students who have taken up the online course (both boys as well as girls). Secondly, it can be inferred that the females in the control and experimental groups contributed higher score than males and, thereby contributed to an improvement in the total mean score. This research study contributed to the evolution of the Multi-Faculty Self-Regulating e-Learning Framework. The experimental results prove the hypothesis H6 that the Multi-Faculty Model positively impacts faculty empowerment.

Chapter 6 presented the discussion on results of the experiments of the Factor analysis on Self-Regulated-Learning (SRL), Sentiment Analysis, Web Usage Pattern Analysis, Social Networking Analysis, and Validation of the Multi-Faculty model. Discussions on the experimental results provided empirical evidence for the effectiveness of the proposed self-regulating e-Learning Framework. This chapter also presented the discussion on the results of the univariate ANOVA analysis on student performance in Harvard and MIT massive open online courses. These findings empirically proved that intervention such as efforts in accessing course material in the learning process contributes to higher improvement in learning outcomes.