Academic Achievement of Senior Secondary School Students

An Analysis on the basis of Self-regulated Learning and Some Demographic Variables

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Abstract

The present study was undertaken to examine the academic achievement of senior secondary school students in relation to self-regulated learning and demographic variables (type of school and gender). Academic achievement was treated as a dependent variable whereas self-regulated learning (High, Average and Low), and demographic variables — type of school (Government and Private) and gender (Male and Female) — were treated as independent variables. Descriptive survey method was employed for the present study. A sample of 600 students was taken using multi-stage stratified random sampling technique. Self-regulated Learning Scale by Gupta and Mehtani (2017) was used to collect the data and Three-way ANOVA with 3×2×2 factorial design was used to analyse the data. Levene's Test of Homogeneity of Variance was also applied to test the assumption of homogeneity of variance for ANOVA. Main effect of self-regulated learning, type of school and gender on academic achievement of senior secondary school students was found to be significant. No significant interaction effect of self-regulated learning and gender was reported on academic achievement of senior secondary school students. On the other side, significant interaction effect of self-regulated learning and type of school and type of school and gender was reported on academic achievement of senior secondary school students. Triple interaction effect of self-regulated learning, type of school and gender on academic achievement of senior secondary school students was found to be insignificant.

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Introduction

In the present era of globalisation and technological revolution, education is considered as the first step for every human activity. It plays a vital role in the development of human capital and is linked with an individual's well-being and opportunities for better living (Battle and Lewis, 2002). It is the most persuasive mechanism for the advancement of human beings which widens, enriches and improves an individual's image of the future. It is the principle instrument in awakening the child to cultural values, preparing for later professional training and also in helping to adjust to the environment.

Education develops an individual like a flower and has been regarded as a source of illumination and power. It nurtures the inquisitiveness and curiosity in individuals. It is education that brings confidence in child to take decisions, to face the various situations and also to accept successes and failures in life. In fact, a man without education is no more than an animal.

Today, the world is becoming more and more competitive and quality of performance is the key factor for personal progress. Excellence, particularly in academic area, is seen as an important aspect. It has been noticed that those who have better academic achievement are better placed in the society. Academic achievement holds a cardinal place in the field of education and is considered as an outstanding inducement for the progress of individuals. It is the acquisition of knowledge, understanding and skills in a specified academic subject or group of subjects and also the most desirable outcome of school life. It is an index of students' performance, teachers' efforts and attainment of educational objectives. As it is the unique responsibility of all educational institutions to promote scholastic achievement of the students, all the activities of school revolve around one chief aim, i.e., maximising the academic achievement of the students. Administrators, educators, curriculum planners, teachers and students work to make teaching-learning process feasible for academic excellence. Thus, there is a need to know the factors which contribute towards high achievement and also the factors which act as barriers towards attainment of high academic achievement.

Home environment, self-regulated learning, gender, type of school, parental support, locality, study habits, academic stream, etc., have their significant effect on academic achievement of the students. Williams and Hellman (2004) concluded that student's self-regulation is generally accepted as an important construct in students' success. On the other hand, Pelt (2008) found that there exists no significant relationship between self-regulated learning and academic achievement. However, the results showed that high-achievers used more self-regulated learning and

more advanced strategies than the low achieving students. Achufusi-Aka and Offiah (2010) found that there exists a significant difference in the academic achievement of students exposed to academic self-regulation and the students taught with lecture method. Adetayo and Kiadese (2011) found that parental involvement is the predictor of students' achievement in financial accounting and significant relationship exists between parental involvement and academic achievement of the students. Chika, Obodo and Okafor (2015) found that self-regulated learning strategies enhanced higher students' achievement in basic science than the conventional method. Agustiani, Cahyad and Musa (2016) concluded that self-regulation of learning and academic achievements are positively correlated which implies that if one of these variables experiences a positive or negative change, the other two will also experience change.

Review of literature makes it clear that only a few researches have been done which focus on the effect of self-regulated learning on academic achievement of students. Not a single research is there to know the main effects and interaction effects of self-regulated learning, type of school and gender on academic achievement of senior secondary school students. Thus, the present study is an endeavour to investigate the academic achievement among senior secondary school students with reference to self-regulated learning and demographic variables (type of school and gender).

Variables Used

- Dependent Variable: Academic Achievement
- Independent Variables: Self-regulated Learning, Demographic Variables (Type of School and Gender)

Objectives of the Study

1. To study the main effect of: (a) self-regulated learning; (b) type of school; and (c) gender on academic achievement of senior secondary school students.
2. To study the interaction effect of: (a) self-regulated learning and type of school; (b) type of school and gender; and (c) self-regulated learning and gender on academic achievement of senior secondary school students.
3. To study the interaction effect of self-regulated learning, type of school and gender on academic achievement of senior secondary school students.

Hypotheses of the Study

$\mathbf{H_{01}}$: There exists no significant effect of: (a) self-regulated learning; (b) type of school; and (c) gender on academic achievement of senior secondary school students.

$\mathbf{H_{02}}$: There exists no significant interaction effect of: (a) self-regulated learning and type of school; (b) type of school and

gender; and (c) self-regulated learning and gender on academic achievement of senior secondary school students.

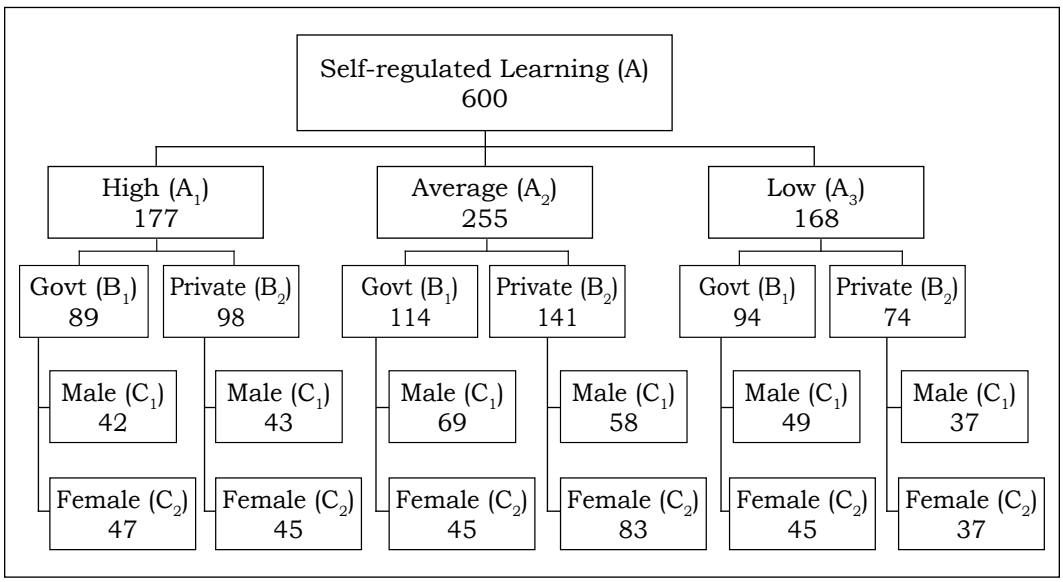
$\mathbf{H_{03}}$: There exists no significant interaction effect of self-regulated learning, type of school and gender on academic achievement of senior secondary school students.

Design and Methodology

In the present study, descriptive survey method was used. Multi-stage stratified random sampling technique was used to select the sample of 600 senior secondary school students of Haryana. The 3×2×2 factorial randomised group design was used to analyse the data. The sample was further stratified on the basis of self-regulated learning, i.e., High (177), Average (255) and Low (168); type of school, i.e., Government (297) and Private (303); and also on the basis of gender, i.e., Male (302) and Female (298). Distribution of the sample on the basis of self-regulated learning, type of school and gender has been depicted next.

Tool Used

Self-regulated Learning Scale by Gupta and Mehtani (2017) was used to assess the level of self-regulated learning among senior secondary school students. This scale consists of 48 statements to measure self-regulated learning of the students with six dimensions — self-awareness, planning and goal-setting, self-monitoring, self-control, self-evaluation and self-modification. Test-retest reliability of the scale is



0.88 and Split-half reliability is 0.982. The scale has high construct validity which ranged from 0.503 to 0.596.

Academic achievement of the students was determined on the basis of marks obtained in previous class (Class 10 marks).

Statistical Techniques Used

The data was analysed using descriptive as well as inferential statistics. The Three-way Analysis of Variance (ANOVA) with 3×2×2 factorial design was computed using SPSS version 20 to study the main effects and interaction effects of the independent variables, i.e., self-regulated learning, type of school and locality on academic achievement of senior secondary school students. Levene's Test of Homogeneity of Variance was used to test the assumption of homogeneity of variance before applying Three-way ANOVA. Wherever F-value was found significant, 't'-test was employed for further investigation.

Data Analysis and Interpretation

The objective of the present study was to find out the main and interaction effects of self-regulated learning, type of school and gender on academic achievement of senior secondary school students. For this, the data was subjected to analysis of variance (ANOVA) of a 3×2×2 factorial study with a randomised group design. The independent variables 'self-regulated learning', 'type of school' and 'gender' were coded as A, B and C respectively. The independent variable 'self-regulated learning' varied into three ways as: High (A_1), Average (A_2) and Low (A_3). On the other hand, independent variables 'type of school' and 'gender' varied into two ways as: Government (B_1) and Private (B_2); and Male (C_1) and Female (C_2) respectively. The Mean and Standard Deviation (S.D.) of different sub-samples have been presented in Table 1 and Figure 1. The summary of ANOVA (3×2×2 factorial design) has also been presented in Table 2, which is analysed in terms of main effects and interaction effects.

Table 1
Mean and S.D. of Sub-samples of 3×2×2 Factorial Design for Academic Achievement of Senior Secondary School Students in relation to Self-regulated Learning (A), Type of School (B) and Gender (C)

Self-regulated Learning (A)	Type of School (B)	Male (C_1)	Female (C_2)
High (A_1)	Govt (B_1)	N= 42 Mean=68.00 SD=14.014	N= 47 Mean=76.04 SD=12.539
	Private (B_2)	N= 43 Mean=81.35 SD= 11.848	N= 45 Mean=83.91 SD=13.828

Average (A_2)	Govt (B_1)	N= 69 Mean=62.23 SD=11.043	N= 45 Mean=69.69 SD=12.544
	Private (B_2)	N= 58 Mean=68.62 SD=11.231	N=83 Mean=70.96 SD=11.466
Low (A_3)	Govt (B_1)	N= 49 Mean=58.63 SD=10.136	N= 45 Mean=65.80 SD=12.195
	Private (B_2)	N= 37 Mean=64.65 SD=13.00	N= 37 Mean=66.24 SD=13.604

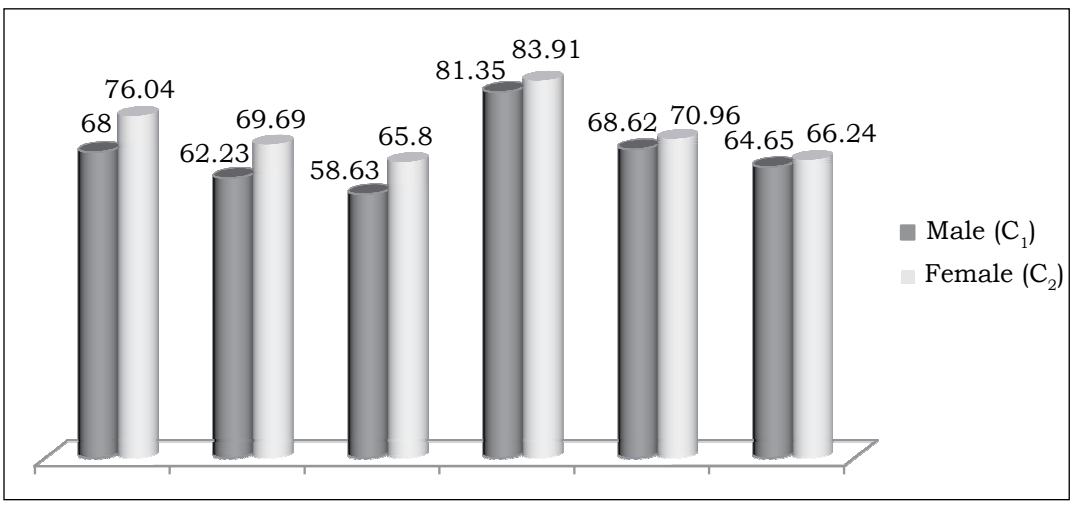


Figure 1. Mean Scores of Sub-samples of 3×2×2 Factorial Design for Academic Achievement of Senior Secondary School Students in relation to Self-regulated Learning, Type of School and Gender

Table 2
Summary of Three-way ANOVA (3×2×2 Factorial Design) for Academic Achievement of Senior Secondary School Students in relation to Self-regulated Learning, Type of School and Gender

Sources of Variance	df	Sum of Squares (SS)	Mean Sum of Squares (MSS)	F-ratio
A (Self-regulated Learning)	2	16772.090	8386.045	56.677**

B (Type of School)	1	4931.604	4931.604	33.330**
C (Gender)	1	3359.130	3359.130	22.703**
A x B Interaction	2	1528.192	764.096	5.164**
B x C Interaction	1	1032.041	1032.041	6.975**
C x A Interaction	2	18.204	9.102	0.62 (NS)
A x B x C Interaction	2	1.545	1471.648	0.005 (NS)
Between Cells Within Cells	11 588	116025.398 87001.639	..... 147.962	
Total	599			

*Notes: ** Significant at 0.01 level; * Significant at 0.05 level; NS= Not Significant*

Main Effect of Self-regulated Learning, Type of School and Gender on Academic Achievement of Senior Secondary School Students

Self-regulated Learning (A)

From Table 2, it is clear that F-ratio for the main effect of self-regulated learning on academic achievement of senior secondary school students (56.677) is significant at 0.01 level leading to the conclusion that self-regulated learning has a significant effect on academic achievement of senior secondary school students. Therefore, the null hypothesis H_{01}(a), "There exists no significant effect of self-regulated learning on academic achievement of senior secondary school students," is rejected. Further, t-test was employed to find out the significance of difference between mean academic achievement scores for different groups. The results have been shown in Table 3.

Table 3
t-values for the Mean Academic Achievement Scores of Senior Secondary School Students with respect to Self-regulated Learning

Self-regulated Learning		N		Mean		S.D.		t-value
HIGH	LOW	177	168	77.42	63.55	14.296	12.465	9.63**
AVERAGE	LOW	255	168	67.84	63.55	11.964	12.465	3.52**
HIGH	AVERAGE	177	255	77.42	67.84	14.296	11.964	7.31**

*Notes: ** Significant at 0.01 level; *Significant at 0.05 level; NS: Not Significant*

Table 3 illustrates that t-value for the mean academic achievement scores of senior secondary school students belonging to high and low self-regulated learning groups (9.63) is significant at 0.01 level. In terms of mean, it was found that mean academic achievement scores of senior secondary school students with high self-regulated learning (77.42) are higher than those students with low self-regulated learning (63.55). It shows that the students with high self-regulated learning have high academic achievement as compared to the students with low self-regulated learning. Table 3 also reveals that t-value for the mean academic achievement scores of senior secondary school students belonging to average and low self-regulated learning groups (3.52) is significant at 0.01 level. Mean academic achievement scores of senior secondary school students with average self-regulated learning (67.84) are higher than those students with low self-regulated learning (63.55). It shows that senior secondary school students with average self-regulated learning have high academic achievement as compared to the students with low self-regulated learning. It is also clear from Table 3 that t-value for the mean academic achievement scores of senior secondary school students belonging to high self-regulated learning and average self-regulated learning groups (7.31) is significant at 0.01 level. Mean academic achievement scores of senior secondary school students with high self-regulated learning (77.42) are higher than senior secondary school students with average self-regulated learning (67.84) or low self-regulated learning (63.55). It shows that senior secondary school students with high self-regulated learning have more academic achievement as compared to their counterparts.

Type of School (B)

It is observed from Table 2 that F-ratio for the main effect of type of school on academic achievement of senior secondary school students (33.330) is significant at 0.01 level, which indicates that type of school has a significant effect on academic achievement of senior secondary school students. Therefore, the null hypothesis H_{01}(b), "There exists no significant effect of type of school on academic achievement of senior secondary school students," is rejected. Further, t-test was employed to find out the significance of difference between mean academic achievement scores for different groups. The results have been shown in Table 4.

Table 4
t-value for the Mean Academic Achievement Scores of Government and Private Senior Secondary School Students

Group	N	Mean	S.D.	t-value
Govt	297	66.31	13.140	5.63**
Private	303	72.56	13.983	

*Notes: ** Significant at 0.01 level;*
**Significant at 0.05 level;*
NS: Not Significant

It can be inferred from Table 4 that t-value for the mean academic achievement scores of government and private senior secondary school students (5.63) is significant at 0.01 level. In the context of mean scores, it is found that the mean academic achievement scores of private senior secondary school students (72.56) are higher than mean academic achievement scores of government senior secondary school students (66.31).

Gender (C)

It is clear from Table 2 that F-ratio for the main effect of gender on academic achievement of senior secondary school students (22.703) is significant at 0.01 level, which shows that gender has a significant effect on academic achievement of senior secondary school students. Therefore, the null hypothesis H_{01} (c), "There exists no significant effect of gender on academic achievement of senior secondary school students," is rejected. Further, t-test was employed to find out the significance of difference between mean academic achievement scores for different groups. The results have been shown in Table 5.

Table 5
t-value for the Mean Academic Achievement Scores of Male and Female Senior Secondary School Students

Group	N	Mean	S.D.	t-value
Male	298	66.76	13.569	4.81**
Female	302	72.15	13.760	

*Notes: ** Significant at 0.01 level;*
**Significant at 0.05 level;*
NS: Not Significant

It can be inferred from Table 5 that t-value for the mean academic achievement scores of male and female senior secondary school students (4.81) is significant at 0.01 level. In the context of mean scores, it is found that the mean academic achievement scores of female senior secondary school students (72.17) are higher than mean academic achievement scores of male senior secondary school students (66.76).

Double Interaction Effect of Self-regulated Learning, Type of School and Gender on Self-regulated Learning of Senior Secondary School Students

Self-regulated Learning (A)×Type of School (B)

It is evident from Table 2 that F-ratio between self-regulated learning and type of school (5.164) is significant at 0.01 level, which indicates that self-regulated learning (A) and type of school (B) interact with each other and have a significant interaction effect on academic achievement of senior secondary school students. Therefore, the null hypothesis H_{02}(a), "There exists no significant interaction effect of self-regulated learning and type of school on academic achievement of senior secondary school students," is rejected. Further, t-test was employed to find out the significance of difference between mean academic achievement scores for different groups. The results have been shown in Table 6.

Table 6
t-values for Mean Academic Achievement Scores of Senior Secondary School Students for Different Groups of Self-regulated Learning (A) × Type of School (B)

Groups	N		Mean		S.D.		t-value
A_1B_1 vs A_2B_1	89	114	72.25	65.18	13.783	12.168	3.82**
A_1B_2 vs A_2B_2	88	141	82.66	70.00	12.889	11.389	7.54**
A_1B_1 vs A_2B_2	89	141	72.25	70.00	13.783	11.389	1.29(NS)
A_1B_2 vs A_2B_1	88	114	82.66	65.18	12.889	12.168	9.77**
A_1B_1 vs A_1B_2	89	88	72.25	82.66	13.783	12.889	5.18**
A_2B_1 vs A_2B_2	114	141	65.18	70.00	12.168	11.389	3.23**
A_2B_1 vs A_3B_1	114	94	65.18	62.06	12.168	11.676	3.12**
A_2B_2 vs A_3B_2	141	74	70.00	65.45	11.389	13.239	2.51*
A_3B_1 vs A_3B_2	94	74	62.06	65.45	11.676	13.239	1.73 (NS)
A_2B_1 vs A_3B_2	114	74	65.18	65.45	12.168	13.239	0.14 (NS)
A_2B_2 vs A_3B_1	141	94	70.00	62.06	11.389	11.676	5.16**
A_1B_1 vs A_3B_1	89	94	72.25	62.06	13.783	11.676	5.39**
A_1B_2 vs A_3B_2	88	74	82.66	65.45	12.889	13.239	8.35**
A_1B_1 vs A_3B_2	89	74	72.25	65.45	13.783	13.239	3.21**
A_1B_2 vs A_3B_1	88	94	82.66	62.06	12.889	11.676	11.26**

*Notes: ** Significant at 0.01 level; * Significant at 0.05 level; NS: Not Significant; A_1= High SRL; A_2=Average SRL; A_3 = Low SRL; B_1= Govt and B_2= Private*

From a close perusal of Table 6, it is evident that t-values 3.82, 7.54, 9.77, 5.18, 3.23, 3.12, 5.16, 5.39, 8.35, 3.21 and 11.26 for the groups (A_1B_1 vs A_2B_1), (A_1B_2 vs A_2B_2), (A_1B_2 vs A_2B_1), (A_1B_1 vs A_1B_2), (A_2B_1 vs A_2B_2), (A_2B_1 vs A_3B_1), (A_2B_2 vs A_3B_1), (A_1B_1 vs A_3B_1), (A_1B_2 vs A_3B_2), (A_1B_1 vs A_3B_2) and (A_1B_2 vs A_3B_1) respectively are found significant at 0.01 level. Further, it is clear from Table 6 that t-value 2.51 for the group (A_2B_2 vs A_3B_2) is significant at 0.05 level. Table 6 also reveals that t-value 1.29, 1.73 and 0.14 for the groups (A_1B_1 vs A_2B_2), (A_3B_1 vs A_3B_2), and (A_2B_1 vs A_3B_2) respectively is not significant at 0.01 level. The mean achievement scores of secondary school students for different groups of self-regulated learning and gender have also been presented in Figure 2.

Type of School (B) × Gender (C)

Table 2 further concludes that F-ratio between type of school and gender (6.975) has been found significant at 0.01 level, which leads to the inference that type of school (B) and

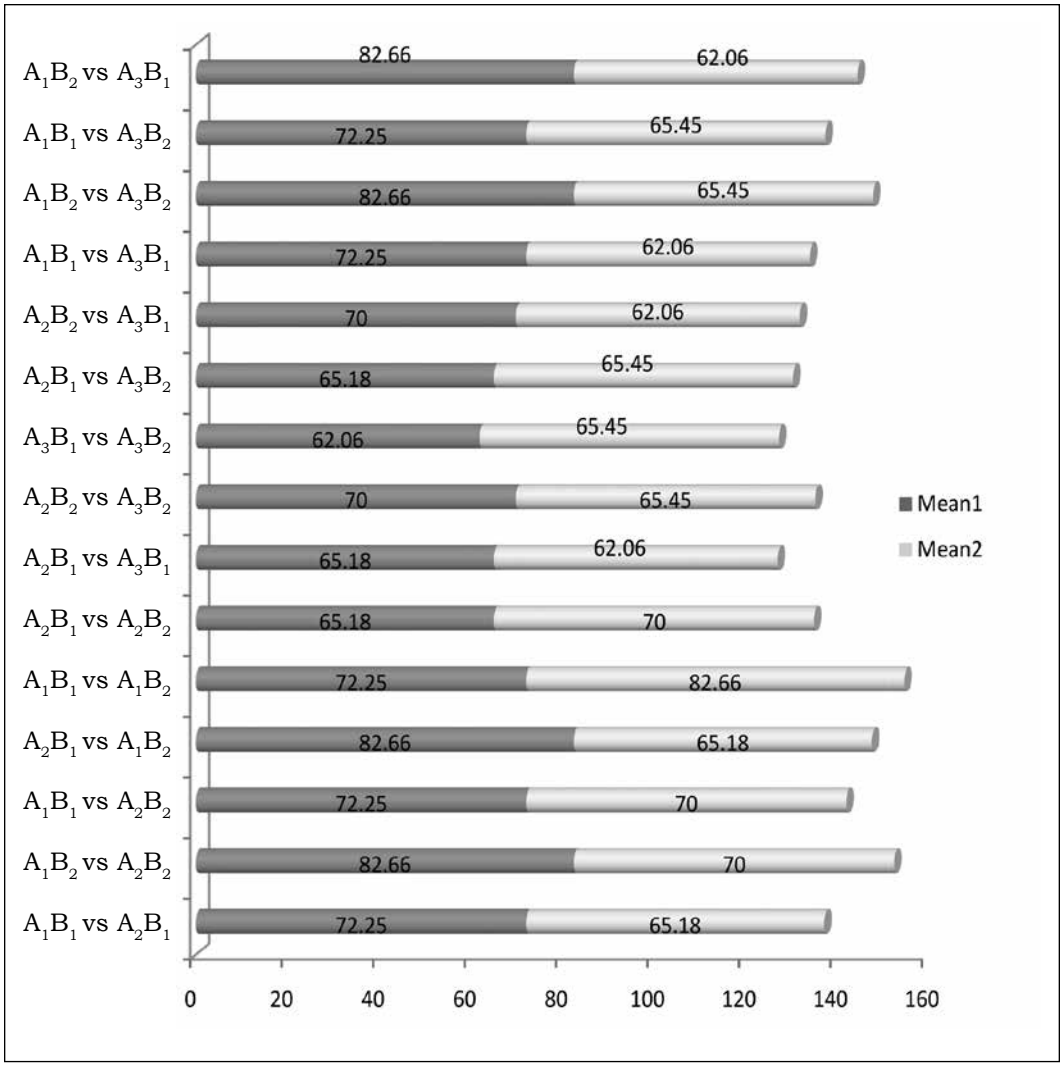


Figure 2. Mean Academic Achievement Scores of Senior Secondary School Students for Different Groups of Self-regulated Learning (A) × Gender (B)

gender (C) interact with each other. Therefore, the null hypothesis H_{02}(b), "There exists no significant interaction effect of type of school and gender on academic achievement of senior secondary school students," is rejected. Further, t-test was employed to find out the significance of difference between mean academic achievement scores for different groups. The results have been shown in Table 7.

Table 7
t-values for Mean Academic Achievement Scores of Senior Secondary School Students for Different Groups of Type of School (B)×Gender (C)

Groups	N		Mean		S.D.		t-value
B_1C_1 vs B_2C_1	160	138	62.64	71.52	12.100	13.659	5.88**
B_1C_2 vs B_2C_2	137	165	70.59	73.44	13.051	14.232	1.82 (NS)
B_1C_1 vs B_2C_2	160	165	62.64	73.44	12.100	14.232	7.35**
B_1C_2 vs B_2C_1	137	138	70.59	71.52	13.051	13.659	0.58 (NS)
B_1C_1 vs B_1C_2	160	137	62.64	70.59	12.100	13.051	5.41**
B_2C_1 vs B_2C_2	138	165	71.52	73.44	13.659	14.232	1.19 (NS)

*Notes: ** Significant at 0.01 level; * Significant at 0.05 level; NS: Not Significant;*
B_1 = Govt; B_2 = Private; C_1 = Male; C_2 = Female

Table 7 discloses that t-values 5.88, 7.35 and 5.41 for the groups (B_1C_1 vs B_2C_1), (B_1C_1 vs B_2C_2) and (B_1C_1 vs B_1C_2) respectively have been found significant at 0.01 level leading to the conclusion that these groups differ significantly on academic achievement. Table 7 further indicates that t-values 1.82, 0.58 and 1.19 for the groups (B_1C_2 vs B_2C_2), (B_1C_2 vs B_2C_1) and (B_2C_1 vs B_2C_2) have not been found significant which means Govt female (B_1C_2) and Private female (B_2C_2); Govt female (B_1C_2) and Private male (B_2C_1); and Private male (B_2C_1) and Private female (B_2C_2) senior secondary school students do not differ significantly with respect to academic achievement. The mean achievement scores of secondary school students for different groups of type of school and gender have also been presented in Figure 3.

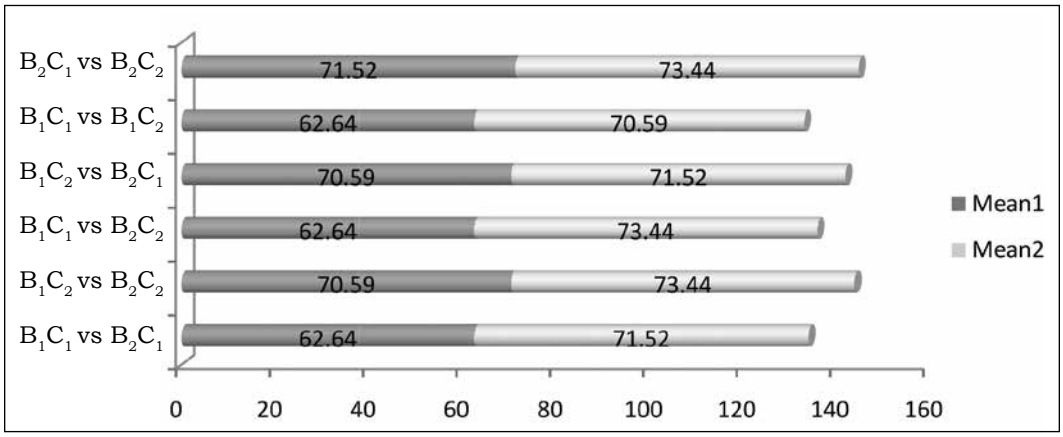


Figure 3. Mean Scores for Interaction Effect of Type of School and Gender on Academic Achievement of Senior Secondary School Students

Self-regulated Learning (A) × Gender (C)

A glance at Table 2 indicates that F-ratio between self-regulated learning and gender (0.062) has not been found significant at 0.05 level leading to the conclusion that self-regulated learning (A) and gender (C) do not interact with each other. Therefore, the null hypothesis H_{02}(c), "There exists no significant interaction effect of self-regulated learning and gender on academic achievement of senior secondary school students," is accepted.

Triple Interaction Effect of Self-regulated Learning, Type of School and Gender on Academic Achievement of Senior Secondary School Students

Self-regulated Learning (A) × Type of School (B) × Gender (C)

Table 2 further indicates that the F-ratio (0.005) for the triple interaction effect of self-regulated learning, type of school and gender on academic achievement of senior secondary school students is not significant at 0.05 level leading to the inference that self-regulated learning, type of school and gender do not have interaction effect on academic achievement of senior secondary school students. Therefore, the null hypothesis H_{03}, "There exists no significant interaction effect of self-regulated learning, type of school, and gender on academic achievement of senior secondary school students," is accepted.

Discussion of the Results

The present study was conducted to study the academic achievement of senior secondary school students in relation to self-regulated learning and demographic variables (type of school and gender). The findings of the present study are in consonance or contrast with the findings of following studies in the area. The results of the study highlighted that self-regulated learning has a significant effect on academic achievement of senior secondary school students. The present finding is in consonance with the findings of Kosnin (2007), Matuga (2009) , Mutua (2010) Tavakolizadeh and Ebrahimi-Qavam (2011) who also found that the students who had high scores on self-regulated learning had overall high academic achievement score and the students who had low scores on self-regulated learning were found to be low academic achievers. In the present study, it was found that senior secondary school students with high self-regulated learning have more academic achievement as compared to their counterparts. The reason for the difference between academic achievement scores of senior secondary school students with different level of self-regulated learning can be that more the level of self-regulated learning, more he/she is able to monitor, control, evaluate and modify his/her learning, which enables them to maximise their academic achievement.

The present study also established that there exists significant effect of type of school on the academic achievement of senior secondary school students. The present finding is in consonance with the finding of Singh (2014) who found that there exists significant difference between government and private students with regard to their academic achievement. It was further found that private senior secondary school students have academic achievement higher than their counterparts. This finding is also in agreement with the finding of Olatoye (2009) who also found that private school students performed better than their counterparts.

It was found that there exists significant effect of gender on academic achievement of senior secondary school students. This result is in consonance with the result of Powell (2004), Chaturvedi (2009) and Reddy and Reddy (2016) who also found that significant gender difference exists in the academic achievement of school students. It was found that the mean academic achievement scores of female senior secondary school students are higher than male senior secondary school students. The present finding is in agreement with the findings of Karthigeyan and Nirmala (2012) and Hanafi and Noor (2016) who also concluded that academic achievement of the female students is better as compared to male students. Significant interaction effect of self-regulated learning and type of school and type of school and gender on academic achievement of senior secondary school students was found. It is generally seen that female students pay more attention to their studies and also students with more self-regulated learning exhibit high academic achievement. Many researchers have also reported the significant effect of type of school on the academic achievement of the students. This may be the reason for having significant interaction effect of self-regulated learning and type of school and type of school and gender on the academic achievement of the students.

Conclusion

Self-regulation is conceptualised as a process whereby students actively construct their own knowledge and skills; and manage their own learning. In the present study, self-regulated learning was found to be one of the most important factors influencing learning and academic success of the students. Thus, in order to promote self-regulated learning among students, self-regulated learning instructional strategies can be integrated within the curriculum. To educate teachers about the use of self-regulated learning instructional strategies, conferences/ seminars/ workshops can be organised regularly so that they may be able to develop this among students. As the academic achievement of female school students was found higher than male school students and significant interaction effect of self-regulated

learning and type of school was also found, so guidance and counselling services may be arranged specially for male students to enhance their self-regulated learning and academic achievement.

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