

In the current research titled: Influence of perceived attributes and perceived emotional climate on academic performance of students - An exploratory study. An attempt is made to understand the underpinning thoughts and feelings that may not just accompany but determine academic performance at various levels of achievement. The variables that have been included for this study are as follows: Learned optimism, mindset, low frustration tolerance, metacognitive awareness, perceived peer empathy and perceived teacher empathy.

**Objectives:**

- I. To explore non academic cognitive factors linked to academic performance.
- II. To identify adaptive and maladaptive non academic cognitive profile associated with academic performance.
- III. To develop, execute and test the skill building program based on the model proposed, interconnecting the selection of non academic cognitive factors to facilitate adaptive non academic cognitive profile and academic achievement.

**Research questions:**

Based on the research objectives stated above, the following specific research questions have been framed to be investigated in the course of the study. The current study has been executed in two phases.

**Phase I:** Research questions have been delineated below:

- 1a. Does explanatory style influence academic performance?
- 1b. Does mindset influence academic performance?
- 1c. Does Low frustration tolerance influence academic performance?
- 1d. Does metacognitive awareness influence academic performance?
- 1e. Does perceived peer empathy influence academic performance?
- 1f. Does perceived teacher empathy influence academic performance?

1g. What is the non academic cognitive profile associated with high/low academic achievement?

**Phase II:** research questions have been delineated below:

2a. Does the skill building program, effectively help students develop facilitative non academic cognitive factors linked to academic performance?

2b. Does expectation of the participating students in the skill building program, enhance academic performance?

2c. Does the skill building program improve the participating students' academic achievement?

**Hypotheses:**

As the Phase I of the current research study is exploratory in nature. Null Hypotheses have been formulated to test the relationship between the selection of independent variables and dependent variable.

**Phase I:**

1. There is no relationship between explanatory style and academic performance.
2. There is no relationship between mindset and academic performance.
3. There is no relationship between frustration tolerance and academic performance.
4. There is no relationship between metacognitive awareness and academic performance.
5. There is no relationship between perceived peer empathy and academic performance.
6. There is no relationship between perceived teacher empathy and academic performance.

**Phase II:** After the skill building program:

Directional hypotheses have been used in phase II as the objective of phase II is to test the effectiveness of the skill building program, developed on the basis of the model suggesting the interplay between the non academic cognitive factors.

1. There is a difference in explanatory style after the skill building program.
2. There is a difference in mindset after the skill building program.
3. There is a difference in metacognitive awareness after the skill building program.
4. There is a difference in frustration tolerance after the skill building program.
5. There is a difference in perceived teacher empathy and academic performance.
6. There is a difference in perceived peer empathy and academic performance.
7. There is no relationship between expectation and academic performance.

The current chapter discusses the results of the study, in the following sections.

### **Phase I**

**Section 5.I:** Discusses the sample characteristics, in terms of sample distribution with regard to age, gender and college.

**Section 5.II:** Discusses the descriptive statistics on Independent variables, to determine, mean, standard deviation, minimum score, maximum score, kurtosis and skewness.

**Section 5.III:** Presents the discussion on the analysis of data using inferential statistics:

**Subsection 5.III.A:** Discusses the results arrived at using Pearson product-moment correlation to test the hypotheses of Phase I.

**Subsection 5.III.B:** Discusses the results arrived at using multiple regression to check for the proposed model strength.

**Subsection 5.III.C:** Discusses the results arrived at using logistic regression to determine, the independent variable/s most predictive of academic performance at high/low levels of achievement.

**Subsection 5.III.D:** Discusses the results arrived at using independent t test to differentiate between the high and low academic achievement groups and identify the Non-academic cognitive profile of the two groups.

## **Phase II**

**Section 5.IV:** Presents the discussion of the data analysed using inferential statistics:

**Subsection 5.IV.A:** Discusses the results arrived at using t tests to verify phase II hypotheses 1-6, to determine any significant difference between the experimental and control groups at pre, post and follow up assessment.

**Subsection 5.IV.B:** Discusses the results arrived at using Pearson product-moment correlation to test phase II hypothesis 7, for checking proposed relationship between the independent variable – expectation and the dependent variable – academic performance.

**Subsection 5.IV.C:** Discusses the results arrived at using t tests to check if Academic achievement of the experimental group has enhanced in the duration of the year.

## **Phase I**

**Section 5.I:** Discusses the sample characteristics, in terms of sample distribution across gender, age and college.

Table 4.1 and graph 4.1 presents the sample population (n=505) segregated according to gender. Of the sample 59% are female and 41% are male. There is a difference of 10% in the gender distribution.

To further understand the gender differences, an independent t test was calculated for the means of the two groups on the dependent and independent variables. As shown in tables 4.1a and 4.1b the groups show a high significant difference for most of the independent and dependent variables with the exception of the independent variables mindset, low frustration tolerance and perceived peer empathy.

Female students of the group have recorded higher levels of optimism, better metacognitive awareness skills, higher academic scores and perceive their teachers as more empathetic than male students of the group. Whereas male students have recorded lower levels of frustrations and perceive their peers to be more empathetic than female students. Both groups show similar mindset orientation, indicating that the processes that create and maintain this behaviour work undifferentiating between the two genders. The results are in line with Dweck (2006).

The above recordings are in line with general perceptions associated with the gender groups. Female students often maintain a better academic performance and related study skills and are often considered to be more obedient and amicable of the two genders by the teachers. Both female and male students have recorded similar levels of frustration tolerance, considering academic performance and better perceived teacher empathy, it could be said that females have more adaptive coping behaviours as compared to boys. Perhaps female students usually record higher incidence of anxiety and depression levels internalize the frustration. Whereas boys, considering their lower perceived empathy of teachers might, act out their frustration resulting in receiving negative attention by teachers.

Both groups record similar perceived peer empathy levels. Considering that conversation among females tend to be “feelings” oriented whereas conversational content among boys are (effective/ineffective) “problem-solving” oriented. It is possible that in view of the better academic performance, female students tend to deal with their frustrations by interacting with peers. Whereas boys, keeping in mind the lower perceived teacher empathy may choose to act out in class in order to deal with their frustration.

Also male student especially adolescent population are often distracted by their peer oriented activities and tend to slack in their academic performance under decreased supervision at college. As displayed in their comparatively lower academic mean score, lower levels of perceived teacher empathy.

The mindset orientation perhaps plays a similar role in the interaction of the above interweaving of variables among the two genders operating as a facilitator to academic performance.

As the current study's objective is to, understand the relation between the independent variables and academic performance and not how these variables differ among the gender groups. The gender differences in the scores of the independent variables will not be investigated as it is outside the parameters of current study. In phase II of the research study, which involves the experimental design to test the skill building program, the gender composition is controlled.

Table 4.2 and graph 4.2 presents the sample population segregated according to age. The major section of, population (72%) are 16 year olds, while 15 and 17 year olds together make a considerably minor group of (27%). While, 18 year olds comprise a negligible 1%. Therefore the average age of the group is calculated to be 16 years. So, age as a variable will not affect the research findings.

Table 4.3 and graph 4.3 presents sample distributed in terms of the data collected across different colleges situated in urban Bangalore. The largest collection of data from a single source is 29%, the other two sections are around 20% each while the rest three sections together account for over 30% of the data collection. As the colleges were matched in terms of syllabus followed, co-educational and the fee structure, the influence of the college-related variables on the research findings can be said to be controlled to an extent.

**Section 5 II:** Discusses the results of the descriptive statistics done on the group scores on dependent and independent variables.

Table 4.4 and graph 4.4 presents the descriptive statistics namely, mean, minimum, maximum, standard deviation, kurtosis and skewness scores for each of the variable. The

standard deviations, inform about the dispersion of the data. A larger standard deviation indicating a, higher dispersion.

The table 4.4 shows that optimism scores are the least dispersed scores while the academic achievement scores are the most widely dispersed. Indicating that, most students' optimism scores are better represented by the mean for optimistic score than the academic achievement scores. Indicating that, while optimism varies in a shorter range, academic achievement varies at a larger range.

A positive skewness is noted for optimism, mindset and perceived peer empathy. Indicating that, many students' scores lie below the calculated mean for the group. Denoting that most students are less optimistic possess lesser degree of growth oriented mindset and perceive their peers to be less empathetic than the group mean represents. The above is because there are a few students who have reported very high optimism, extremely higher degree of growth-oriented mindset and perceive very high peer empathy.

The skewness scores indicate a negative skewness for low frustration tolerance, metacognitive awareness, perceived teacher empathy and academic scores, indicating that most students lie on the right side of the mean. The negative skewness of scores denotes that most students have frustration levels higher than the mean denotes, with a few students reporting extremely low levels of frustration. While most students possess better metacognitive awareness, perceive their teacher to be more empathetic and tend to be above average academic scorers, than the group mean represents, a few demonstrate extremely low metacognitive awareness, perceived teacher empathy and are poor academic scorers.

A glance at the kurtosis scores reveal that the distribution of scores on all the variables is less than 3, indicating that less extreme values have been recorded when compared to a normal distribution curve and the scores are wider spread around the mean. Indicating that, most students have scores closer to the mean than the extremes.

**Section 5.III:** Inferential statistics: This section discusses the results obtained using inferential statistics. Different inferential statistical techniques have been used to verify individual hypothesis.

**Subsection 5. III. A** discusses the results of testing each individual hypothesis of phase I.

**Subsection 5. III. B** discusses the result of the proposed model strength and

**Subsection 5. III. C & D** discusses the non academic cognitive profile of high and low academic achievers.

**Subsection 5.III. A:** Pearson product-moment correlation was used to test the hypotheses of Phase I. This allowed for checking which of the proposed independent variables were significantly correlated to academic performance. Each hypotheses proposed at phase I has been individually discussed in the following subsections.

**Subsection 5.III. A. i:** Discusses the Hypothesis 1 of phase I, that states, ‘There is no relationship between explanatory style and academic performance’. Based on the correlation scores stated in Table 5.5, it is found that optimism is highly significantly correlated to academic performance. Thus **rejecting** the null hypothesis 1.

The findings are in line with the research studies presented in the review of literature. As denoted by the explanatory styles of the student, the more optimistic or hopeful a student tends to remain, they bounce back from impaired performance.

In accordance, with the three dimensions of, explanatory style namely, personal/others, temporary/permanent and specific/global. Optimistic explanatory style could enable students to view impaired performance as a temporary consequence, blame other sources like too much to study, too little time, unfair evaluations, questions were too tough or out of syllabus and contain the impaired performance to specific subjects rather than generalizing it. This enables students not to distort the experience of impaired performance, and stage a faster and emotionally less intense come back. Thus sustaining efforts and improving chances of performance.

Also, optimistic students tend to attribute desirable academic achievement to self, think of them as permanent and generalize their desirable performance in one on to others as well. Thus spreading the 'feel good' factor and generally improving and sustaining confidence levels achieved in one pedagogy, where they are performing desirably to other pedagogies where they may not be performing at desirable levels.

Therefore Optimistic students maximize on the 'success' of desirable achievements and counter the effects of 'impaired performance' by restricting its potency.

**Subsection 5.III.A. ii:** Discusses the testing of Hypothesis 2 of phase I, that states, 'There is no relationship between mindset and academic performance'. Based on, the correlation scores stated in the table 4.6 between Academic scores and mindset scores. The null hypothesis 2 is **accepted**.

The lack of correlation could be explained at two levels, the sensitivity of the tool and the role of mindset as a proposed mediator between optimism and academic achievement. One the sensitivity of the tool used to measure mindset, is more along the lines of a survey questionnaire, looking for opinions as compared to the highly specialized tool used to discriminate explanatory style, which uses a series of hypothetical situations to interpret patterns in the explanatory style.

Also the sensitivity of the tool could be compromised by students' choosing socially desirable attitudes towards the importance of hard work as opposed to inherent intelligence and not necessarily reflect their 'real' opinion. Therefore the tool would need to be sensitive to this phenomenon by incorporating a lie scale.

Another reason could simply mean that a growth oriented mindset, which advocates that ability grows with effort, may not play a mediating role to sustaining effort. Perhaps an optimistic explanatory style is enough to enable a student to bounce back and sustain effort in the face of impaired performance. In other words, as long as the student believes that there is hope, they sustain efforts thus improving the chances of his/her performance to change for the better. Consequently he/she would find strategies conducive for

sustaining effort thus bypassing the need for mindset. Mindset could be a more embedded attitude rather than an explicitly (worded) learnt skill, which is probably also acquired as a by product of hope, which in turn is the result of possessing an optimistic explanatory style.

**Subsection 5.III.A. iii:** Discusses the Testing of Hypothesis 3 of phase I, that states, ‘There is no relationship between low frustration tolerance and academic performance’. Based on, the correlation scores stated in the table 4.7, academic scores are not correlated to low frustration tolerance. Thereby accepting hypothesis 3.

The lack of correlation between low frustration tolerance and academic scores along with the negative skewness of the low frustration tolerance (as stated in the table 4.4) and high correlation between optimism and academic scores, could mean that though most students experience high levels of frustration, as long as they maintain an optimistic explanatory style, frustration levels do not influence academic performance.

Perhaps optimistic explanatory style buffers the intense feelings of frustration felt by most students (as indicated by negative skewness). As, students are able to talk their way out of frustration by perceiving impaired performance optimistically, they remain hopeful and sustain effort which is eventually rewarded.

**Subsection 5.III.A. iv:** Discusses the testing of Hypothesis 4 of phase I, that states, ‘There is no relationship between metacognitive awareness and academic performance’. Based on the correlations scores stated in the table 4.8 academic scores are highly significantly correlated to metacognitive awareness scores. Thereby **rejecting** the null hypothesis.

The high correlation between metacognitive awareness and academic scores is in line with research studies mentioned in review of literature. Highlighting the, influential role played by, knowledge and regulation of effective study habits in academic performance. Along with remaining optimistic about their efforts, students require the knowledge and

use of effective learning strategies. Perhaps these learning strategies play the role of the mediator rather than mindset and frustration regulation. Knowledge and regulation of learning strategies help translate intangible hopefulness derived from optimism into tangible academic performance.

To summarize, of the independent variables that comprise perceived attributes namely, explanatory style, mindset, low frustration tolerance and metacognitive awareness only explanatory style and metacognitive awareness were found to be highly significantly and positively correlated to academic performance. There was no correlation reported between mindset and low frustration tolerance with academic performance. Indicating that as long as a student remains optimistic and is metacognitively aware of learning strategies, irrespective of his/her frustration levels or their beliefs about their ability to perform, will continue efforts and eventually translate them to better academic performance.

**Subsection 5.III.A. v:** Discusses the testing of Hypothesis 5 of phase I, that states, ‘There is no relationship between perceived peer empathy and academic performance’. Based on the correlation scores stated in the table 4.9 academic scores are highly significantly but negatively correlated to perceived peer empathy scores.

The negative correlation between perceived empathy and academic performance could be because of the nature of discussions related to academics, being problem-centred rather than solution focused. Though the shared talk could facilitate empathy they do not facilitate the required effective problem solving skills. Thus peer interaction could be focusing more on ‘venting feelings’ rather than strategically resolving academic concerns. Such sharing in peer interaction could next improve interpersonal relations with peers. The improved interpersonal relations could further increase the instances of distractive behaviours in the student rather than encouraging task (academic) focused behaviours.

Thus perceived peer empathy though improves interpersonal relations that results in creating an emotionally safe space in the learning environment (probably)making it conducive for learning, it more often than not deviates or is counterproductive to learning as it results in activities that negatively influences task (academic) focused behaviours thus interrupting learning and consequently deteriorating academic performance.

**Subsection 5.III.A. vi:** Discusses the testing of Hypothesis 6 of phase I, that states, ‘There is no relationship between perceived teacher empathy and academic performance’. Based on the correlation scores stated in the table 4.10, academic scores are significantly related to perceived teacher empathy scores.

The significant correlation between academic scores and perceived teacher empathy highlights the role of teacher’s acceptance of student’s academic identity as being an important motivator for sustaining students’ academic efforts in the face of impaired academic performance.

In other words, students feeling understood and respected for their academic efforts consistently by their teachers, independent of their favourable or unfavourable academic performance bolsters their academic perseverance. Thus perceived teacher empathy might help students to draw confidence from their teacher’s empathetic view of their academic potential especially during diffident academic performance. This empathetic relationship could improve the approachability towards the teacher for academic related discussions, resulting the student in gaining valuable insights to better their academic performance.

The last two hypotheses (5 & 6) test the constructs (perceived peer empathy and perceived teacher empathy) that comprise the emotional climate of the learning environment. Both the components are found to be significantly (with perceived peer empathy at a higher level of significance) but correlated differently with academic performance. Perceiving teachers to be more empathetic than your peers has emerged to be more conducive to academic performance, while perceiving one’s peers as empathetic has counterproductive influence on academic performance.

Thus the discovered pattern of interpersonal dynamics (empathetic relationships with teachers as opposed to peers) allows for more academic-focused time, effort, reduces distractions and consequently improves academic performance.

**Subsection 5.III.B:** Discusses the results of Multiple Regression used to check for the proposed model strength. This statistical technique enables to understand, the network of the proposed independent variables functioning as predictor variables in estimating academic performance.

The VIF (variance inflation factors) indicates the multicollinearity among the independent variables. The highest VIF recorded is 1.3 which is indicative of low level of multicollinearity which will not affect the regression coefficients of the independent variables.

Based on, the model summary presented in table 4.11, the proposed network of variables account for 59.5 % of academic performance. With optimism score emerging as the, sole highly significant predictor of academic performance.

Keeping in view the correlation results, it appears that though a student could possess high metacognitive awareness and share a more empathetic interpersonal dynamics with his/her teachers when compared to peers. It is still the explanatory style that plays a deciding role in determining the student's academic performance.

In other words, a student who remains inherently hopeful (optimistic) in the face of adversity is able to effectively utilize the resources at his/her disposal in terms of intrapersonal skill (effective study habits) or interpersonal dynamics (an empathetic teacher/s) to better his/her academic performance.

The student needs to believe that his/her performance can change and is not a permanent evaluation of ability, this hopeful outlook enables the student to take the first step towards recovery from (especially during impaired) academic performance, the rest of the necessary skills (academic behaviours, learning strategies) are facilitative aids that

probably moderates the journey of recovery and still account for a sizeable portion (39.5%) of determining academic performance and cannot be overlooked.

The best plan of action in case of impaired academic performance would be to first look into the explanatory style of the student, empower them with a hopeful outlook and then look into the technicalities of performance in terms of academic cognitive factors like content knowledge, effective study habits and other facilitative academic behaviours.

This is not the traditional plan of action followed in such cases, the focus continues to remain on the student's current status of academic behaviours, he/she is advised to spend more time studying, given stricter and more rigorous study schedules, which is not 'wrong' but if the student is not bolstered with the non academic cognitive factor of optimistic explanatory style the academic cognitive strategies may not be 'effective' in remedying the impaired performance.

Perhaps this imbibing of hope is what teachers who are perceived as empathetic do, their continued effort with the student is viewed by the student as a 'sign of hope' in his/her abilities to change her academic performance and then the learning inputs given by the teacher are effectively received by the student.

**Section 5.III. C:** Discusses the use of logistic regression to determine, the independent variables most related to academic performance at High and low levels of achievement. As the table 4.14 presents, the model strength is estimated at the range of 44 -61.3%. And the table 4.15 presents the independent variables most predictive of the high and low academic achievers' groups.

Optimistic explanatory style emerges as, highly significant of determining the admission to each group followed only by perceived teacher empathy which is the next significant predictor. These findings further add support to the above presented argument that inherent optimistic explanatory style of the student and the presence of empathetic teachers who embolden students' academic efforts especially when performance goes

downhill, facilitate academic performance. Together these factors determine the admission to purer groups of academic high achievers (students who score equivalent and above 75) and low academic achievers (students who are unable to clear the minimum score of 35).

Indicating that, high achievers are more hopeful and continue to remain so even in the face of impaired performance and are able to sustain rather than surrender efforts, thus paving their way to better academic performance. While low achievers paint a contrary picture of more often than not being pessimistic in general, including academic achievement and perceiving their teachers as not necessarily empathetic towards their academic efforts, identity and achievement.

**Section 5.III.** Discusses the results of using an independent t test to differentiate between the high and low academic achievement groups and identify the Non-academic cognitive profile of the two groups.

Tables, 4.16a & 4.16b presents the descriptive statistics of the two groups on, the independent variables. While, table 4.17 t test values between the means of the high and low academic achievers.

The groups differ very significantly on their optimism scores, with high academic achievers' group recording a higher mean. The groups also significantly differ on metacognitive awareness, perceived peer and teacher empathy. With high academic achiever group recording a higher mean on metacognitive awareness. Of the two constituents of the perceived emotional climate, high academic achievers perceive their teachers to be more empathetic as compared to their peers.

The above findings are in line with the general picture that emerged with the correlation analysis between the independent and dependent variables for the entire sample, where improved academic performance is highly significant and positively correlated to optimism score and metacognitive awareness. And highly significantly but negatively

correlated to perceived peer empathy and significantly positively correlated to perceived teacher empathy.

Thus the non academic cognitive profile that appears in general for improved academic performance is high levels of optimism, coupled with high levels of metacognitive awareness, better empathetic relationships with teachers as compared to peers. The means derived for both the groups could be used as a guideline to classify students.

The means calculated for the purer groups of high and low academic achievers have been found to be significantly different, with the higher academic achievers recording higher means on the non academic cognitive factors and the low academic achievers recording lower means on the same. Thus additional support is derived for the emerging non academic cognitive profile associated to improved academic performance.

Therefore, if we consider the non academic cognitive factors on a continuum, the high academic achievers would lie on the adaptive extreme of the continuum and the low achievers would lie on the maladaptive extreme. As each of the non academic cognitive factors do possess these polarities and can be represented on a continuum (they are not dichotomous variables).

To sum up the non academic cognitive profile for high achievers can be delineated as highly optimistic, equipped with metacognitive awareness of effective learning strategies, better empathetic interpersonal relations with teachers as compared to peers.

While, the non academic cognitive profile for low academic achievers can be delineated as recording lower levels of optimism or tending closer to pessimism, with poorer metacognitive awareness of learning strategies and share better empathetic relationships with peers as compared to teachers.

**Summary of Phase I:** The discussion of the results of the phase I findings have revealed that of the four independent variables comprising perceived attributes. Academic

performance is most facilitated by an optimistic explanatory style and metacognitive awareness of learning strategies. While of the independent variables comprising the perceived emotional climate, academic performance is facilitated by empathetic perceptions of teachers and adversely influenced by empathetic perceptions of one's peers towards academic performance. The model proposed by the researcher accounts for 59.5 % of variance seen in academic performance. Higher academic achievers possess a distinct non-academic cognitive profile when compared to low academic achievers, emerging as highly optimistic, metacognitively aware of learning strategies and perceiving teachers as more empathetic about their academic performance than their peers.

The following sections, presents the discussion of the Phase II of the research findings. It constitutes the analysis of the effectiveness of the skill building program. The skill building program was built on the framework of the theoretical model described in detail in chapter 2. The correlational and regression analysis discounted two of the perceived attributes namely mindset and low frustration tolerance as affecting academic performance. The skill building program still was inclusive of them for the following reason. The skill building program being pre-decided and rolled out immediately after the phase I of the research design was not intended to be modified based on the data analysis of phase I. And therefore was based on the assumption of the plausible working of the theoretical model and not the 'factual' strength of the model as indicated by the research findings of Phase I.

**Section 5.IV:** Presents the discussions of the results of the analysis of the data collected from control and experimental groups, pre and post the skill building program.

**Subsection 5.IV.A:** Discusses the sample characteristics of the experimental and control groups.

**Subsection 5.IV.A.i:** Discusses the Gender distribution of the experimental and control groups. Graphs 4.6 and 4.7 represent the group composition of the experimental and control groups in terms of gender distribution. Both groups have the same number of

male and female students. This assures that gender difference on the variables is controlled for.

**Subsection 5.IV.A.ii:** Discusses the age distribution of the experimental and control groups. Graphs 4.8 and 4.9 represent group composition of the experimental and control groups in terms of age. Again, both groups have the same number of students who are 15, 16 and 17 years old. This assures that age difference on the variables is controlled for.

**Subsection 5.IV.B:** Presents the discussion of the results of using t tests to verify phase II hypotheses 1-6. To determine any significant difference between the experimental and control groups at pre, post and follow up assessment.

The figures 1a & b, illustrate that for each independent variable the group means will be compared at four steps namely – Step 1: Pre experimental and control (E-C); step 2: Post experimental and control (E'-C'); step 3: Pre and post control (C-C') and step 4: Pre and post experimental (E-E'). To test hypotheses 1- 6, the groups need to significantly differ at step 4 (Pre and post experimental). To ensure that the change seen in the post experimental data is due to the skill building program and not other factors, the means should not ideally differ at step 1( pre experimental and control) and step 3 (pre and post control). But differs at step 2 (post experimental and control) and step 4 (pre and post experimental).

**Subsection 5. IV. B. i (Independent variable- Explanatory style):** Discusses the results of testing Hypothesis 1 of phase II, that states, 'There is a significant difference in explanatory style after the skill building program'.

Tables 4.18-21 a & b, present the descriptive statistics and t test values at the different steps. While no difference was noticed between the pre experimental and control groups, the post experimental and control group analysis has been found to be different. Also

though the means seem at a glance to be different at pre and post experimental levels, the paired t test value does not consider this as statistically significant difference.

The standard deviation of the pre experimental group shows a wider dispersion of scores (sd= 4.41) while the dispersion of the scores has considerably reduced post the skill building program in the experimental group (sd=3.91). A closer look at the pre and post raw scores of the experimental group further clarifies the wide dispersion.

Table 4.22, presents the pre and post optimism scores of the experimental and control group. When comparing the experimental and control group optimism scores it can be seen that, the skill building program has influenced the optimism scores of the experimental group. The results are in line with Seligman (2007), research findings that optimism does vary at a range and the program prescribed to train participants does effectively regulate their optimism.

While majority of the experimental group show a upward rise in optimism scores above 10% (as highlighted in yellow and red font) by the end of the skill building program as compared to the a few stray cases of such increases noticed in the control group. There is a sharp fall (of more than 10%) of noticed in some cases in the experimental group (as highlighted in green and red font). Such a sharp decrease is not noticed in the control group. This fall could be attributed to coping mechanism to life circumstances, yet this defence fails to successfully explain it is as similar sharp drops are not seen in the control group. Yet another explanation could be that in the three cases of the sharp drop could represent high optimism scores as a result of misattribution (success is due to external favourable circumstances that get generalized for specific periods of time as in the case of superstitious beliefs) which the questionnaire is not built to check. The drop in the optimism score could represent a realignment of the attribution style as prescribed by the skill building program. This process of realignment needs to be studied further for better understanding in terms of its regulation of optimism and the additional support that would need to be provided to the participants in whom this realignment is noticed.

The participants who have shown minor fluctuations could be studied further to understand and counter resistance to the skill building program.

A glance at the control group could reveal the normative pattern for regulation of optimism. That most individuals maintain a status quo in terms of their optimistic or pessimistic explanatory style recording minor fluctuations on either side of the continuum.

The above findings can also help understand the nature of effectiveness of the skill building program. The program seems to have most effect on individuals who have extremely low optimism or highly pessimistic. While it does not seem to, improve the optimism level of individuals who to begin with were not highly pessimistic.

Considering the nature of optimism scores in the control group, perhaps an individual to begin with does not possess a highly pessimistic outlook and if the external life events remain consistent, the individual tends to be resilient and bounce back. But it is not necessary that the individual is aware of how he/she is sustaining the optimism and therefore might still remain vulnerable to a sudden nose dive in the favourability of circumstances.

Therefore, though it might be inherent in human nature to bounce back, it does not take away from the significance of awareness of skills that can be utilized to 'bounce back' or 'remain hopeful'. Or simply abstain from subjectively 'distorting' and instead maintain an objective view of, the nature of the unfortunate or unfavourable event. Ensuring that the way back from impaired performance is faster and less intense.

As the step 4 analysis of pre and post experimental difference is not significant hypothesis 1 of phase II is rejected. The above finding needs to be viewed in the light of step 2 analysis of the significant difference seen between the post experimental and control group. The experimental group has a noticeably higher optimistic mean as compared to the control group but keeping in mind that the post experimental group scores is statistically not different from the pre skill building group scores, it can be

interpreted that the program enhanced the optimism scores of a handful few who to begin with had very low optimism scores and whose increase in scores contributed to the increase in group mean scores, while not making much difference to individuals who were already optimistic.

Even in cases where individuals began with an optimistic stand and sustained the same level post the skill building program. The program still remains meaningful as it helps them to discern and understand their optimism(attribution/misattribution), and learn the tool of regulating their optimism henceforth.

**Subsection 5.IV. B. ii (Independent variable- Mindset):** Presents the discussion on testing hypothesis 2 of phase II, that states, ‘There is a significant difference in mindset after the skill building program’. Based on the descriptive statistics and t test values presented in tables 23-26 a & b. It is seen that except at the post experimental and control step, the means do not differ significantly at any of the previous steps. Therefore hypothesis 2 of phase II is partially accepted.

This could be indicative of a gradual change in attitude that has set in that is not observed in the control group, but would require considerable time to sustain and develop. Also, the dip seen in the control group’s mindset scores was not observed in the experimental group, though there was no significant increase observed either. This could be attributes to the nature of the of the skill building program, that occurred at two levels, classroom and online. The classroom activities were meant to reinforce and clarify the content learnt personally online.

The effectiveness of this construct (though intrapersonal is open to interpersonal influences) would largely be determined by the attitudes endorsed by fellow teachers and parents. Who may not ‘all’ necessarily prescribe to the growth- mindset orientation. And as students are new at learning this mindset and not entirely understanding its technicalities they may not be able to support the growth-mindset orientation if a significant adult does disagree with their point of view. The skill building program to

sustain its effectiveness will either have to reach out and educate concerned parents and teachers to imbibe this attitude or equip students for ensuing counter questioning.

Yet compared to the control group's dip in the mindset scores by the end of the academic year, when the pressure to perform and wearing out effect is higher. The experimental group has sustained if not improved their mindset scores. Indicating that perhaps the skill building program was effective in partially mitigating the effects of performance pressure and wearing effect but to be most effective would still require reinforcement from interaction from significant others.

Also, considering that the program basically is about questioning, regulating and imbibing new habits of the mind/thinking, 12 weeks may be sufficient to learn but not enough to practice and replace the pre existing patterns of thinking.

**Subsection 5. IV. B. iii (Independent variable- low frustration tolerance):** Presents the testing of the hypothesis 3 of phase II, that states, 'There is a difference in low frustration tolerance after the skill building program'. As seen in the values presented in the table 27-30 a & b. Steps 2 and 3 are highly significantly different in their means. Indicating that experimental groups differs very significantly from the control group and from, before the skill building program.

The result indicates the effectiveness of the program in addressing the frustration levels of the students. The component of the skill building program that dealt with low frustration tolerance was taught first, the effectiveness of the program cannot all be explained by primacy effect alone but rather for accounting for enough time for the skills taught to be imbibed and practised. The findings also help understand the nature of the constructs. That the emotional concerns of, the individual needs to be addressed before reaching for the more deeply ingrained belief system.

As the REBT based segment of the program begins with connecting the feelings to cognitive perceptions regulated by the underlying imperative beliefs. They are educated about the ABCDE (Activating event, belief, consequence, disputation and replacing with

effective belief) model, the nature of irrational beliefs and replacing them with rational beliefs.

Students realized that they had a choice about how they felt and could choose to regulate them by merely changing their perceptions and addressing their underlying beliefs stimulating them. The technique of disputation was taught as having an argument with one's self about how one 'chose' to think to lead to the current way of 'feeling' and what other 'choice' would lead to a more 'manageable' feeling.

Comparing the above results to phase I, results where there was no significant correlation seen between low frustration tolerance and academic performance. Indicates the need to, better understand the relationship.

Perhaps low frustration tolerance is not directly related to academic performance but is related to optimism, especially when 'learning' to be optimistic, which in turn influences academic performance. As discussed earlier, decreasing one's frustration levels improves an individual's ability to learn better newer habits of thinking by lowering resistance and creating the optimal (intrapersonal) conditions (cognitive and emotional) to learn. This could explain the research findings discussed in subsection 5.IV.B.i. Perhaps a drop in the frustration level is a prerequisite to improvement and sustenance of optimism.

Considering the variance inflation factors given in table 4.13 is indicative of moderate collinearity between the independent variables, future studies could focus on better understanding the relationship between levels of frustration and optimism.

Based on the significant difference in means at step 3 (pre and post experimental), hypothesis 3 that states – 'There is a difference in low frustration tolerance after the skill building program' is accepted.

**Subsection 5.IV. B. iv (Independent variable- metacognitive awareness):** Discusses the testing of hypothesis 4 of phase II, that states, 'There is a difference in Metacognitive awareness after the skill building program'. Tables 4.31-34 a & b, lists the means of the

pre and post experimental and control groups. As the means are highly significantly different at step 3 (pre and post experimental group) hypothesis 4 is partially accepted.

As can be seen in the tables 4.31-34 a & b means at step 2 (post experimental and control group) are not significantly different. This can be understood by focussing on the pre experimental and control means, which to begin with were not significantly different but the control group did start with more effective metacognitive awareness skills. While the experimental group by the end of the skill building program have very significantly improved their metacognitive awareness skills and met the levels of metacognitive awareness levels of the control group, while the control group themselves have remained stable at their previous level.

The metacognitive awareness component was dealt with in the last segment of the skill building program. This was deliberately done so, students would be ready to receive the training on the study skills once they had received instructions on the other influencing constructs. This could have influenced the skill being remembered more readily along with a more simplistic explanation of recency effect of the program.

As proposed in the review of literature, students participating in the workshop have until now been exposed to and trained in skill sets and exercises, that involves introspection. Paying attention to one's integral thinking process, connecting the thinking process to one's consequential behaviours and finally, regulating the thinking process in order to regulate the consequential behaviours leading to desirable consequences.

This continuous process of being aware and regulating ones thoughts, empowers students to take control of their thoughts rather than feel helpless and entrapped by their thoughts/feelings and consequential actions. Also the ground is now fertile to steer the same awareness and regulation to learning strategies. Instead of learning a set of general study skills, students were encouraged to observe their existing learning strategies and evaluate them. They were then taught newer strategies which they could improvise or encouraged to devise their own which met the set objectives and consistently regulate these strategies for optimum effectiveness.

Having had adequate exposure in metacognitive awareness and having only to change the context in which it needs to be applied, would have also contributed to the effectiveness of this component of the program.

Thus based on the paired t test value in table 4.34 b, hypothesis 4 of phase II, that states that ‘There is a difference in the metacognitive awareness after the skill building program’ is accepted.

**Subsection 5.IV.A. v (Independent variable- perceived teacher empathy):** Discusses the testing of Hypothesis 5 of phase II, that states, ‘There is a difference in Perceived teacher empathy after the skill building program’. Based on the t test values presented in tables 4.35-38 a & b, it is seen that the means do not differ at any of the four steps. Thus the hypothesis 5 is rejected.

Though the skill building program did not directly deal in improving the perceived teacher empathy among students. The rationale behind the framing of the aforementioned hypothesis, was that improved intrapersonal skills in the participating students would ease their stress or improve their communication levels in the interpersonal relationship they shared with their teacher. Thus interpersonal communication patterns especially with teachers would improve as a by-product of the participant’s awareness of their own inner workings (thoughts + feeling = consequent behaviour connection) empowering them to take a stock of their academic life and thereby de-stressing other interpersonal relations (with parents, teachers and peers) from academic issues.

Even though as part of the program, two of their current subject teachers volunteered and addressed the students in the importance of hard work over intelligence and the importance of hope and being optimistic in the face of impaired performance, thus reinforcing the skills. It does not seem to have improved students perceptions of teachers’ empathy.

The research findings could be a result of one or both of the following two reasons as well. First, a general one time talk on the subject may not be as effective. A regular

reinforcement of the concept by regulating the content of their ‘praise’ and ‘criticism’ during routine classroom interaction, might be a more effective strategy to endorse the above presented ideas and thus improve perceived teacher empathy.

The second reason is related to the data collection process itself. Students were asked to, give a collective opinion of all their (current academic year subject) teachers rather than a specific teacher, so the scores probably reflect a general perception of teachers’ empathy, which could mask individual differences. Also the collective opinion could be ‘larger than the sum of the parts’ a fallacy along the lines of representative heuristics, which means general perceptions are more resistant to change than specific instances. In other words, students when asked about their perceptions on teachers without specifying an individual teacher would focus on a ‘average’ or ‘popular’ or most ‘representative’ of all the teachers they have come across. This average can thus falsely negate some exceptional relationships.

**Subsection 5. IV. B. vi (Independent variable – perceived peer empathy) :** Discussing the testing of hypothesis 6 of phase II, that states, ‘There is a difference in Perceived peer empathy after the skill building program’. Based on the tables 39-42 a & b. It is seen that the means significantly differ only at step 2 i.e. at the post experimental and control group step. Therefore the hypothesis 6, that ‘There is difference in perceived peer empathy after the skill building program’ is rejected.

It can be observed from the tables that, the means between experimental and control group were different (with experimental group recording a higher mean) but not statistically different at the pre skill building level. And the slight increase in this level post the skill building program, has contributed to a highly significant difference even though it not significant within the group (experimental) pre and post the skill building program.

The rationale behind testing the aforementioned hypothesis was that just as with perceived teacher empathy, improving the intrapersonal skills through training in developing rational beliefs, an optimistic explanatory style and a growth oriented mindset

would empower students to develop healthier self-management skills improving their chances to develop healthier relationships with their peers.

Also owing to an interactive and discussion oriented nature of the skill building program, which focused and led to sharing of many personal even intense experiences. Was assumed would enhance their empathetic expressions and impressions of each other. But the skill building program itself was not designed to develop such skills and the current study only proposed to study the possibility of such an occurrence and not focus on empathy as a skill to be learnt.

In other words, even though peers already share a relationship that allows for discussion of various issues including academic concerns. The assumption of the researcher that in the aftermath of the skill building owing to adaptive responses towards dealing with their academic concerns and the personal disclosures in the duration of the program would improve their perceptions of being empathized by their peers was disapproved by the research findings. Also the skill building program did not directly facilitate the empathy skills, because of the assumption that as intrapersonal skills improve, students would be more equanimous thus improving the quality of their crucial interpersonal connections with teachers and peers.

The research findings though do not support the above assumptions and therefore the hypothesis 6 of phase II, that ‘There is a significant difference in perceived peer empathy after skill building program’ is rejected. This highlights that empathetic skills would require conscious focus and development. Empathy of a group could improve on a surface palpable level incidental to a group’s task, allowing for the group to work better together. But for individuals’ to personally perceive others as being empathetic to them would require more concentrated effort.

The above two constructs perceived teacher and peer empathy as the significant components together forming the perceived emotional climate encapsulating the learning process. Though phase I shed light on the nature of the relationship of these two constructs, perceived peer empathy having a highly significant but negative influence

while perceived teacher empathy having a significant positive influence on academic performance.

But both failing to emerge as predictors of academic performance (based on the multiple regression analysis). The importance of these constructs cannot be sidelined as the intrapersonal skills talked about especially optimistic explanatory style and growth oriented mindset are facilitated and sustained by these empathetic interpersonal skills.

Future studies can focus on further unravelling the nature of the relationship between the independent constructs themselves and through them academic performance.

The skill building program is based on the proposed theoretical model interweaving the independent variables. The phase II of the program is immediately rolled out after the conclusion of the phase I data collection. Therefore the data analysis of phase I has not been used to direct the

The acceptance (partial in case of 2 & 4) of hypotheses 2, 3 & 4 and the improvement in the academic performance of the students of the experimental group.

The analysis of the effectiveness of the skill building program, though counters the research findings of Phase I on face analysis as the predictor variables of Phase I (Optimistic explanatory style and perceived teacher empathy) have not emerged as the significant or 'key' variable in Phase II, which is instead played by low frustration tolerance. This very variable failed to emerge as the predictor in Phase I. These findings shed light on the permeability of these variables to respond to

**Subsection 5.IV.B (Independent variable- expectation score):** Discusses the testing of the null hypothesis 7 of phase II that states, 'There is no relationship between expectation and academic performance', using Pearson product-moment correlation. Based on the correlation values presented in the table 4.43, it is seen that there is a significant relationship between expectation and academic performance.

The participating students were asked to estimate the possible increase they would see in their academic performance as a result of participating in the program, higher the improvement expected more was the recorded expectation level.

The rationale behind framing of the null hypothesis was to explore the role of motivation in participating in such a skill building program geared towards improving academic performance. As students were informed about the objective of the program, it was assumed that their motivation levels would decide their extent of participation and thus their open-mindedness in learning about the constructs and acquiring the tools to regulate the influence of these constructs.

Also, the possibility of the expectation alone having worked along the lines of a placebo effect, can be ruled out because there is significant difference seen in the student's post assessment in two of the perceived attributes namely – low frustration tolerance and metacognitive awareness and in some students scoring very low on optimism saw a marked increase in their optimism. Thus expectation of the participants to change their academic performance based on their participation in the program could be facilitating behaviours like maintaining attendance in the skill building program, improve receptivity in learning the skills, increase the chances of application of the skills into active academic learning resulting in improving academic performance.

Table 4.43 presents the significant correlation value between the student's expectation of improvement in their performance and their actual academic achievement. Thus the null hypothesis of phase II, that states 'There is no relationship between expectation and academic performance is rejected.

**Section 5.IV. C:** Discusses the results of using repeated measures to check if academic achievement of the experimental group has enhanced in the duration of the year. Table 4.44 presents the means of the experimental group across an academic year from assessments like I internals, mid-term, preparatory and final examinations. Table 4.45 presents the Mauchys test of sphericity and the values indicates a highly significant

difference between the test scores across the different examinations. Indicating that, the experimental group performed distinctly at each examination.

A clearer look at the nature of this performance is provided by the graph 16, that presents the means and standard deviations of the experimental group across the different examinations. It is visible at a glance that the group's performance significantly plummeted at the mid term examinations and has steadily rose from there, with the highest average of the group, reached in the final examinations of the academic year.

The dip in performance after the first internal could be understood in two ways. Firstly while the I internal test were scored on a maximum of 25 marks. The mid-terms was their first experience of a 100 marker question paper. Therefore, more challenging than the first internal. Secondly, also the skill building program which started soon after the I internal, was still too precocious to have much influence on their academic performance. The program was heading to completion a month before the preparatory exams, and the final exams were held a month from the preparatory, where the highest average has been recorded.

To, investigate that the increase in the marks since the mid term can be attributed to the effectiveness of the skill building program and not a result of a natural trend. The experimental groups' academic performance was compared to the control groups' academic performance. Graph 17, presents the line graphs of the two groups' academic performance. The control group also presents a similar dip in their scores after the I internal, drawing support to the argument that students' academic performance suffers between the I internal to mid term due to the transition from a smaller 25 marker test to a 100 marker exam as a natural trend.

The control group line graph mimics a progression in academic performance similar to that of the experimental group, with academic performance improving with subsequent examinations (both preparatory and final examinations) after the initial dip. Both groups end with the largest mean at the final examination. Tables 4.47 a & b presents the descriptive statistics and the paired t test value for the control group's academic achievement at I internal and final examinations. While in the experimental group, the

means at the above two levels(I internal and final examinations) are significantly distinct with the larger mean scored during the final examination. The control groups' academic scores do not significantly differ. Thus it can be concluded that the experimental groups' academic performance though follows a trend similar to the control group (initially), but unlike the control group shows a significant improvement by the final examinations.

Tables 4.48 a, b & c, clearly demonstrates the above contention by providing a percentage representation of the differences recorded between different assessment levels in experimental and control group. The nature of the difference is indicative that the experimental group on an average shows double the growth recorded in the control group in the duration and the conclusion of the academic year. Also fewer incidences of slide in performance is recorded in the experimental group as opposed to the control group. While 47.22 % of participants of the experimental group have shown more than 10% increase in their academic performance, 25 % of the control group have recorded a more than 10% growth. Also of significance is the slide in performance noted in both the groups, while experimental group recorded 5.5% participants recording a more than 10% slide in their performance by academic year end. The control group noted 19.4% participants recorded a slide of more than 10% in their academic performance. The research finding provides support to the role of the independent variables also collectively referred to as non-academic cognitive factors on academic performance. The skill-development program both aids performance and reduces the frequency of slacking in one's academic performance when the pressure mounts.

This answers the last research question raised for phase II, that whether the skill building group improves the academic achievement in students. By comparison with-in and between the experimental and control groups it can be concluded that, though the experimental and control groups did not vary from each other in their academic performance either before or after the skill building program and they followed a similar trend. With academic performance dramatically dropping after the first internals and then consistently improving with each group recording the highest mean at the final examinations.

In comparing the (within group) difference observed between their first assessment (Internal) and last assessment (final examination scores). The control group's performance did not significantly differ in their academic performance between, internal and final examinations, while the experimental group performed significantly better at their final examinations. Thus affirmatively answering the research question of phase II about the effectiveness of the skill building program in improving the academic performance of the participants.

The following section summarizes the discussion of the research findings:

### **Phase I**

1. Of the four beliefs working in the intrapersonal realm of a student, namely – explanatory style, mindset, low frustration tolerance and metacognitive awareness. Only explanatory style and metacognitive awareness have found to be highly significantly and positively correlated to academic performance. Suggesting that an optimistic explanation bolstered by effective study strategies buffers students against increasing frustration and bypasses the requirement of a growth mindset training which could be a more embedded attitude acquired as a result of hope garnered from an optimistic explanatory style.
2. Both the components proposed to comprise the emotional climate of academic learning were found to be correlated to academic performance albeit differently. While perceived teacher empathy seems to influence academic performance positively. This relationship is not as strong as compared to perceived peer empathy's negative influence on academic performance. Thus having an empathetic teacher may not necessarily always improve academic performance but having many friends does most often impact negatively on one's academic performance.
3. The proposed model strength of the interconnected predictors accounts for 59.5 % of academic performance. Of the individual predictors, explanatory style emerges as the strongest predictor of academic performance. Indicating that irrespective of presence or absence of conducive interpersonal dynamics (perceived teacher and peer empathy) and

academic relevant intrapersonal skill (metacognitive awareness) an optimistic explanatory style ensures that academic performance sustains and improves.

4. The high and low academic achievers possess distinct non-academic cognitive profiles. While high academic achievers possess an optimistic explanatory style and their academic efforts have the scaffold of metacognitive awareness. They tend to have more empathetic relationships with their teachers as compared to their peers. Whereas the low academic achievers, are predominantly pessimistic in their explanatory style and are not metacognitively aware of their academic efforts. Also, they do not share empathetic relationship with their teachers and are highly influenced by their peers

### **Phase II:**

1. Hypotheses 1 to 4, test the four components taught in the skill building program, namely, frustration tolerance, mindset and metacognitive awareness have been effective. Resulting in lowering frustration levels in participants, sustaining their mindset scores from declining and improving their metacognitive awareness of learning strategies. While optimism training has proven effective in cases of participants who were (very) low on optimism to begin with and did not affect participants who had a healthier optimism scores.
2. Hypothesis 5 & 6 of Phase II which tested the constructs based on perception of empathy. The constructs were thought to be incidental to the effectiveness of the skill building program. The data analysis has revealed that empathy of a group can be improved owing to the nature of the program but to improve the empathetic skills themselves would require direct training in expression (verbal/non-verbal communication skills) of empathy.
3. The rejection of hypothesis 7, of phase II indicates that the expectation of a change could be positively influencing the motivational level of the participants and thus facilitating (academic) behaviours like attendance, receptivity to the program content and application of the skills learnt in the due course of the program.

4. Academic performances of the experimental and control group follow a similar trend. An initial dip in the academic performance followed by a steady improvement with the highest mean recorded for the final examinations in both the groups. While the control group's performance does not significantly differ from its initial performance the experimental group does significantly different and better from its initial performance. Thus affirming that the skill building program did improve academic performance of the participants in the experimental group.