CHAPTER 5
OUTCOMES AND ANALYSIS

5.1 OUTCOMES

Outcomes of research ideally concentrate on observations from this research experiment. This chapter therefore, starts with “research story” which is about the efforts and some amazing feeling of students that will be otherwise missed out in the report. Work with adolescents started in the year 2009 where a summer camp for adolescents was conducted. It was observed that students got benefit from summer camp, but they want to continue for longer duration. Moreover, they all are not happy with a Yoga session conducted in school. For them, it is just a waste of time. They love to learn the importance of Yoga through games. As part of research, first experience was in Gujarati medium school where all students are from lower middle-class family. Initially students were not inclined towards Yoga session, but slowly they started enjoying it. An attempt was made to solve their problems using Stories based on Various Yoga Sūtra. Based on these experiences, it was decided to work on integrated approach and for longer duration and here amazing feedbacks from the students were received

1) One student had a serious fear of maths and science. The participant was in 10th Standard. In the mid of sessions of region 1, the participant decided to leave all tuition classes and started doing self-study for all the subjects. And the participant scored 86%, which is better than classmates from sessions.
2) One student opened up in mid of the session of the region 1 and revealed to parents that the participant is afraid of exams and hence the participant tries to attempt suicide during his 9th standard exam. The participant also started own way of learning the subjects and scored above 85% marks in the exams.
3) One student was afraid of parents and their expectations, and the participant had no control on urination. But this problem was also solved permanently in the beginning of 2nd region of experiment.
4) All the students at the end of the 3rd session were not willing to leave Yoga session. They were in tears and wished that the session continued.
5) Initially students had intense negativity about Yoga, but at the end of the session, students were so much influenced that they insist on their parents to join the Yoga sessions.
6) Students encourage to create more games and stories and then they identify moral of the games and stories.

This research story will set a perspective for finding of this research.

5.2 ANALYSIS

For analysis, the observations from the experiment have been depicted in graphical format. Below graph lines are based on empirical observation and validated using grade score from Rubrics. Observation is an initial reaction about various Yoga practice by all students and reaction after performing same Yoga practice. All the reaction is captured though grade score of Rubrics. Grade score are normalised so that can be drawn as coordinates in the graph. Coordinate of two Yoga practices are taken, one at the beginning of the region and one at end of the region and find the slope of the line connecting two points. Same practices are repeated in three regions.

![Figure 5.1: Actual Outcome based Graph](image)

In the previous chapter, figure 4.6 depicted Desired Outcome based Graph. Above graph represents Actual Outcome. Based on comparison of both the graphs, the following was inferred.
1) Region 1 concentrates on providing positive aspect of Yoga and benefits that help them to improve the academic performance. This is the most challenging phase of this research methodology.

2) Students are performing Yoga in their school from 1st standard and their perspective of Yoga is generally that it is just a waste of time.

3) The first session is about handling lots of negativity. Students are not even ready to spend half hour in the session. They are forced to attend due to parental pressure.

4) As depicted by above graph, there is slow progress in removing negative perception and acceptance of Yoga is also very less.

5) Drop of resistance line is quite low and it is due to average grade score on Rubrics which is always below three. It illustrates high resistance from students.

6) Progress line in Region 1 has low rise gradient as compared to its slope in another region, but has more gradient as compared to the slope of resistance line in Region 1. This is a positive effect as students will be forced to believe in Yoga as they get the benefits.

7) In Region 1, maximum concentration was in removing negativity about Yoga and that is the reason mostly play way method was used. Also story based on Pātañjala Yoga Sūtra and Bhagavad Gītā has given very good effect at the later part of Region 1.

8) The average time required in region one is from four weeks to seven weeks.

9) It is observed that all students are not getting desired outcome for every game at the same time. Hence there is a need of variations in various games so that some students may play same games more times till desired outcome is achieved.

10) In Region 1 students are able to analyse their problem related to peer pressure, parents’ expectance, problem with themselves and are now able to tackle it meaningfully.

11) When students move from Region 1 to Region 2, they all are now ready for actual Yoga Practice to improve their academic performance.

12) Main finding is in Region 2, that the decline in resistance line is Multi-fold compared to its slope in Region 1. And rise of progress line is also more compared to Region 1.
13) In this region, students are mainly working on stress management, focus, concentration and increased their remembering capability while studying. These have direct impact on improving academic performance.

14) The average time required in this region is from 27 to 35 weeks. The main objective is to understand student’s problems related to their study, interest in subjects, negativity about the subjects, perception about subjects and queries about the importance of a particular subject.

15) In Region 2, students also started performing āsanas using the play way method. There is no immediate acceptance to āsanas as they have practiced same āsanas in school as part of Physical Training lecture. And they could not get benefits from them. It was a monotonous activity and they were not interested in doing it. Hence, the play way method along with variation in āsanas is implemented.

16) At the end of Region 2, students are acquainted with various Yoga practices and they observe their benefit while studying. But, a general tendency of discontinuing Yoga practices after a few weeks is observed. Subsequently students give priority to other things over Yoga practice. Therefore, now important aspect is to create a lifelong learning capability and develop the ability to take their own decisions, and be able to set their future goals. To sustain the Yoga practice, students need to understand the true essence of Yoga in life. As they are already pursuing Yoga in various forms for almost 30 weeks, it is time to work on Region 3 which is about the long term benefit of Yoga.

17) Fall of resistance line is more compared to that in Region 2 whereas rise of progress line is less compared to gradient of progress line in previous regions. The rationale is Region 3 aims to sustain the progress.

18) Region 3 is more on stories based on Pātañjala Yoga Sūtra and games so that students are able to analyse the situation, set goals based on own capabilities, accept the surrounding, Flow with the situation, work with ethics and differentiate between various choices.

5.3 DISCUSSION
As discussed in previous chapter, experiments conducted as part of pre-experimental study were based on traditional approach where control groups were selected from school and Yoga was practiced for three month duration. Based on output of the experiments, new approach evolved for experiments which is based on integrated
approach of Yoga. In the integrated approach of Yoga, inputs to experiments is hierarchy of Sūtra which provide true essence of Yoga. This new approach is outcome based study where desired outcomes are set and subjects need to attain the outcome before going for next level of Yoga practices. As the proposed framework was designed for longer duration, all such desired outcome were achieved by subjects in their own space. General method to evaluate such experiments on population is statistical hypothesis testing\(^1\). But is there a need to use hypothesis testing method for outcome based study in Yoga? To get answer to this question, there is need to test outcome of this research experiments on statistical hypothesis method.

In this research work, outcomes have been evaluated and re-verified using statistical hypothesis testing approach. In statistical hypothesis testing method, success of this research work would depend upon the certainty of academic improvements in adolescents. Statistical hypothesis testing consists of null hypothesis\(^2\) as well as alternative hypothesis. In null hypothesis, there’s no relation between the two phenomena, represented by \(A \not\Rightarrow B\). Alternative hypothesis is of the form \(A \Rightarrow B\), where \(A\) is the antecedent and \(B\) is the consequent. Refusing the null hypothesis concludes that there’s relation between \(A\) and \(B\), leading to acceptance of alternate hypothesis. In this research work, there are two hypothesis and respective null hypothesis as reflected below. Statistical hypothesis is dependent on the number of participants on which experiment in conducted. This research work included 40 subjects to test the study which is sufficient to test this experimental hypothesis.

**Hypothesis**

It is hypothesized that

**Hypothesis 1**

Implementing integrated approach in Yoga for adolescence for a longer duration will help adolescents to improve and sustain the academic performance.

There is no effect of integrated approach of Yoga on adolescent in improving the performance.

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\(^1\) [https://en.wikipedia.org/wiki/Statistical_hypothesis_testing](https://en.wikipedia.org/wiki/Statistical_hypothesis_testing)

Hypothesis 2

There is a correlation between inculcating true essence of Yoga through integrated approach in adolescent and lifelong learning capability acquired by adolescents which helps to improve academic performance.

There is no correlation between knowing true essence of Yoga and lifelong learning capability in adolescents.

Now the outcomes of the experiments have been evaluated.

5.3.1 p-VALUE

Probability value, better known as p-value\(^3\), is used for determining significance of the outcomes. p-value refers to the probability of obtaining an outcome given that hypothesis is true. Mathematically, p-value is represented as:

\[
p\text{-value} = \text{Probability(observed/hypothesis)}
\]

p-value is, thus, used to weigh the strength of the evidence which ranges from 0 to 1. For evaluation of the experimental thesis, significance level i.e. threshold for p-value is selected as 0.5 i.e. \(\alpha = 5\%\). Below are the experimental interpretations based on p-value\(^4\):

- If p-value \(\leq 0.05\), reject null hypothesis since small p-value indicates weak evidence for null hypothesis.

- If p-value > 0.05, then null hypothesis is correct since large p-value indicates strong evidence for null hypothesis.

\(^3\) https://en.wikipedia.org/wiki/P-value  
5.3.2 EVALUATION OF HYPOTHESIS:

Null Hypothesis 1: There is no effect of integrated approach of Yoga on adolescent in improving the performance.

In this research work, Yoga is justified to be Outcome Based Study. The researcher and the subjects know the desired outcome in advance. Moreover, the subjects represent the target population. As per proposed framework, region 1 of the experiment was related to solving the queries, removing the chaos from mind and making subjects aware about breathing. In this Outcome Based Research, one cannot move from region 1 to region 2 unless all the goals of region 1 are achieved. This achievement of goals was verified based on the Rubric questionnaire provided to students during experiments. Hence, only when queries of all the subjects were resolved and they were made aware about breathing practice, experiments of region 2 were conducted. Same holds true for other regions as well. Therefore, it is evident from the experiments conducted that in this Outcome Based Research, Yoga was introduced to all the subjects, they were made aware about different Sūtra and respective Yoga practices through games. Based on the Rubric assessment from both qualitative and quantitative perspective, an instant evaluation of the experiment was done. Transformation in the subjects was observed through both the assessment techniques. Hence, the researcher can justify that effect of integrated approach of Yoga was observed in all the 40 subjects. In other words, there was not a single adolescent in which improvement was not observed as per null hypothesis 1. Therefore, p-value for null hypothesis 1 can be evaluated as:

\[
p\text{-value} = \text{Probability(}o\text{bserved}/\text{hypothesis}) = \text{Probability}(0/40) = 0
\]

Since, p-value for null hypothesis 1 is 0 and 0 is less than 0.05, there are strong evidences against null hypothesis. Hence, null hypothesis 1 gets rejected which alternatively proves Hypothesis 1 that Implementing integrated approach in Yoga for adolescence for a longer duration will help adolescents to improve and sustain the academic performance.
Null Hypothesis 2: There is no correlation between knowing true essence of Yoga and lifelong learning capability in adolescents.

In this research work, Yoga was proposed as an integrated approach to subjects. This integrated approach referred to the hierarchy of Sūtra and the Pañca Kośas from overall development perspective. Region 3 of the proposed framework had below goals to be achieved:

1) To work in time bound manner
2) To understand and being aware about Sūtra in daily life
3) To create culture of self-study
4) To develop ability to handle varied situations

All the above goals reflect intellectual capability utilized for daily tasks. Based on the Rubrics evaluation and as justified for null hypothesis 1, transformation in subjects was observed after conducting the experiments for region 3. Hence, the researcher can justify that all the 40 subjects reflected the correlation between knowing true essence of Yoga and developing lifelong learning capability. In other words, there was not a single adolescent in which development of lifelong learning capability was not observed. Thus, this observation defied null hypothesis 2 that there is no correlation between knowing true essence of Yoga and developing lifelong learning capability. Therefore, p-value for null hypothesis 2 can be evaluated as:

\[
\text{p-value} = \text{Probability}(\text{observed/hypothesis}) = \text{Probability}(0/40) = 0
\]

Since, p-value for null hypothesis 2 is 0 and 0 is less than 0.05, there are strong evidences against null hypothesis. Hence, null hypothesis 2 gets rejected which alternatively proves Hypothesis 2 that There is a correlation between inculcating true essence of Yoga through integrated approach in adolescent and lifelong learning capability acquired by adolescents which helps to improve academic performance.

5.4 SUMMARY
Apart from statistical hypothesis testing, research story as well as Rubrics assessment also verify the positive outcomes of the experiments. The feedback from students, parents and teachers also reconfirmed the hypothesis that improvement in academic performance was observed and integrated approach of Yoga developed lifelong
learning capability in the subjects. Also, the feedbacks supported the fact that this approach developed confidence, enhanced learning ability, improved concentration, strengthened mental stability and made subjects aware about mind, body and health leading to overall personality development. Hence, this research work proves to be largely successful, fruitful and worthwhile.