# CHAPTER IV
## RESEARCH METHODOLOGY

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CHAPTER IV
RESEARCH METHODOLOGY

4.1 INTRODUCTION

The present study is aimed at developing a new mind/body intervention: ‘Mind-Body Management Education (MBME)’ program for self-development and to test its effectiveness in enhancing physical and mental achievement. This chapter provides a detailed methodology of research design, data collection and data analysis.

The present study is using a multimethod research. “In recent years there has been an increase in discussions about the nature and use of multiple methods by social science researchers. This interest in multi-method research is based to a certain extent on the simple but insightful idea that using more than one method during the phases of data collection or analysis phases of a study may be more useful in answering research questions than using a single method. Although the use of multiple methods in a single study is not new, the past decade has seen a growth in the number of discussions on the purposes and nature of multiple methods as a strategic choice in research design and data analysis,” (Eisenhart, 2005)¹ (Howe, 2005)² (Raudenbush, 2005)³ (Schutz, Chambless & DeCuir, 2004)⁴.

4.2 MULTIMETHOD RESEARCH - BENEFITS

The present study is using multimethod research that includes literature analysis, product development and experimental methods. The advantage of this approach is the following:

- It allows for development that “seeks to use the results from one method to help develop or inform the other method” (Greene et al., 1997)⁵. This permits the researcher to use more than one method, one after the other. So that the results from the first can inform the use or interpretation of the next.
- “When used strategically, multimethod research provides avenues for combining data in unique ways to explore phenomena or to test or to generate new hypothesis” (Uplane, 2011)⁶.

1. L.A. (Literature Analysis) Method is used for determining the criteria for mind body intervention. And analyzing the literature for interpretation of body-based programs and their effects on the body and the mind.
2. **NPD (New Product Development) Method** is used for developing new product Mind-Body Management Education (MBME) program that improve the selected qualities of movement on the body and the mind.

3. **Experimental Method** is used for determining the effects of the Mind-Body Management Education (MBME) program on the body and the mind.

### 4.3 PHASES OF STUDY

The present research study has adopted a multimethod research design in three phases to find solutions to the objectives of the study. In Phase I, for objective 1 and 2, using the literature analysis method to determine the criteria for a mind body intervention. In Phase II, for objective 3, using the product development method to create a new mind body intervention. In Phase III, for objective 4, using the experimental method to determine how the subjects in the study are affected by the intervention and to find out whether there are changes in the selected qualities assessed by the measurement of appropriate variables.

### 4.4 PHASE I: LITERATURE ANALYSIS

**Objective 1-** To analyze literature for interpretation of body-based programs and their effects on the body and the mind.

**Objective 2-** To identify appropriate components for development of mind body management education MBME program.

In Phase I, the literature analysis method was used to determine the criteria for a mind body intervention. The mind body concept is a vast field and this literature analysis includes so many factors that needed to be identified for this study, chapter two is dedicated to the study context. Chapter three includes a review of the literature related to past and present attempts to address the core concept of this study.

### 4.4.1. Need for Literature Analysis Method

According Cooper (1988)\(^7\), first, literature analyses “may be empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe, summaries, evaluate, clarify and/or integrate the content of primary reports.” Also important that it provides “the background to and justification for the research undertaken” (Bruce 1994)\(^8\).

This present study is using the literature analysis method as part of a multimethod research to support the product development and experimental study.
4.4.2. The Purpose of the Literature Analysis

There are many valuable reasons for the time and effort involved in a thorough literature analysis so that it proceeds in a logical and efficient way.

Bourner (1996)\(^9\) indentified key components of this process, including:

- **To identify gaps in the literature**
  : This helps to identify the areas of existing mind body interventions that have not yet been thoroughly researched yet.

- **To avoid reinventing the wheel**
  : This helps to save time and prevent repeating others’ mistakes.

- **To carry on from where others have already reached**
  : This makes sure that this research builds on existing knowledge and ideas and supports the development of the new product.

- **To identify other people working in the same fields**
  : This helps to identify a valuable researcher network.

- **To increase the breadth of knowledge of the subject area**
  : This helps to widen the understanding of the implications and applications of the study.

- **To identify opposing views**
  : This helps to sharpen the researcher’s approach to any areas of controversy.

- **To put your work into perspective**
  : This helps for example to identify the value of mind body interventions in the educational field.

- **To identify methods that could be relevant to the project**
  : This helps to choose experimental criteria and research methodology.

4.4.3. Literature Analysis Tools Design

According to Afolabi (1992)\(^10\) the tools for a literature analysis include “the use of indexes and abstracts to conduct exhaustive bibliographic searches,” so as “to organize the collected data meaningfully, describe, critique and relate each source to the subject of the inquiry, and present the organized review logically, and last, but by no means least, to correctly cite all sources mentioned.”
In the present study, published studies in academic journals, published books, recognized sources of statistics etc., were used to determine the criteria for mind-body intervention. The study conducted in following three stages:

1. **Systematic Review of related literature**

   The ancient as well as modern literature was reviewed systematically to identify the major dimensions of the mind-body issue, managing self-development, and educational remedies.

2. **Preparation of Checklist**

   Based on the attributes of the major dimensions, common checklist was prepared for mind-body issue, managing self-development, and educational remedies. For this, standard procedure was followed (Guilford & Fruchter, 1973). The preliminary form of the checklist to assess the status of mind-body issue, science of education, and Managing self-development had 12 items respectively. The details of the checklist are in table 4.1 below.

**Table 4.1**

<table>
<thead>
<tr>
<th>Sample Copy of Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Name of Book/ academic journals/ Report/ Literature</td>
</tr>
<tr>
<td>2. Author(s)</td>
</tr>
<tr>
<td>3. Publisher</td>
</tr>
<tr>
<td>4. Year of Publication</td>
</tr>
<tr>
<td>5. Page Numbers</td>
</tr>
<tr>
<td>6. Where this literature is available?</td>
</tr>
<tr>
<td>7. Is it a standard literature?</td>
</tr>
<tr>
<td>10. Role of mind-body Intervention</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td>11. Importance of mind-body intervention of –</td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td>12. Literature suggested mind-body intervention for -</td>
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</tbody>
</table>

### 3. Source of data

Each of the selected references, accessed from all the available sources, were verified by using the Checklist as developed in this study and data related to the contribution of each of the literatures towards mind-body issue, managing self-development, and educational remedies were collected.

#### 4.4.4. Nature: Plan and Procedure of the Literature Analysis

In the present study, the fundamental issue is to understand the mind and body and their inter-relationship. This involves so many factors for the researcher to investigate to identify which of those many factors were relevant to support the development of a new mind body intervention and to study its effectiveness. The plan and procedure of the study includes the following steps:

- **Step 1:** A literature analysis was undertaken to analyze and interpret, from an historical perspective, fundamental relationship between the mind and the body.
- **Step 2:** From this analysis emerge an understanding of the mind body problem, and its implication for physical health, mental health and society in general.
- **Step 3:** The implication and possible remedies of these issues for education and self-development were reviewed.
• **Step 4:** Based on the understanding of the problems outlined in 1, 2 and 3 above a further literature review was undertaken to explore past and present mind body intervention in order to establish a appropriate components for a new mind body management program with particular reference to education.

![Fig 4.1 : Plan and Procedure of Literature Analysis Method](image)

**4.5 PHASE II: PRODUCT DEVELOPMENT**

**Objective 3** - To develop Mind-Body Management Education program which through managing improve the selected qualities of movement on the body and the mind.

In the product development method for this study, the understandings gained from the literature analysis were applied to the creation of a new mind/body intervention.

**4.5.1 Introduction to Product: MBME Program**

The key aspect of the introduction of the new MBME program was to create a physical movement program that was relevant to the specific needs of contemporary people. It would include aspects of traditional and modern interventions combining the best of both in a new way, applying a interdisciplinary approach, included Physical Education, Psychological Consideration, Management theory, and Science of Education.

New **product MBME (Mind Body Management Education) program** which uses five bodily qualities – Flexibility, Balance, Awareness, Breathing, Beauty/Grace – in a combined movement program in such a way that the physical properties developed in
the body will also be reflected in the psychology of the participants thus educating the
mind through the body.

In this present study 4 stages of process of new product development were used –
Proposed Product, Actual Product, Modified Product, and Final Product – to develop new
mind-body intervention MBME program.

4.5.2 Nature of Product: MBME program

MBME program is a simple, enjoyable, effective movement program that can fit
into modern people’s busy lives, and yet also reduce stress, increase well being inner
peacefulness, and at the same time give their bodies a good daily exercise.

- People are also more likely to participate if the exercise program is varied and
  enjoyable, rather than monotonous and arduous (Balle, 1997)12.

4.5.3 Plan and Procedure of New Product Development (NPD)

For new product development, often referred to as the NPD (New Product
Development) process (Belliveau, Griffin, & Somermeyer, 2002)13, it is important to
follow a clear plan and procedure step-by-step. In the present study this process is divided
into four stages as follows:

Stage 1: Proposed Product:

- Idea generation: Purpose of NPD
- Idea screening: Objects of NPD
- Concept development: Aim of NPD

Stage 2: Actual Product:

- Title of New Product: MBME program
- Developing Activities Based on Theory
- Principles of MBME program
- Structures of MBME program

Stage 3: Modified product:

- Need for modification of the product
- Plan and procedure
- Findings of pilot study
- Resulting modifications
Stage 4: Final product

- Realization and Confirmation of objectives of MBME program
- Creation of final product of MBME program

**Fig 4.2 : Plan and Procedure of MBME product development**

### 4.5.4 STAGE I: PROPOSED PRODUCT

- Idea generation: Purpose of NPD
- Idea screening: Objects of NPD
- Concept development: Aim of NPD

**Fig. 4. 3 : Proposed product**
4.5.4.1 Idea Generation: Purpose of NPD

It is well recognized that idea generation is a key first step in the creation of new products, and the need to identify the need of the new product (Edgett & Cooper, 2012)\textsuperscript{14}.

- The first step was to identify the need for a new mind body intervention. In the previous chapters we have identified through a detailed analysis of the literature the problems of modern people associated with the move from a physically based lifestyle to our present sedentary lifestyle. In particular:
  - A lack of exercise resulting in obesity and the “diseases of civilization” like diabetes and heart disease.
  - The difficulty people have in finding time in their busy schedules for adequate exercise.
  - A dramatic increase in mental problems, especially stress, despite the vast resources applied to attempt to manage this issue.

4.5.4.2 Idea Screening: Objects of NPD

For this second step of new product development, Edgett and Cooper (2012) also identify the importance of “first-rate screening.” This opportunity to confirm that there is a demand for this new product and if the product is the right one for the particular situation at hand (Morgan, 1996)\textsuperscript{15}.

In this study, through the literature review, several key issues were examined to this end:

- The proven scientific value of mind-body interventions.
- The popularity, demand, and acceptability of mind-body interventions today.
- An analysis of the advantages and disadvantages of currently available mind-body interventions.
- What is missing, or can be added to the existing mind-body interventions.

4.5.4.3 Concept Development: Aim of NPD

The next step, concept development, is to create a detailed version of the ideas already considered above. It is a key element in the product development process (Koen
et al., 2001). It includes again a thorough review of the literature as it relates to similar products available with a particular focus on providing a meaningful alternative to those products, creating a product that includes opportunities for learning and self-development. The new mind-body movement intervention needs to have a very clear concept:

- It needs be of a flexible length to fit in with people’s busy lives.
- Easy to learn without the need of a long training process.
- Enjoyable so the participants are more likely to continue the program.
- Provides a good physical workout including adequate calorie usage.
- Can be managed at home without needing to visit expansive gyms.
- To allow participants to relax and relieve stress.
- To include the benefits of the slow movement traditional interventions as well as the more modern fast moving interventions.
- To include key components which will ensure that the physical changes will also become mental changes, changes that are critical in this age of rapid change:
  - Flexibility
  - Balance
  - Awareness
  - Breathing
  - Beauty&Grace
- Providing the participants, through these components, an opportunity to learn about their bodies and themselves.

Through that learning process, to provoke an understanding that the changes depend only on the enthusiasm only they can bring to their participation: self-development.

4.5.5 STAGE II: ACTUAL PRODUCT

- Title of new product: MBME program
- Developing activities based on theory
- Principles of MBME program
- Structures of MBME program
4.5.5.1 Title of New Product: MBME program

An important part of new product development includes creating a good title that conveys the essence of the product that emerges from the stage I, the proposed product.

For this product the title includes an interdisciplinary element – a combination of mind and body, management, and education. A major outcome of the new product is self-development.

- Mind-body: the program benefits both mind and body
- Management: the program uses components based on management theory.
- Education: the program is learning process
- Self-Development: the program is based on self-achievement

The considerations above resulted in the new product title: Mind-Body Management Education (MBME) program on Self-Development.
4.5.5.2 Theory Based on Developing Activities

Actual Product development for creating new Mind-Body Management Education program in the following steps:

- **Step 1: Theory:** Collect theories of various movement programs that are related to body intervention. Ex. Dance Therapy (Mieko, 1998)\(^17\), Movement Therapy (Rodney & Nina, 2004)\(^18\) (McCredie, 2007)\(^19\), Yoga (Tiwari, 2002)\(^20\) (Iyengar, 2001)\(^21\), Pilates (Judy et al., 2005)\(^22\), Tai Chi (Waysun, 1977)\(^23\), NIA (Debbie & Carlos, 2004)\(^24\), Zen Dance (Sun-Ock, 2001)\(^25\), Five Rhythms (Gabrielle, 2001)\(^26\) etc.

- **Step 2: Affect of Mind and Body:** Study the relationship between movements and their effect of the selected qualities (flexibility, Balance, Breathing, Awareness and Beauty& Grace) on the body and the mind.

- **Step 3: MBME program Activities:** Design the activity for each of the selected qualities.

The following table 4.2 describes the theories and activities of Mind-Body Management Education (MBME) program.

**Table 4.2**

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Name of MBME Element</th>
<th>Step 1: Theory</th>
<th>Step 2: Affect of Mind and Body</th>
<th>Step 3: MBME program Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flexibility</td>
<td>Dance, Movement Therapy, Kundalini Yoga, Artistic Yoga, Yoga, Pilates</td>
<td>M: Responsive to change, B: Capable of being bent or flexed, ease of movement</td>
<td>1. March &amp; Jump on the spot 2. Upper Body Twist 3. Surya Namaskar</td>
</tr>
<tr>
<td>3</td>
<td>Breathing</td>
<td>Zen Dance, Yoga, Vippasana, Dance Therapy, Yoga Dance</td>
<td>M: Relaxation, B: Deep Breathing</td>
<td>1. Watching the breath 2. Breathing with pelvis and trunk 3. Movement from feet to head (with breathing)</td>
</tr>
</tbody>
</table>
4.5.5.3 Principles of Mind-Body Management Education (MBME) Program

Product development method for Mind-Body Management Education (MBME) program is using F.I.T.T. Principle (Wachner, 2012)27. She explains, “The F.I.T.T. Principle is one of the foundations of exercise, a set of guidelines that help you set up a workout routine to fit your goals and fitness level while helping you get the most out of your exercise program.” F.I.T.T. stands for frequency, intensity, time, and type. Also she said, “The F.I.T.T. Principle is important because it outlines how to manipulate your program to get in shape and get better results. It also helps you figure out how to change your workouts to avoid boredom, overuse injuries and weight loss plateaus.”

To safely apply the principles of MBME program, the F.I.T.T. guidelines were followed:

The following table 4.3 describes the F.I.T.T. principles of MBME program.

<table>
<thead>
<tr>
<th>Principles</th>
<th>Definition</th>
<th>Suggested MBME Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>How often you exercise</td>
<td>Suggested daily and minimum 3-5 days a week</td>
</tr>
<tr>
<td>Intensity</td>
<td>How hard you work during exercise</td>
<td>Using the suggested variety of movements to stimulate your body within your limits of comfort and enjoyment.</td>
</tr>
<tr>
<td>Time</td>
<td>How long you exercise</td>
<td>Suggested 30 minutes – 60minutes.</td>
</tr>
<tr>
<td>Type</td>
<td>The type of activity you're doing</td>
<td>5 different movement activities: Flexibility, Balance, Breathing, Awareness, &amp; Beauty/Grace</td>
</tr>
</tbody>
</table>
Certain principles must be followed if a participant is to make steady progress in practices and training programs and to avoid illness and injury. For that Principle of Regularity, Individuality, Progression, Specificity, Overload, Recovery, and Reversibility can be applied when developing a new product of physical program.

- **Regularity:**

  “The regularity principle” is based on the old adage of “use it, or lose it” and state that physical activity must be performed on a regular basis to be effective. Any fitness gain attained through physical activity will be lost if the person does not continue to be active. The various body systems respond differently to discontinuation of training and physical inactivity.

  For the present study the investigator made a great effort to conduct her MBME program on regular basis. Participants were motivated continuously maintain the regularity of the program.

- **Individuality:**

  “The individuality principle” takes into account that each person begins at a different level of fitness, each person has different personal goals and objectives for physical activity and fitness, and each person has different genetic potential for change.

  This principle was followed in the present program. Every individual’s fitness level was considered – allowing each person to begin at their own level, depending on his or her own physical limits of comfort and enjoyment.

- **Progression:**

  “Progression” refers to how an individual should increase the overload. Proper progression involves a gradual increase in the levels of exercise that is manipulated by increasing frequency, intensity, or time, or a combination of all three components. It is important to emphasize that all progression must be gradual to be safe. To emphasize that improving person’s fitness level is a continual, ongoing process.

  With increasing fitness levels of the participants’ intensity, the load of exercise was increased in the present program.

- **Specificity:**

  “The specificity principle” states that explicit activities that target a particular body system must be performed to bring about fitness changes in the area. Training will only improve those parts of the body being trained e.g. stretching the body will increase
the body flexibility, expressive movement will increase the quality of beauty and grace in the body and the mind. Therefore, training should reflect the type of body movement required for whatever program is being trained.

The Mind-Body Management Education program is designed so that the participants can experience the improvements in outcomes.

To develop MBME program must be trained to show improvement. Therefore in the present program, the activities are arranged so that the participants work at a continuous steady pace for a long period of time to improve the level of physical response. The objective of the MBME program was to improve physical wellbeing and reduce stress.

- **Overload:**

  The overload principle states that a body system must perform at a level beyond normal in order to adapt and improve physiological function and fitness. To become more efficient the specific body systems must be exercised at a level above that which can be carried out comfortably i.e. training must exceed the typical daily demand and the body should be worked harder than usual.

  The symptoms of overload were known to the researcher and as per that program were conducted.

- **Recovery:**

  Training cannot be rushed. The body requires time for the improvement in physiological mechanisms to be implemented. Overload training must not be done daily as it can damage muscle fibers, and time must be allowed for muscles to heal. If training intensity is increased too quickly this can lead to increased risk of illness, injury, and fatigue or cause one to peak too quickly.

  Sufficient recovery period was given throughout the program.

- **Reversibility**

  As the cliché says “Use it or loose it.” Unfortunately, it usually takes longer to develop endurance than to lose it, as muscles quickly lose their ability to use oxygen efficiently. In fact with complete bed rest, fitness can decline at a rate of almost 10% per week! Therefore, a balance must be found between exercise and rest.

  Knowing this principal the investigator managed her program by maintaining the intensity and load in program and giving appropriate-recovery period.
4.5.5.4 Structures of MBME Program

MBME program provides a unique balance between the disciplines of slow movements on the one hand and free expressive movements on the other.

Fig. 4.6 : Structures of MBME program

4.5.6 STAGE III: MODIFIED PRODUCT

After the initial stage of development of the actual product, it was now necessary to confirm the practical details of the new intervention and to make any appropriate modifications. In this stage, using a pilot study it provided the opportunity to support the realization of the final modified MBME program.

4.5.6.1 Need for Modification of the Product

The actual product needs to be modified by applying the program to the different populations. In particular it was important to assess the acceptability, ease of participation, pleasure of participation, enthusiasm and interest in continuing the process.

Through the pilot study for the modification of the product, the following aspects needed to be considered:

- Proper duration of the session
- Number of activities
- Sequence of movements
- Way to introduce the concept of this new product
- Structures of program
- Frequency of program
- Intensity of program
The following practical questions also need to be answered:

- How much time for one session?
- How often to conduct the sessions?
- How many different activities to include?
- How to combine the different components?
- Was this combination practical?
- How much time for each component?
- What is the best order of the different components?
- Is this program equally appropriate for both genders and different age groups?
- How to help the participants understand that this physical intervention was a mind-body process, which included a psychological outcome?

4.5.6.2 Plan and Procedure

This included testing out different combinations of the components for different lengths of time in different groups.

Over the course of four years the researcher conducted many sessions in different countries for different lengths of time with different age groups, sometimes individually and other times in groups of different numbers.

This pilot study work included:

- March 2008, Korea (3 days) – 70 participants
- August 2009, Hangzhou, China (5 days) - 140 participants
- September 2010, University of Pune, India (5 days) - 31 participants
- August 2011, ShenZhen, China (5 days) – 100 participants
- July 2012, ShenZhen, China (3 days) – 150 participants
- March 2013, Hangzhou, China (3 days) – 29 participants
- From March 2008 to December 2012 – Individual sessions

The following table 4.4 contains the feedback from different groups during the pilot study on the MBME program.
Table 4.4

Suggested Feedback from Pilot Study

<table>
<thead>
<tr>
<th>When</th>
<th>Where</th>
<th>Suggested Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2008</td>
<td>Korea</td>
<td>- Difficulty in following too many sequences.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Initial explanation has to be longer for the first session.</td>
</tr>
<tr>
<td>August 2009</td>
<td>Hangzhou, China</td>
<td>- At the beginning of the sessions people often found it difficult to understand the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mind-body process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Maximum of 50 participants is ideal.</td>
</tr>
<tr>
<td>September 2010</td>
<td>University of Pune, India</td>
<td>- Daily 60-minute sessions were too hard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Difficulty sitting on the floor without the mat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Comfortable clothes; no shoes is better for the participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Enough space is needed to move the whole body.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Theoretical background needs to be given.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Initial explanation has to be longer for the first session.</td>
</tr>
<tr>
<td>August 2011</td>
<td>ShenZhen, China</td>
<td>- Needed to add more active movements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The movement needed to be repeated more often.</td>
</tr>
<tr>
<td>July 2012</td>
<td>ShenZhen, China</td>
<td>- Use of a variety of more modern movements required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Daily 60-minute sessions were too long.</td>
</tr>
<tr>
<td>March 2013</td>
<td>Hangzhou, China</td>
<td>- A greater variety of movements were needed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Total time had to be less than 1 hour.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Free expressive movements were difficult for beginners; this had to be explained</td>
</tr>
<tr>
<td></td>
<td></td>
<td>well for them to follow easily.</td>
</tr>
<tr>
<td>From March 2008</td>
<td>Pune, India</td>
<td>- Total duration of the sessions had to be reduced.</td>
</tr>
<tr>
<td>To December 2012</td>
<td></td>
<td>- Structure of the program had to be explained in a better way.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- More explanation and guidance was required about the free expressive movements.</td>
</tr>
</tbody>
</table>

4.5.6.3 Findings of Pilot Study

Through this random sampling, pilot study approach, the following conclusions emerged:

1. Duration of the sessions:
   - A single 60-minute session was well accepted by most people.
   - Daily 60-minute sessions became too hard for many participants.
• Daily 30-minute sessions were well accepted by most people.
• 3-5 consecutive days improved the participants’ regular follow-up in most cases.

2. Structures of the sessions:
• During that 30 minutes, it was best to divide the session into 3, 10-minute sections
• The easiest combination for the participants was to spend 10 minutes of flexibility and balance, 10 minutes of awareness and breathing, and 10 minutes on the physical interventions to promote beauty and grace, in that order.

3. Population Findings:
• Both genders found this format very acceptable.
• Young and old found this format very acceptable.

4. Understanding:
• At the beginning of the sessions people often found it difficult to understand the mind-body process, and that it included a psychological outcome.
• The solution to this issue was to include an explanation of the mind-body interrelationship during the presentation of each of the physical components.
• This understanding evolved naturally as the sessions continued and they experienced the program.

4.5.6.4 Resulting Modifications Based on Findings of Pilot Study

From the findings of the pilot study the final format of the MBME program was realized and confirmed as follows:

• The duration of each session is limited to 30 minutes.
• An initial 3-5 consecutive days is valuable to support regular follow-up.
• The structure of each session is composed of three parts: 10 minutes of flexibility and balance, 10 minutes of awareness and breathing, and 10 minutes on the physical interventions to promote beauty and grace.
• The explanation of each physical component includes a description of the psychological outcomes and the understanding of the mind-body interrelationship.
This modified product procedure allowed for the creation of the final format of the new MBME product for presentation and study.

4.5.7 STAGE IV: FINAL PRODUCT

After the initial stages of development described above in detail, the next step was to include all the feedback, and lessons learned. It was important to make sure that these suggested changes could be added in a way that supported the core theoretical principals of the program. Then the new product could be finalized for the experimental study of effect on MBME program.

4.5.7.1 Realization and Confirmation of Objectives of MBME program

The researcher realized the changes that needed to be made based on the feedback and lessons learned. Theses suggested changes listed below were confirmed to finalize the new product – keeping in mind the objectives of the MBME program:

The objectives of MBME program are the following:

- To effect mind through the body using the new mind-body intervention.
- To provide the participants with appropriate physical exercise and body movements.
- To help participants integrate their bodies and minds through MBME.

The confirmed changes are the following:

- Total session time limited to 30 mins.
- 5 components are divided into 3 stages.
  -10 mins: Flexibility & Balance
  -10 mins: Breathing & Awareness
  -10 mins: Beauty/Grace
- The sequence of activities is limited 3 movements of each component.
  -Flexibility activity - 1, 2, 3
  -Balance activity - 1, 2, 3
  -Breathing activity - 1, 2, 3
  -Awareness activity - 1, 2, 3
  -Beauty/Grace activity - 1, 2, 3
- The structure of the activities combined traditional and modern approaches.
• The MBME is designed to be not too simple to be boring, and not too complicated to frustrate beginners.

• During the session, the explanation of each physical component includes a description of the psychological outcomes.

• Follow up guidance is needed to give to all participants.

4.6 PHASE III: EXPERIMENTAL: Effectiveness of MBME program

Objective 4- To determine the effects of the MBME program on the body and the mind.

In the experimental method are designed after literature analysis and product development, to study and analyze the effects of MBME program on the body and the mind.

4.6.1 Research Design

The perfect research design decides the accuracy in results and quality of research findings. Research is a scientific process hence research experts like Edwards (1968)28, Kerlinger (1978)29, Winer (1978)30 and many others considered research design as a controlled mechanism governed by the principle of “Max Con Min.”

The ‘Max’ part of which gives an understanding to the investigator to go for ‘Maximum’ systematic variance, whereas the ‘con’ segment of the principle stands for ‘control’ over unwanted (extraneous) variables and ‘min’ part of it explains the investigator the principle to ‘minimize’ error variables so as to get the reliable data on the basis of which results may be generalized. A properly designed research only can guide the correct act to be done and indicates the steps to be taken in sequential manner for collecting the empirical data while verifying hypothesis. The research design is hence known as a ‘blue print’ of research engine that guides the researcher in the data collection stages, which gives direction to the investigator, whether her research process is on the right path of not” (Gratton & Joines, 2004)31.

4.6.1.1 Experimental Design

For the experiment, the researcher used the single group, pretest- posttest design. This design provides some improvement as the effects of the treatment are judged by the difference between the pre-test and the post-test scores. A comparison with a control group is provided. The experimental has been planned in three phases.
4.6.1.2 Details of Experimental Study

Main Experimental Study is to investigate the effect of a 3-month, long-term MBME program. The pre-test happened in both the experimental and the control group before the experimental group continued with the MBME program. The post-test was conducted in both groups after the experimental had completed the full 3-months’ treatment.

The treatment of MBME program has 15 sessions, divided into two sections. The first, a 5-day intensive on consecutive days with the 30-minute session each day. The second, the ongoing program of 10 weekly 30-minute session. (The initial intensive 5-day program ensured that only those who were able to complete this first section were allowed to continue to sign up the full study. This allowed the researcher to determine which participants would have the motivation and time to follow through with the full 10 weeks of the study.)

Comparing those of the experimental group who have participated regularly in the 3-month treatment program with those in the control group who have not received the treatment program.

1. Experimental group

<table>
<thead>
<tr>
<th>Selection of Group</th>
<th>Pre Test</th>
<th>Treatment of MBME Program (5 times)</th>
<th>Ongoing MBME program (10times)</th>
<th>Post Test</th>
</tr>
</thead>
</table>

Fig. 4.7 : Flow chart of Research Design for Experimental group

- Selection of Group will be with purposive random sample selection. The selected group will spend 1 hour on day 1 for an introduction to MBME for Self Development.
- Pre-Test will be performed on day 2 before beginning the intensive MBME program.
- Treatment of MBME Program will happen on day 2-6 for 1 hour each day (5 times).
- Ongoing program will be conducted with whoever completed the 5-days program. It will be weekly, 10 times in 3 months.
• **Post-Test** will be performed after complete ongoing program at the end of 3 months.

The following table 4.5 describes the time schedule of Mind-Body Management Education (MBME) program.

### Table 4.5

<table>
<thead>
<tr>
<th>Timing</th>
<th>Frequency</th>
<th>Topic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Once for 2 hours (1day)</td>
<td>Introduction and Pre-test</td>
<td>Explanation of MBME on Self-Development and conduct Pre-test</td>
</tr>
<tr>
<td>Day 2~6</td>
<td>Each day for 1 hour (5days)</td>
<td>Intensive MBME program for experimental group</td>
<td>To conform the attendance and sign up for ongoing program</td>
</tr>
<tr>
<td>From 2(^{nd}) week to 3(^{rd}) month</td>
<td>Once a week for 1 hour (10 times)</td>
<td>Follow up/ongoing intensive MBME program</td>
<td>MBME treatments for an experimental group</td>
</tr>
<tr>
<td>End day of the 3(^{rd}) months</td>
<td>2 hours (1day)</td>
<td>Post test</td>
<td>Main experimental study: research testing at the end of 3(^{rd}) months</td>
</tr>
</tbody>
</table>

#### 2. Control group

![Flow chart of Research Design for Control group](image)

- **Selection of Group** will be with purposive random sample selection. The selected group will spend 1 hour on day 1 for information of process for control group.
- **Pre-Test** will be performed on day 2.
- **No Treatment of MBME Program for 3 months.**
- **Post-Test** will be performed at the end of 3 months.
4.6.2 The Population

The study would benefit from studying as large a population as possible.

The target population will be physically healthy individuals of both genders. For this study, the selected the sample will be drawn from the accessible population: postgraduate students from one university, Pune University in that one city.

4.6.2.1 The Sample

It has been stated earlier that the primary purpose of the research is to discover principles that have universal application. Therefore, arriving at sound inferences and findings, generalizable to the greater population, has become a target in this scientific enquiry. But to study a whole population for arriving at generalizations is impossible in maximum cases. Thus, in the present investigation instead of studying the entire population, the sample drawn has been studied.

The major task in a sampling process is to select a sample from the defined population by an appropriate technique that ensures the sample is representative of the population and as far as possible not biased in any way. The sample must be adequately large in size so that the power of generalization of the findings is high enough to provide an accurate estimation of the properties of the population.

4.6.2.2 The Sample Size

Borg and Gall (1979)\textsuperscript{32} suggest that co relational research require a sample size of no fewer than thirty cases, that casual comparative and experimental methodologies require a sample size of no fewer than fifteen cases. Gratton and Jones (2004)\textsuperscript{33} advice in his book that a sample of 100 is likely to provide equally accurate results whether the population consists of 5,000 or 50,000. Also earlier researcher Sonawane (2002)\textsuperscript{34} and Deshpande (2007)\textsuperscript{35} did their co relational study in the sample size of 560 and 579. To study a whole population for arriving at generalization is impossible in maximum cases. Thus, in the present investigation instead of studying the entire population, the sample drawn has been studied.

100 students of age group 20 to 29 years, preferably studying for their P.G. courses.

Sample selection technique: Purposive random sample selection.

4.6.2.3 Procedure of the Sample Selection

Since the Pune city is expanding its periphery, the samples for the study were
widely scattered. Hence, the Multi-phase sampling technique was used. In multi phase sample the purposes change at each phase, for example, at phase one the selection of sample might be based on the criterion of geography; phase two might be based on an economic criterion; phase three might be on a political criterion. In the present study at the first phase researcher considered geographical area of Pune city, second phase researcher considered economic status of the University. For this purpose researcher classified University based on their teaching medium i.e. English and Marathi. For third phase the status of physically healthy individuals of both genders of postgraduate students from one university, Pune University in that one city.

4.6.2.4 Techniques of Sampling

For the experiment, purposive random sampling technique was used. The researcher as per her feasibility and limitation of the resources used the said technique. 100 students were selected considering their availability, willingness and teacher’s permission from department to participate as subject in experiment.

The researcher selected from the accessible population, this group will be subject to purposive random sampling methodology to provide both an experimental and control group for the experiment.

4.6.3 Internal Validity of Research Designs

The internal validity of research designs requires that other factors be ruled out as rival explanations of the observed association between the variables under investigation.

These factors can be classified as those that are extrinsic to the research operation and those that are intrinsic and which impinge on the results during the study period.

4.6.3.1 Extrinsic Factors

Extrinsic factors can account for possible biases resulting from the differential recruitment of research participants to the experimental and control groups. These selection factors can produce differences between the experimental and control groups prior to the research operation. Selection effects are especially problematic in cases in which the individuals themselves decide whether to participate in an experiment.

In such cases, the investigator cannot tell whether the independent variable itself caused the observed differences between the experimental and control groups, or whether other factors related to the selection procedures were responsible for the observed effects.
4.6.3.2 Intrinsic Factors

Intrinsic factors can account for changes in the individuals or the units studied that occur during the study period, for example, changes in the measuring instrument, or the reactive effect of the observation itself.

There are seven factors to consider (Campbell & Stanley, 1963)\textsuperscript{36}:

1. History

The history refers to all events occurring during the time of the study that might affect the individuals studied and provide a rival explanation for the change in the dependent variable.

In the present study, the only historical issue that arose was the need to reschedule date of one session due to a national holiday.

2. Maturation

Maturation involves biological, psychological, or social processes that produce changes in the individuals or units studied with the passage of time. These changes could possibly influence the dependent variable and lead to erroneous inferences. For example, over a long-term experiment, subjects may grow physically or intellectually, or may become more rigid or more tolerant, or they develop health problems or conversely experience improved health.

In this present study, the total duration of the experiment was limited to three month, during a fairly quiet period in their scholastic year during a time when weather was stable. There were no additional maturation factors beyond the affect of the study that the researcher was aware of.

3. Experiment mortality

Experimental mortality refers to dropout problems that prevent the researcher from obtaining complete information on all cases. When individuals drop out selectively from the experimental or control group, the final sample on which complete information is available may be biased.

In this case, the study began with 100 students for the experimental and control groups – 50 in each group. From the experimental group there were 7 dropouts, and from the control group 12. There is no reason to suspect that the absence of these individuals caused of statistical bias to the results or provide a rival explanation for the change in the dependent variables of the study.
4. Instrumentation

Instrumentation refers to changes in the measuring instruments between the pre-test and the post-test. To associate the difference between post-test and pre-test scores with the independent variable, one has to show that repeated measurements with the same instrument under unchanged conditions would yield the same results. The stability of measurement is also referred to as reliability, and its absence can be a threat to the validity of experiments.

The most important method of avoiding this threat of the influence of instrumentation is to include a control group in the study. If the change between post-test and pre-test scores is a result of the instrument's unreliability, this will be reflected in both groups. Yet only when the groups are exposed to identical testing conditions does this method of control provide a solution to the instrumentation problem.

In this case, the researcher made every effort to ensure identical testing conditions. The testing was all performed at the same time of day in the same location, using the same assistants for both the pre-test and post-test. The research also used standardized instrumentation that was easy to conduct which had clear simple instructions for their application.

5. Testing

The possible reactivity to measurement is a major problem in social science research. The process of testing may itself change the phenomena being measured. A difference between post-test and pre-test scores could thus be attributed, not necessarily to the independent variable but rather to the experience gained by individuals while taking the pre-test. Using a control group is also an answer to the matter of reactivity to testing. The reactive effect of measurement, if present, is reflected in both groups and leaves no grounds for misinterpretation.

In this present study, a control group was used and there was no indication of any concern on this issue.

6. Regression artifact

The regression artifact is a threat that occurs when individuals have been assigned to the experimental group on the basis of their extreme scores on the dependent variables. When this happens and measures are unreliable, individuals who scored below average on the pre-test will appear to have improved on re-testing. Conversely, individuals who scored above average on the pre-test would appear to have done less well on re-testing.
In this case, by random purposive sampling of the experimental and the control group, the researcher found no evidence that there were any affects on the results due to regression artifact.

7. **Interactions with selection**

   • Selection-history

   Selection-history interaction results when the experimental group and the control group are selected from different settings so that each might affect their response to the treatment.

   In the present study both the experimental and control group was selected from the same settings: students of one university in the same scholastic year.

   • Selection-maturation

   Selection-maturation interaction occurs when the experimental group and the control group mature at a different rate.

   In the present study both the experimental and control group was selected from a similar age group, all studying for postgraduate degrees. In addition the length of the study, 3 month, made it unlikely that selection-maturation was a problem.

4.6.3.3 **Procedures of Control Extrinsic/Intrinsic Factors**

   Extrinsic and intrinsic factors that threaten the internal validity of causal inferences may be controlled by several procedures as follows: (Trochim, 2004)\textsuperscript{37}.

   • Control procedures for extrinsic factors
     
     – Matching: Controls for variables that are known to the investigator prior to the research operation.
     
     – Randomization: Helps to offset the effect of unforeseen factors

   • Control procedures for intrinsic factors
     
     – Intrinsic factors are controlled by using a control group from which the experimental stimulus is withheld.
     
     – Ideally, the control and experimental groups are selected randomly or by matching so that they will have the exact same characteristics and are also under identical conditions during the study except for their differential exposure to the independent variable.
     
     – Features of the experimental situation or external events that occur during
the experiment are likely to influence the two groups equally and will not be confounded with the effect of the independent variable.

In this present study, the researcher followed all the best practices as outlined above to avoid these threats to the results.

4.6.4 Variables Measured

The selected tests were chosen specifically to measure the changes in both the body and mind of MBME program participants. Standard test tools were used for the collection of data.

There are 17 measured variables used for this present study. Variables 1 to 6 relate to the five selected components of MBME program and variables 7 to 17 relate to self-development, which MBME program is designed to support.

The following table 4.6 describes the tools used to measure the variables.

<table>
<thead>
<tr>
<th>Components</th>
<th>Variables</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Flexibility</td>
<td>Flexibility</td>
<td>Sit &amp; Reach Test</td>
</tr>
<tr>
<td>2 Balance</td>
<td>Balance</td>
<td>Standing Stork Test</td>
</tr>
<tr>
<td>3 Breathing</td>
<td>Breathing</td>
<td>Resting Respiratory Rate</td>
</tr>
<tr>
<td>4 Awareness</td>
<td>Awareness</td>
<td>Ruler Drop Test</td>
</tr>
<tr>
<td>5 Beauty/Grace</td>
<td>1. Self-Evaluative Salience</td>
<td>Body Image Assessments: ASI-R</td>
</tr>
<tr>
<td></td>
<td>2. Motivational Salience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Competence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Lovability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Likeability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Self-Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Personal Power</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Moral Self-Approval</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Body Appearance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Body Functioning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Identity Integration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Defensive Self-Enhancement</td>
<td></td>
</tr>
</tbody>
</table>
4.6.4.1 Data Collection for Physical Measurements

1. Flexibility: Sit & Reach Test

![Sit & Reach Test](image)

**Fig. 4.9 : Sit & Reach Test**

- **Purpose:** The objective of this test is to monitor the development of the participant’s flexibility.

- **Preparation:** The assistant secures the ruler to the box top with the tape so that the front edge of the box lines up with the 23cm (9 inches) mark on the ruler and the zero ends of the ruler points towards the participant.

- **Procedure:** The participant sits on the floor with their legs fully extended with the bottom of their feet against the box.
  - The participant places one hand on top of the other, slowly bends forward and reaches along the top of the ruler as far as possible holding the stretch for two seconds.
  - The assistant records the distance reached by the participant’s finger tips (cm)
  - The participant performs the test three times.
  - The assistant calculates and records the average of the three distances and uses this value to assess the participant’s performance.

- **Expected duration:** 20 minutes
2. **Balance: Standing Stork Test**

- **Purpose:** The objective of this test is to monitor the development of the participant’s ability to maintain a state of equilibrium (balance) position.

- **Procedure:** Stand comfortably on both feet. Lift one leg and place the toes of that foot against the knee of the other leg. Raise the heel and stand on your toes. Assistant starts the stopwatch the moment the participant is in correct posture. Balance for as long as possible without letting either the heel touch the ground or the other foot move away from the knee. Assistant records the time the participant were able to maintain the posture.

- **Plan:** Each participant is tested 4 times. Standing on each leg, with eyes open and closed. The participants of each group can be tested one at the time. The 4 groups are tested simultaneously.
Expected duration: 10 minutes.

Fig. 4.12. Actual photograph of the Subject on Standing Stork Test

3. **Breathing: Resting Respiratory Rate**

- **Purpose:** The resting respiratory rate will be measured at rest and simply involves counting the number of breaths for one minute by counting how many times the chest rises.

- **Procedure:** Sitting comfortably on the mat with eyes closed breathing naturally. The participants of each group can be tested one at the time. The 4 groups are tested simultaneously.

- **Expected duration:** 15 minutes.

Fig. 4.13: Actual photograph of the Subject on Resting Respiratory Rate Test
4. **Awareness: Ruler Drop Test**

   ![Fig. 4.14. Ruler Drop Test](image1)

   - **Purpose:** The objective of this test is to monitor the athlete’s reaction time.
   - **Preparation:** The ruler is held by the assistant between the outstretched index finger and thumb of the participant’s dominant hand, so that the top of the participant’s thumb is level with the zero centimeter line on the ruler. The assistant instructs the participant to catch the ruler as soon as possible after it has been released.
   - **Procedure:** The participant stands with their dominant arm relaxed as in the photo. The index finger and thumb are parallel and the participant focuses on the ruler. The assistant without warning releases the ruler. The catch point is recorded. The test is repeated 3 times. The participants of each group can be tested one at the time. The 4 groups are tested simultaneously.
   - **Expected duration:** 10 minutes.

   ![Fig. 4.15 : Actual photograph of the Subject on Ruler Drop Test](image2)
4.6.4.2 Data Collection for Psychological Measurements

5. Beauty & Grace: Body Image Assessments: ASI-R
   - **Purpose:** The Appearance Schemas Inventory-Revised (ASI-R) is an empirically validated, extensive revision of Cash and Labarge’s (1996) original assessment of individuals’ psychological investment in their physical appearance. This 20-item measure consists of two subscales vis-a-vis one’s cognitive-behavioral investment in one’s own appearance—Self-Evaluative Salience (12 items) and Motivational Salience (8 items). Self-Evaluative Salience reflects the extent to which individuals define or measure themselves and their self-worth by their physical appearance, which they deem influential in their social and emotional experiences. Motivational Salience pertains to the extent to which persons attend to their appearance and engage in appearance-management behaviors.
   - **Expected duration:** 10 minutes.

6. Self-Development: Multidimensional Self-Esteem Inventory: MSEI
   - **Purpose:** The MSEI, based on a coherent model of self-concept and self-esteem, measures global self-esteem and its eight components: Competence, Lovability, Likeability, Personal Power, Self-Control, Moral Self-Approval, Body Appearance, and Body Functioning.
   - **Expected duration:** 40 minutes.
   - **Procedure for the psychological instruments:** Mark all of your responses on the rating sheet provided. DO NOT ERASE! If you need to change a response, make an “X” through the incorrect response and then fill in the correct circle. It is best to rely on first impressions in answering each item and be sure to respond to all of the statements. Write at the top of the rating sheet your name, group name and number, age, gender and the date.
   - **Equipments:** Pencil, Item Booklet and Rating Sheet
Fig. 4.16 : Actual photograph of the Subject on Psychological Instruments Test

4.6.5 Facilities and Equipment

Yoga mats

Music: iPod and speaker

Poster of each component of MBME

Camera and video for recording the study

Comfortable clothes (no shoes)

Tissue boxes and water
4.6.6 Procedure of Test Administration

The 40 participants are divided into 4 groups (A, B, C, and D) of 10 participants. Each participant is given a number based on which group they are in: A 1–10, B 1–10 and so on.

From each group 1 participant will be chosen to administer the tests to the other 9. These 4 helpers will be tested by the researcher.

4.6.7 Statistical Tools and Techniques Used

Data obtained through the questionnaires was input in Microsoft Excel. It was then exported and analyzed statistically using the Statistical Package for Social Science (SPSS version 16.0). The following statistics was used to analyze the data:

- Descriptive statistics (for analyzing findings using frequencies, means, standard deviations, skewness and Kurtosis)
- Correlation analysis (for testing association between variables of study)

According to Libarkin & Kurdziel (2002)\(^{38}\), descriptive statistics can be used to describe and reveal participant characteristics, answers to research questions and summaries research findings in statistically meaningful ways.

Therefore, in order to present the essential characteristics of the data in the study, data obtained from physical measurements and questionnaires were arranged into an interpretable form using SPSS to calculate numerical indexes (Johnson & Christensen, 2004)\(^{39}\) such as frequency distributions, averages, percentages of item responses, mean scores (M) and standard deviation (SD) for categorical variables.

To investigate the association between variables that affect the mind/body, correlation analysis was performed on the data (using paired samples t-test in SPSS).

4.7 PROCEDURE OF THE RESEARCH

1. Through literature analysis to assess the appropriate components and identify body based programs and their effect on the body and the mind.
2. Developing product: MBME (Mind-Body Management Education) program.
3. Select schools for experimental study (using stratified random sampling).
4. Prepare tools for data collection:
   - Prepare two different time schedule for experimental and control group.
   - Prepare tools for physical measurements and questionnaire for psychological measurements.
   - Prepare checklist for results.
5. Take an appointment for classroom for conducting MBME program and measuring data.
6. Collect data and Analyze statistically.
7. Generalizations and/or predictions based on findings.
8. Conclusion and suggestions

Fig. 4.17: Procedure of Research
References


## CHAPTER V

**DATA ANALYSIS AND INTERPRETATION**

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