

Chapter 3

Research methodology

“Developing elementary harmonic ear training exercises for music majors: an approach based on root motion theory and drill technique” uses a one group pretest posttest design.

The overall process involved two phases:

1. Data collection
 - 1.1. Problem statement
 - 1.2. Literature review
 - 1.3. Synthesis of literature
 - 1.4. Determine strategy and solution of the problem
2. Implementation
 - 2.1. Create the research instruments
 - 2.2. Developing the exercises
 - 2.3. Having the exercises reviewed by experts and correct accordingly
 - 2.4. Selecting a sample group
 - 2.5. Implementing the lessons with sample group
 - 2.6. Data analysis
 - 2.7. Conclusion

Rationale

My approach to the solution of the problem is to design harmonic ear training exercises that apply root motion theory and use drill technique.

The drill technique is an efficient teaching method for the development of aural skills but the drill method by itself does not sufficient as a teaching tool. Rogers (1984) says it is not enough just to recognize the sound(s) but we should hear this sound(s) in a musical context. A well-rounded ear-training program demands a 'holistic approach' that learns how to hear a sound in its contextual relationship. (Rodgers, 1984)

This holistic approach is achieved through the adding of root motion theory into the exercises. Students are taught to hear the relationships between chord progressions which results in a more complete and broader hearing experience.

Root motion theory classifies the progressions in **three types**: (contextual relationship)

1. **strong** progressions (S)
2. **weak** progressions (W)
3. **superstrong** progressions (SS)

The adding of chord progression types allows for a more structural hearing, a horizontal way of hearing chord progressions. As Benward (1990) explains "the purpose of dictation is to produce a certain kind of musician who can hear sound as meaningful patterns."

A skill, such as ear training, can often be broken down into still smaller units, called subskills. (Salisbury, 1988) In ear training subskills are used extensively. For example practicing hearing chord qualities is a subskill that needs to be addressed before proceeding to a more difficult task, namely hearing chord progressions, because chords are the building blocks for the progressions. Therefore chord quality identification is incorporated in the lessons as a subskill. These chord identification exercises focus on the vertical aspect of a chord progression.

Population and sample group

The population are 64 music major students from Payap University.

The sample group for this research are 17 music major students that passed the MU211A and MU211B course (Payap University). These were acquired by purposive sampling.

To comply with the purpose of this study purposive sampling has been used, meaning students need to show a genuine interest in the study.

Data analysis method

The data analysis software I used was MS Excel2007 and SPSS (version 16).

The following functions were used:

1. The sum

$$\sum X_i$$

2. the mean

$$\bar{X}$$

3. standard deviation

$$S = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n - 1}}$$

The process of developing the research instruments

This section is organized in the following way

1. Harmonic ear training exercises for music majors designed by the researcher using a root motion and drill approach.
 - 1.1. Developing and try out of the sample lessons
 - 1.2. Pilot study
 - 1.3. The lessons (harmonic ear training exercises)
2. Pre evaluation form for the experts
3. One pre test and post test evaluation set.
4. Two tests during the treatment period.

1. Harmonic ear training exercises for music majors

The harmonic exercises are designed to train the students on three levels:

- the recognition of chord progression types
- chord quality identification
- the recognition of chord progressions

In total 360 exercises were designed, spread out over eight lessons.

1.1 Developing and try out of the sample lessons

Before actual developing all the lessons, sample lessons were made at first, reviewed by experts and then tested with a few students.

After evaluation with advisors (Aug 29, 2008) we decided that a sample lesson should be designed.

I had informal interviews with ear training teachers of the College of Music. These discussions gave me better insights on the level of the students and the contents of the future exercises that I am building. I then proceeded to design sample lessons.

1.1.1 Method

I proceeded in four steps: 1. Define the objectives 2. Creating pilot exercises 3. Implement the exercises 4. Draw conclusions

The pilot lesson used four students: 2 second year students and 2 fourth year student.

1.1.2 The objectives

1. To create a sample lesson using harmonic ear training exercises
2. To see what unforeseen problems might occur
3. To verify how many units can be evaluated in 60 minutes
4. To test the difficulty level of the units
5. To see if the answering sheet is efficient
6. To provide a sample exercise format that can be used for the other exercises

1.1.3 Materials

A room with a computer and audio system was used.

1.1.4 Contents

The exercises used in the pilot lesson were divided into five groups according to different conditions which reflect the level of difficulty.

Group 1: conditions

- Three chord harmonic progression starting and ending on the I chord.
- Chords do not contain sevenths.
- The following chords can be used: I ii iii IV V vi
- The key changes after each exercise.

Example:

The example shows two systems of musical notation. The first system is in the key of D major (two sharps) and consists of three chords: D major (I), E minor (ii), and D major (I). The second system is in the key of B minor (two flats) and consists of three chords: B minor (i), C major (II), and B minor (i).

Group 2: conditions

- Four chord harmonic progression starting and ending on the I chord.
- Chords do not contain sevenths.
- The following chords can be used: I ii IV V vi
- The key changes after each exercise.

Example

The example shows two systems of musical notation. The first system is in the key of D major (two sharps) and consists of four chords: D major (I), E minor (ii), D major (I), and D major (I). The second system is in the key of B minor (two flats) and consists of four chords: B minor (i), C major (II), B minor (i), and B minor (i).

Group 3: conditions

- Four chord harmonic progression starting and ending on the I chord.
- Chords do not contain sevenths.
- First inversion of the IV and V chords are added.

- The following chords can be used: I ii IV IV6 V V6 vi
- The key changes after each exercise.

Example



Group 4: conditions

- Four chord harmonic progression starting and ending on the I chord.
- Chords do contain sevenths.
- The following chords can be used: I ii ii7 IV IVmaj7 V V7 vi vi7
- The key changes after each exercise.

Group 5: conditions

- Four chord harmonic progression. (not always starting from the I chord)
- Chords do contain sevenths.
- The following chords can be used: I ii ii7 IV IVmaj7 V V7 vi vi7
- The key changes after each exercise.

1.1.5 Objectives for the students:

Students will:

1. recognize chord qualities
2. recognize chord progressions
3. recognize harmonic intervals
4. write down the correct answers on the answering sheet using Roman numeral system

The goal for the students is to answer as accurate as possible on all units.
In case of doubt a question mark should be used.

1.1.6 The sample lesson

	Part 1	Part 2	Part 3	Total
Level	1	2	3	
Contents	20 intervals between minor second and major ninth	10 harmonic progressions (starting on I)	10 harmonic progressions (not always starting on I)	
units	20	28	27	75
Breaks	2 min	2 min	2 min	48:06

Structure of the sample lesson

From a test done at home I calculated that it takes 40 seconds to do one exercise that consisted of four chords.

1.1.7 Results and conclusions

1. Unforeseen problems:

- Students were not ready or late
- Breaks between lessons need to be longer, because students need time to mentally prepare the next listening exercise.

2. Amount of units to be tested:

- I underestimated the timings for the exercises because the 40 sec per chord progression was not enough, more time is needed per unit.
- 75 units were tested in 48:06 (these units included intervals. This is approx 1.5 units per minute.)

3. Experts suggestions: difficulty level of the units

- I choose not include the secondary dominant chords or inversions because they are too difficult as was suggested by the experts and followed up for the creation of the lessons.

- Chord quality exercises were not included but should be in next sample lesson! These were incorporated in the other lessons.
- The answering sheet was good but could be improved to a table style design.

The results were as follows:

Results of a sample lesson

Student	Intervals (20 units)	Chord progressions (55 units)	Total (75)	Total in %
1	15	28	43	57.33%
2	11	32	43	57.33%
3	14	35	49	65.33%
Average	13.33	31	45	60.00%
Time used	10:21 minutes	36:45	48:06	

4. This exercise format could be used for all the other exercises
5. General conclusions:
 1. No chord quality exercises were included, should consider doing so in the real lessons This was suggested by the experts and followed up by the researcher.
 2. The average score for the intervals was at 65%.
 3. The average score for the progressions was at 55%.
 4. Need more breaks in between exercises, this was suggested by the experts and followed up.

5. Timings per units are on the fast side. I underestimated the timings for the exercises thus more time is needed per unit, so more time was given to the students in between the exercises.
6. The answering sheet was adjusted as suggested by the experts.
7. The exercises should not contain seventh chords only diatonic triads, as suggested by the experts and followed up.
8. The exercises should not contain inversions, as suggested by the experts and followed up.

1.2 The pilot study

1.2.1 Objective

A pilot study was done over a period of 4 weeks its purpose was to confirm the problem statement and to collect more data that would allow me to analyze the problems more in detail, especially the delimitation of the study.

1.2.2 Contents of the pilot study

The pilot study consisted of four harmonic ear training tests divided into 3 sections: intervals, chord quality and chord progressions. (Fig. 3) The subjects for the study were 10 second, third and fourth year music major students who volunteered.

The following evaluation standard was used (Ministry of Education).

Grading scale

80 - 100	Grade A
75 - 79	Grade B+
70 - 74	Grade B
65 - 69	Grade C+
60 - 64	Grade C
55 - 59	Grade D+
50 - 54	Grade D
0 - 50	Grade F

1.3 The harmonic ear training exercises

1.3.1 General Objectives (all lessons)

- 1) To create harmonic aural skills exercises for music major students using root motion approach and drill technique.
- 2) To provide a set of sample exercises that can be used for future teachings.

1.3.2 General outcomes (for all lessons)

- 1) The students will have improved the level of their harmonic ear training skills in terms of chord progressions starting and ending on the I chord using the following triads: I ii iii IV V vi.
- 2) The students will have improved the level of their harmonic ear training skills in terms of chord quality identification: major and minor triads.
- 3) The students will have improved the level of their harmonic ear training skills in terms of chord progression types.
- 4) I will have created a set of lessons that can be used for future teachings.
- 5) I will have gained knowledge from the implementation of this alternative approach to developing harmonic ear training skills.

1.3.3 Materials

- 1) Computer with audio system and music software installed (Sibelius)
- 2) LCD projector
- 3) Paper and pencil
- 4) Powerpoints

1.3.4 Design of the lessons

- All lessons are designed to be taught in group.
- All students are doing the same exercises without subdividing the students into smaller groups.
- The course is spread out over eight separate lessons.
- All lessons are practical lessons except for the first lesson which is a combination of practicum and lecturing style in which the principles of root motion are explained,

- The harmonic exercises are designed to train the students on three levels:
 1. the recognition of chord progression types according to the root motion theory principles (Group A)
 2. chord quality identification (Group B)
 3. the recognition of chord progressions (Group C)

An overview of all lessons (360 exercises) can be seen in Fig. 14

2. Pre evaluation form for the experts

Three experts in ear training evaluated the lessons I created. The following table explains the suggestions or comments from the experts and their final judgment.

Expert evaluation form.

	Initial comments and suggestions:	Adjustment made	Final judgment after adjustments
Expert 1	Good as it is No adjustments are needed.	none	Good to go
Expert 2	Good but suggest: Lowering the amount of chords per chord progressions from eight chords to four. Not to include the iii chord in chord progressions. No need to do intervals in the lessons. No need to include augmented, diminished chords and dominant seventh chords.	Yes Yes in some lesson Yes Yes	Good to go

Expert 3	<p>Good but suggest:</p> <p>Change the initial approach to do discovery teaching in the first lesson into a pure lecturing approach from the beginning on. Factual teaching of the theory section is believed to be more time efficient and less confusing.</p> <p>Lowering the amount of chords per progression from eight chords to four.</p> <p>No need to include augmented, diminished chords and dominant seventh chords.</p> <p>No need to include intervals because the research is on chord progressions</p> <p>Minor note mistakes in the exercises.</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>Good to go</p>
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All suggestions were added into the exercises after which I tested the sample lesson with a few students.

3. One pretest and posttest evaluation.

3.1. Objectives:

To evaluate the level of accuracy in recognizing elementary harmonic progressions before and after implementation of the method.

3.2. Method and tools

The ear training tests were either played by the researcher using a keyboard or played by music software. The music software used was Sibelius, which was installed on a pc with windows XP operating system installed. The exercises were programmed by the researcher. Answering sheets were created for the students.

3.3. Evaluation

Each exercise evaluated counts as 1 point and is either correct or incorrect. The maximum score is 40. (40 exercises) The following evaluation standard was used (Ministry of Education)

80 - 100	Grade A
75 - 79	Grade B+
70 - 74	Grade B
65 - 69	Grade C+
60 - 64	Grade C
55 - 59	Grade D+
50 - 54	Grade D
0 - 50	Grade F

3.4. Contents and conditions

In total 40 items are to be evaluated divided in two tests.

Test 1: 10 exercises with the following conditions:

- Harmonic progression consists of two chords and start on the I chord
- Exercises are repeated one time with three seconds in between repeats.
- The following chords can be used: I ii iii IV V vi
- The key changes after each exercise.

Example



Process: The teacher plays the chord progressions using the Sibelius music software after which the student answers on the answering sheets.

Question: identify the chord progression using the following Roman numerals, I ii iii IV V vi. Each exercise consists of two chords.

Test 2: 30 exercises with the following conditions:

- Harmonic progression consisting of four chords and starting and ending on the I chord
- Exercises are repeated one time with three seconds in between repeats.
- The following chords can be used: I ii iii IV V vi
- The key changes after each exercise.

Example



Process: The teacher plays the chord progressions using the Sibelius music software after which the student answers on the answering sheets.

Question: Identify the chord progression using the following Roman numerals: I ii iii IV V vi. Each exercise consists of four chords. The first and last chords are the I chord.

4. Two tests during the treatment.

To ensure that students understand the contents of lesson one, lesson 5 and 7 are evaluated (E1 and E2) using the ear training exercises of lesson 5 and 7.

Condition to be met for success: not less than 70% of the subjects should have a score of at least 65%, grade C+.

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