# Chapter Three

# Methodology and Procedures

This chapter deals with Methodology. It presents a description of the analysis method and of the interview procedures, with its analysis.

## 3.1 Procedures

In order to achieve the aims of the study and to investigate the developments witnessed by the mathematics curricula in Jordan, the researcher has carried out the following procedures:

1. Visiting the Ministry of Education in Jordan, both the curricula and textbooks directorates and the Educational Authentication section of the Ministry, with the aim of gathering available texts and publications related to the educational system curricula, textbooks and educational plans related to mathematics, which could be used towards achieving the study objectives.
2. Reviewing documents, textbooks and publications related to the educational system in Jordan, as well as becoming acquainted with the curricula, textbooks. and study plans mathematics authorized by the Ministry of Education (see chapter one, and appendix 1).
3. Obtaining the mathematics curricula authorized by the Ministry of Education during the period (1964-1999), which was represented by six documents (Appendix. 1).
4. Deciding the period in which to investigate of the developments witnessed in the teaching mathematics curricula in Jordan, this period being from 1964 to 1999. The researcher chose this period in light of the documents (see appendix 1) and data available for this period in general and the fact that Education Law no. 16 was enacted in 1964, a law which paid particular attention to curricula and school textbooks and as a result of which, in 1965, curriculum documents were issued for the first time (see chapter one).
5. Dividing the period (1964-1999) into three sub-periods, in light of the changes and development witnessed by the mathematics teaching curricula in Jordan. Represented by:

the first period (1964-1972), the second period (1972-1987) and the third period (1987-1999) (see chapter one).

6. Analyzing the documents content of mathematics curricula (aims, mathematical content, teaching methods, evaluation methods) (see appendix 5) according to the ´´Principles and Standards for School Mathematics´´ issued by NCTM, 2000 (see appendix 10) and describing them through the three periods (see chapter 4).
7. Analyzing and comparing the content of mathematics curricula during 1964-1999 according to the "Principles for School Mathematics" which were issued by NCTM, 2000 (see chapter 4 and appendix 10).
8. Analyzing and comparing the content of mathematics curricula during the period (1964-1999) according to the process oriented "Standards for School Mathematics" which issued by NCTM, 2000 (see chapter 4 and appendix 10).
9. Analyzing and comparing the content of mathematical curricula during the period (1964-1999) according to the mathematical content oriented "Standards for School Mathematics" issued by NCTM, 2000 (see chapter 4 and appendix 10).
10. Analyzing the content of mathematics curricula according to the sub-period and comparing the content in light of the "Principles and Process and Content Standards for School Mathematics" which issued by NCTM, 2000 (see chapter 4, and appendix 5).
11. Investigating and studying the changes and developments witnessed by the learning objectives of mathematics during the sub-periods, and also, investigating the developments among the mathematical content through the grades of Educational stages (see chapter 4, and appendix 5).
12. Describing and comparing the changes and development to mathematical content in the curricula documents of the different educational stages in Jordan, to decide whether they were in line with the developments to curricula and methods of teaching mathematics in advanced countries, during the three periods (see chapter 4).
13. Interviewing groups of experts represented by: decision-makers in the Ministry, members of the curriculum committees and those compiling and evaluating mathematics textbooks, persons with experience in teaching mathematics curricula during the period covered by the study, as well as supervisors and teachers who received training on teaching curricula during the of change and development (see appendix: 6).

14. Translating all the responses of the sample subjects on the study tool from Arabic into English (see appendix: 9).
15. Translating the content of documents of mathematics curricula aims and learning objectives from Arabic into English (see appendix: 2, 3 and 4).
16. Translating the mathematical content of documents of mathematics curricula from Arabic into English (see appendix: 2, 3 and 4).

## 3.2 Analysis Method

### 3.2.1 Analysis Procedures of Documents Content.

The analysis process included the content of the mathematics curricula documents used during the period (1964-1999). So the curriculum of a certain period was taken and the topics, concepts and skills contained within for the different grades were distributed and classified according to the Standards (see appendix: 5) .

The content of the document was described according to the division of grades (1-12) through the periods in order to facilitate making the intended interviews concerning the distribution of topics, concepts and skills included in the mathematical content of the curricula documents (see chapter: 4).

For example, the procedures of the mathematical content analysis process includes each of the Elementary grades (1-6) according to the content standard of Number and operations. Through referring to the document of the curriculum during the period (1964-1972) identifying the concepts, skills and facts included in the mathematical content and recording them with respect to the standard. Then the researcher referred to the second document during the period (1972-1987), identifying the content included according to this standard and took note of any omission or deletion in the concepts, skills and facts included.

The same procedure was followed for the third period (1987-1999). Then the content of the documents was described according to the standard and the chronological grading according to the three periods. The same procedures were used for the other standards and curriculum documents for the other grades (see appendix: 5).

The learning objectives of teaching mathematics, instructional of teaching mathematics and the methods of mathematics evaluation analyzed according to the Principles and Process Standards for School Mathematics, issued by NCTM, 2000 (see appendix 10) and described the development due to the analysis process of learning objectives, instructional of teaching mathematics and the methods of mathematics evaluation according to the Principle and Process Standards though the sub-periods (see chapter:4).

### 3.2.2 Analysis tool

To investigate the changes made to the content of mathematics curricula for grades 1 to12, the researcher analyzed the mathematical content of the curricula for the educational grades included in the curriculum documents through the period, using the Principles and Content Standards for School Mathematics (see appendix: 10), issued by the American National Council of Teachers of Mathematics (NCTM, 2000), Thus the mathematical content of curriculum for each grade was distributed according to the standards of the content tables, as shown in(Appendix. 5).

## 3.3 Interviews

### 3.3.1 Interview Sample

15 sample subjects were interviewed, persons with long experience in the Ministry of Education and who had a degree in Mathematics' Two people were members of curricula committees involved in compiling and evaluating of mathematics textbooks in the Curriculum Department, while the others were either experienced in teaching mathematics or supervisors of teaching mathematics during the period covered by the study and who had received training on teaching curricula during the change process (Appendix 8).

The sample subjects can be classified into three groups. The first group, the decision-makers, includes persons who occupied administrative or responsible positions or had responsibilities in the Ministry of Education. The second group, the curricula experts, includes members of university teaching staff or members of the curricula and textbook compiling directorate. The third group, the executive group, includes teachers and mathematics supervisors (see appendix: 9).

### 3.3.2 Interview Procedures

1. The objectives of the interviews was to gather data and information with the aim of investigating the changes carried out, supporting the process of analyzing the mathematics documents curricula through knowledge of the points of view and experiences of these people regarding the changes and developments they witnessed during the period 1964-1999 (see appendix: 9).
2. Preparing the interview tool, which includes a set of questions asked to the interviewee, to achieve the objectives of the study (see appendix: 6).
3. The validity of the tool, that included the interview questions, has been verified by a group of arbiters (Appendix No. 7).
4. Arranging interviews with the subjects concerned and conducting the time of the interviews using the study tool.
5. Using tapes in data gathering and recording the responses of some of the sample subjects to the questionnaire. Also some of the subjects wrote down their responses on the questionnaire interview.
6. Analyzing data information gathered through the interviews; classifying them, since identical or similar views expressed within the one group about the same notion have been taken in to account in the classification process, presenting the results of the analysis according to the questions of the study and all the responses translated from Arabic into English and set out as appendix in the study (see appendix: 9).

7. Presenting the results of the interviews with the interviewees of study as summary through the questions of the study (see chapter: four).

### 3.3.3 Interview Tool

The interview tool consisted of a set of questions (see appendix 6) asked of the interviewees during the interviews and cassettes were used to record remarks. The Researcher carried out the interview personally.

Furthermore, the validity of the interview tool was verified by referring it to a group of arbiters consisting of two mathematics teaching staff from Yarmouk and Mu'tah Universities, five educational supervisors,( two mathematics supervisors, an Arabic language supervisor, a English language supervisor and history supervisor). All of whom hold Master degrees in curricula and teaching methods (see appendix: 7). The questions were discussed in a meeting attended by all and the set of questions included in the tool was agreed unanimously, after discussion, suggestions and concurrence on the final form of each question (see appendix 6).

### 3.3.4 Interview Analysis Procedures

The researcher sought assistance from two persons (see appendix:7, No.5 and 3) specialized in curricula and teaching methods, in analyzing the interviews. The following methodology was used in the analysis process. The interview was heard, then after hearing the recorded material, the response of the subject was written down according to the questions of the study tool. The same procedure was followed for the rest of the recorded interviews. Finally, the responses were classified in according to the individual views of each of the interviewees in light of the questions of the study, and the researcher translated all the responses from Arabic into English (see appendix: 9).