

Chapter One

Background and Significance

1.1 Introduction

The twentieth century has seen vast changes in the education systems for most countries, where education was viewed as a substantial investment in their development. However: development has not been limited to the education progress, but rather it has extended to include different goals as well. The changes of Social and Economic structures and therefore the growth of new technologies and of knowledge have also extended development such changes will continue to occur and present challenges to the educator, in particular to the curriculum developer. The need for curriculum development will be transient (Howson et al., 1981, p 1-5).

Education is one of the most important factors for the development of nations; the curriculum is one of the tools used to achieve this aim. Given the importance of curricula as evidence of development, nations are giving great concern to the promotion of curricula. A nation that is not keeping pace with the development of modern civilization is one that has not reviewed its curricula or improved them. All government officials are taking this process into consideration in order to design curricula that meet the needs of the society and posterity (Barekat, 1992, p 5).

The continuous and rapid changes we are witnessing as a result of technological development, has created non-stop competition between countries to achieve the best standards of education. This notion can be justified since every country has the obligation to enhance the level of its schools for the future of upcoming generations (Dweikat, 1996).

Jordan, being a developing country racing to achieve an advanced level of development where technology is of significance, stresses the importance of curricula as a means to achieve its ambitions and face the challenges of this era. During the period 1964-1999, the Ministry of Education in Jordan sought to give curricula, especially the mathematics and science curricula, the priority needed to improve it and keep in step with the curricula of the developed countries in this area, doing so through

participation in seminars, symposiums and educational conferences (Hiyasat & Swailem, 1990).

The most significant developments witnessed by the curricula were the existence of mathematics curricula documents produced by Ministry of Education (MOE, 1965; 1971; 1984 A; 1984 B; 1991; 1992) for the different educational stages, following the Education Law No. 16 in 1964. This had a great effect in identifying the philosophy of education in Jordan for the first time, in light of the development of the prevailing political, economical and social circumstances.

To see how far the mathematics curriculum has advanced in Jordan, the period (1964–1999) has been divided into three sub-periods:

- The first period (1964-1972),
- The second period (1972-1987),
- The third period (1987-1999).

The researcher chose this division due to the following reasons:

The first period (1964-1972): the MOE started in developing a mathematics curriculum during the first period as a project in 1964 in light of the Education Law No. 16, but the process of preparing and designing the mathematical content and textbook was finished in the middle of 1965 (MOE,1965) (*see appendix: I*). The process of generalizing, supporting and using the new curriculum, by all the schools in the kingdom, started in the academic year 1966/1967 (MOE, 1980).

The second period (1972-1987): after the preparations were finished, the MOE started to test the new curricula for secondary stage, under the supervision of the Jordanian National Team for developing Mathematics Curricula and Teaching Methods in the academic year 1971/1972 (MOE, 1971). They did this through assessing a sample of schools in Jordan before generalizing. These curricula were generalized and adopted for all secondary schools in Jordan in the academic year 1975-1976 (Khasawneh, 1985). Then the project of developing mathematics curricula for the rest of the stages was organized under the supervision of the Arab Organization for Education, Culture and Science. As for the elementary stage, its curricula were designed as part of the “Project for the Unification and upgrading of Mathematics Curricula” adopted by Jordan and Syria (Abu-Zienah, 1985; Hiyasat, et al 1990). The document of mathematics curriculum was approved according to the decisions of the committee of the Education in the Ministry of Education, (MOE, 1984) (*see appendix: I*).

The third period (1987-1999): the Ministry of Education in Jordan started the project of developing mathematics curriculum for all educational stages, according to the recommendations of the First National Conference of Improvement in the Educational Process in Jordan, which was held in September 1987(MOE, 1988). The most significant change in the educational system during this period was that basic education became ten years instead of nine; this stage was considered to be compulsory and free; The secondary school stage consisted of two tracks: comprehensive secondary school education based on a common educational foundation, the vocational and academic specialized base, and the applied education track based on vocational preparation and training (Al-Tall, 1993).

The basic amendments and changes related to mathematics curricula, such as changes in the educational system, in instructional plans, will also be investigated.

1.2 The First Period (1964 – 1972).

The development of Jordan's educational system can only be described as dramatic. Starting from almost nothing in the early 1920s, Jordan has forged a comprehensive, high-quality system to develop the future and prosperity of its citizens. Since the 1960s every village or community with 10 or more school age children has been provided with a school, enabling citizens in poor and remote areas to gain access to an education. Education is free for all primary and secondary school pupils and compulsory for all Jordanian children until they reach the age of fifteen. Evidence show that Jordan has achieved over 95 percent of its school aged children being successfully enrolled in schools. Jordan's policy of favoring spending on basic education over spending on higher education has fulfilled the country's goal of universal enrollment and has boosted literacy levels throughout the general population. The kingdom's education record has been proven impressive by international standards. This results from the foresight of the country's leadership, who saw and continue to see the need to focus on building the country's human capital to meet the challenges of the future ⁽¹⁾.

The Ministry of Education directs education in all public and private schools throughout Jordan; private schools use books and curricula approved by the Ministry

¹ see available: www.jordanembassyus.org/new/jib/factsheets/education.shtml

of Education in accordance with the goals set in the education policy; education and examinations are applied to in Arabic, under the supervision of the Ministry (Al-Amayrah, 1999).

1.2.1 Educational System

The Jordanian education system was simple and limited before the fifties consisting of only one secondary school for the whole country, three intermediate schools and a few elementary schools; all considered as one stage of ten years. Gradually as Jordan developed and with the increasing of need social and educational skills, the educational ladder evolved to become six years for the elementary stage and five years for the secondary stage effective from the academic year 1953 -1954 (AL-Tall, 1992). Another change occurred in 1957 when a further educational year was added, making a total twelve years of education instead of eleven. This was one of the requirements for the educational and political unity with Egypt and Syria. In 1964, Education law no. 16 was issued and set the compulsory stages as nine years, resulting in the following stages:

A compulsory stage of nine years comprising in two stages: The Elementary stage: This consists of six years from the first grade through to the sixth and the Preparatory stage which consists of three years from the first preparatory grade through to the third preparatory grade. The secondary stage also consists of three years, from the first secondary through to the third secondary. It was also after the 10th grade that secondary education divided into two branches: scientific and literary (MOE, 1980).

1.2.2 The Instructional Plans

During the period 1964 –1999, and according to the changes in the educational ladder, instructional plans for curricula were developed in Jordan, for all subjects and in particular mathematics. These changes involved the addition of new curricula by the Ministry of Education in 1965 and the distribution of the number of weekly periods on subjects taught, throughout the compulsory stage (first grade through the ninth). These new curricula came into effect in the academic year 1966 -1967 and were taught until 1975 (see page 3) (MOE, 1980; Hiyasat & Swailem, 1990). This is illustrated in table (1).

Table (1)

The Allocation of Weekly Mathematics periods for the compulsory Stage

Stage / Subject	Grades of the Elementary						Grades of the Preparatory Stage		
	1	2	3	4	5	6	1 st Grade	2 nd Grade	3 rd Grade
Arithmetic	4	5	5	5	4	4	1	1	2
Geometry	-	-	-	-	1	1	2	2	2
Algebra	-	-	-	-	-	-	2	2	2
Total	4	5	5	5	5	5	5	5	6

It can be seen from table(1)that the total number of weekly mathematics periods approved by the Ministry of Education plan were four for the first grade, five for the rest of the grades (second to sixth), five for both first and second preparatory, and six for the third preparatory.

The instructional plan for secondary schools has also developed; it used to consist of five grades, changing to three in accordance with the changes in the educational ladder in Jordan, which also involved the approval of new curricula and the reallocation of weekly periods on the subjects taught for every grade of the secondary school stage (MOE, 1980; AL-Amayrah, 1999).

The documents of instructional plans for the Ministry of Education show that these plans were implemented until the academic year 1969/1970, when the main guidelines for academic secondary education were set out, following a two-year study. This study was achieved through participation in the education of UNESCO project “new trends for Developing Content of Mathematics Curricula in the Arab World”, during which curricula and instructional plans were adjusted in terms of the number of periods and reallocation. The committee for developing the mathematics curriculum for the secondary stage set out a new curriculum to link the new trends (focusing on teaching basic concepts) and the content of the previous curriculum, as a transitional stage in the development of teaching mathematics; illustrated in table (2), (MOE, 1971; 1980).

Table (2)

Allocation of Weekly Mathematics Periods for the Secondary Stage

1 st secondary Grade	Scientific secondary Grade		Literary secondary Grade	
	2 nd	3 rd	2 nd	3 rd
Trigonometry (1)	Analytic and Geometry (2)	Analytic and Geometry (1)	General Mathematics: Algebra & Mechanics (2)	General Mathematics: Algebra & Statistics (2)
Algebra (2)	Algebra (2)	Algebra (2) & calculus (1)	-	-
Geometry in one dimension (2)	Trigonometry (1)	Statistics(1)	-	-
-	Mechanics (2)	Mechanics (1)	-	-
-		Trigonometry (1)	-	-
Total = 5 periods	Total = 7 periods	Total = 7 periods	Total = 2 periods	Total = 2 periods

As can be seen in table (2) the number of mathematics periods assigned for teaching students in the first grade of the secondary stage is five periods per week, distributed with: two periods of geometry in one dimension, two period of Algebra, and one period of Trigonometry. The two grades of the secondary stage are branched into two streams: scientific and literary; for the second grade of the scientific seven periods are spilt into: two periods of teaching analytic and spacial geometry, two periods of Algebra, one period of trigonometry, and two periods of mechanics (vectors, velocity, forces, acceleration, projectiles, and compound motion....).

For the third scientific grade is seven periods a week, represented by: one period of teaching analytic and spacial geometry, three periods of Algebra and Calculus (differentiation and integration), one period of trigonometry, one period of Mechanics (Newton's laws in motion, momentum, work, kinetic and potential energy, frictions, circular motion....), and one period of statistics and probability. The number of periods for the grades of the literary stream is two weekly periods for every grade; represented by general mathematics (Algebra and Mechanics) for the second literary grade, and

algebra and statistics and probability for third grade. This plan remained in application until the academic year 1975-1976.

1.3 The Second Period 1972 – 1987.

The educational system developed rapidly during this period and the number of pupils increased in all of the stages. Concern was mostly dedicated to the quantitative expansion of education and the streaming into vocational and academic branches. All of this aimed to meet the needs of the society and create educational opportunities.

1.3.1 Educational System

No change occurred in the educational ladder in this period, which still consisted of two stages: the compulsory of six elementary grades and three preparatory grades and the secondary stage of three grades, but these were streamed into academic and vocational sections (Hiyasat & Swailem, 1990; Al-Amayrah, 1999).

More importantly during this period the academic year was divided into two terms, with the previous curriculum being equally divided into the two terms, each composed of eighteen weeks duration instead of thirty-six as in the previous year (Obeidat & AL-Rashdan, 1993).

1.3.2 Instructional Plans

The changes that took place within the instructional plans during this period aimed at the development of the educational process in Jordan. Making use of other countries' experiences, the Ministry of Education (MOE, 1984 A; 1984 B) approved new curricula and instructional plans (for the teaching of mathematics) as part of the mutual educational cooperation between Jordan and Syria. A framework for an instructional plan was designed for the compulsory stage and was initiated and approved by the Ministry in the academic year 1976/1977, (see page 3). This process involved joint committees from Jordan and Syria which produced unified curricula for mathematics and other subjects for the elementary grades (1-6). These committees were responsible for the writing of the required textbooks. The process was completed

in the academic year 1981/1982 (Abu Zeinah, 1985 & Hiyasat & Swailem, 1990). Table (4) illustrates the allocation of weekly periods for teaching Mathematics.

Table (3)

Allocation of Weekly Mathematics Periods for the Elementary Stage

Stage	Elementary					
Grade	1	2	3	4	5	6
Number of Periods	4	4	4	4	4	4

Table (3) shows the number of Mathematics periods approved by the Ministry of Education to be four periods for the elementary grades (1 through 6).

The instructional plan for the Preparatory and Secondary grades was designed by the “Jordanian National Team for Development the Curricula of Mathematics Instruction” then the Ministry had approved and confirmed by a decision number (375) of the Education Council on May 9th of 1978 (MOE, 1984 A).

Table (4)

Allocation of Weekly Mathematics Periods for Preparatory and Secondary Stages

Stage	Preparatory stage			Secondary school stage				
Grade	1 st	2 nd	3 rd	1 st	Scientific grade		Literary grade	
					2 nd	3 rd	2 nd	3 rd
Number of periods	4	4	4	4	5	5	3	3

As can be seen from table (4) there are four mathematics periods weekly throughout all the preparatory grades. The number of periods for the first secondary stage is also four, while it is five weekly periods for the scientific branch of both grades of the second and third Secondary grades, and three periods weekly for the literary branch of the same grades (MOE, 1984 B). These curricula were effective until 1988.

1.4 Third Period (1987 – 1999).

This was the most significant change in the education system during this period. Jordan saw the change in the educational structure, applied in accordance with the recommendations of the “National Conference for Educational Development” (MOE, 1988, AL-Tall, 1993).

1.4.1 Educational System

After the nursery and kindergarten years, the education system in Jordan comprises of a 12-year comprehensive program divided into two cycles: basic and secondary. The basic cycle runs from grades 1-10 this is free and compulsory for all Jordanians.

At the end of grade 10, the grades of each student for the previous three years (8th, 9th, and 10th) are calculated and averaged to determine which secondary stream that pupil can continue. Usually, the pupils' interest and wishes are taken into account, but the final decision rests with the Ministry of Education.

The secondary cycle of two years is divided into two main streams. The first is the comprehensive secondary education stream that ends with a general secondary education examination, the Tawjihi, and consists of a common core curriculum and optional specialized academic or vocational courses. The second is the applied secondary educational stream, which consists of specialized vocational courses; these prepare skilled labor through apprenticeship programs run by the Vocational Training Corporation or the Ministry of Education ⁽²⁾.

1.4.2 Instructional Plans

In light of the National Conference for Educational Development 1987, changes occurred in the instructional plans for all the grades, and the primary stage curricula were adjusted in accordance with these changes. The Education Council decided to institute new instructional plans that reflected the instructional values of the curricula, branches and number of weekly periods. The instructional plan consisted of three main domains: the first included Human and Social sciences, the second Mathematics and the third included Literary, Sport and Vocational Education. The Ministry formed a special team in 1988 responsible for formulating the main guidelines for Basic education. Table (5) illustrates the allocation of weekly mathematics periods according to the new plan for grades 1 to 10 (MOE, 1991).

² see available:www.jordanembassyus.org/new/jib/factsheets/education.shtml

Table (5)

Allocation of Weekly Mathematics Periods for the basic Stage

Grade	1	2	3	4	5	6	7	8	9	10
Number of periods	5	5	5	5	5	5	5	4	4	4

Table (5) shows that the number of weekly periods of Mathematics, in light of the new adjustments, is five periods for grades: 1 through to 7. For the rest of the grades: 8 through to 10, the number of periods is only four.

As for the instructional plan for the secondary stage, the first domain pivot consisted of General Culture which included Social and Human Sciences while the second included the basic academic sciences, the third pivot included Specialized Academic Sciences. In 1989 the Ministry formed a special team to formulate the main guidelines for the curricula in the secondary stage. Table (6) illustrates the weekly-allocation of Mathematics periods according to the new plan (MOE, 1991; Hiyasat & Swailem, 1990).

Table (6)

Allocation of Weekly Mathematics Periods in the Grades of the Secondary Stage

Branch		Comprehensive			
		Sciences		Literary	
Grade		1 st	2 nd	1 st	2 nd
		Secondary	Secondary	Secondary	Secondary
Primary Requirement	Compulsory	4	-	-	-
	Selective	-	-	3	-
Specialized Requirement (Compulsory)		-	5	-	-

Table (6) shows the allocation of weekly periods for the Mathematics curriculum according to the new instructional plan. This is for the comprehensive academic secondary stream (Sciences & Literary); four weekly Mathematics periods in the Sciences branch for the first secondary grade (eleventh year); five periods for the second secondary grade, sciences (twelfth year) as a compulsory requirement. As for the Literary stream, three weekly periods for eleventh grade according to the Basic requirements and also as a selective requirement. For the eleventh grade (Literary

stream) there is no mathematics curriculum allocated (MOE, 1992). These curricula and instructional plans are still taught in all grades while continuously being developed by the Ministry of Education in Jordan through minor adjustments.

1.5 The Need for Developing Mathematics Curricula in Jordan

Mathematics curricula developed greatly during the 20th century. Their development was connected to the scientific and technological development, which resulted in new concepts and subjects in these fields to solve the problems accompanying technological progress; a progress which had cast shadows on both the curricula and the teaching methods. The invention of the computer and its use in calculations, with its vast applications in such diverse fields as Economics and Geography, accompanied by the change in the range and scope of mathematics was another effective factor to be included in the curricula, (Abu Zeinah, 1997; Howson et al, 1981).

Hendam (1982) mentioned a number of factors considered as positive aids in the development of the mathematics curricula, including the fact that there is a rich knowledge of mathematics in various fields. The method of studying mathematics has developed through concentration on the general concepts linking different branches of the field; similarly, the methods of teaching this subject have also changed in terms of concentration on mathematical concepts and ways of exploring and proving them. Results of educational and psychological studies have also played roles in promoting concepts and revising the mathematical content of curricula in all levels of education.

While mathematics curricula used to concentrate on the designate, distinct and independent branches such as arithmetic, algebra and geometry, it is now viewed as an integrated body of knowledge that is based on a set of concepts like: Set theory, groups, relations, functions and operations. This is in addition to the major constructs that can be built from these concepts like: group, cycle, and field. The branches of mathematics became inter connected and yet more distinct from each other, by mean of the set theory studied and types of relations between the elements of the group and properties of functions and relations (Abu-Sel, 1999). Given this fact, there is a great responsibility to design modern mathematics curricula that meet the demands of our current time, as well as the needs of the individuals. This calls for a revision of the mathematics curricula at the graduate level and at all school levels, by the insertion of more important and beneficial topics (Abu Zeinah, 1997).

In Jordan, as in other countries, which apply traditional curricula, the curriculum is an instructional program consisting of a group of materials that students study to pass an examination at the end of the year. Emphasis is put on the content of the material and the basic role of the teacher is to transfer this content to the brain of the learner. With this view, curricula were designed by academic specialists with scant consideration given to the needs of the students or views of the teachers (AL-Massry and Hiyasat: interview, see appendix 9).

Until the early seventies, curricula in Jordan were characterized as being traditional; most emphasis was given to the instructional material, the book was viewed as the curriculum, the content was divided into separate subjects like: arithmetic, algebra, geometry, trigonometry etc, and the book was treated as the only source of the required material to enable the student to pass the examination (AL-Amayrah, 1999; AL-Tall, 1978).

Before this period, 1964-1999, curricula were designed without taking the needs and abilities of the students into consideration and the curricula was not to field to subject experiments. More over, there was no special department responsible for designing curricula or supervising the process of writing school textbooks. It was sufficient for somebody to write textbooks for a grade or grades, of particular stage and obtain the consent of the relevant official. In Jordan Curricula prevailing mostly concentrated on the theoretical rather than practical material and depended on memorization rather than providing opportunities for the student to conduct experiments and field applications (Obeidat and AL- Rashdan, 1993).

Education is viewed as the best means for the development of the Jordanian society in light of the continual political, economical and social changes it is witnessing. Therefore, the curriculum is considered one of the most important elements of the educational system in helping the individual to develop, to adapt to the ongoing changes, to keep in touch with the revolution of knowledge and technology and to employ these abilities for the purpose of development (Jaradat and Abdul- Hamid, 1980).

As a result of the UNESCO recommendation Curricula in Jordan, especially the mathematics curriculum, have witnessed a continuous process of development and change. Yet, they were unable to keep abreast of the rapid technological revolution; the weak connection between the curricula and the educational objectives of all stages, behavioral and affective aims that these curricula sought to achieve were ambiguous.

Integration and connection between the curricula of the grades throughout a stage was also weak. The curricula lacked direction towards the development of secondary mental skills, the scientific approach to thinking and problem solving, the ability to manifest functional and practical areas of real life and did not take into consideration the abilities and psychological needs of the students to learn (Al-Tall, 1992; Al-Amayrah, 1999).

In light of the comprehensive definition adopted by the Department of Curricula and Schoolbooks in the Ministry of Education in the mid 70's, the Ministry of Education started a process of development for all curricula. In this regard, the modern curriculum was defined as: the educational expertise to develop the information and impart the required skills and intentions to students, thus helping to achieve the general objectives of education, as well as the special objectives of the material. The development processes in 1977 also included setting four bases for the curricula: philosophical, psychological, social and the attainment of knowledge. It also included determining both the general and specific objectives for each grade of the educational stages (compulsory and Secondary) where the elements of the curricula, including the mathematics curriculum, now consist of four basic elements: the general and specific objectives, the learning content of the material, methods of teaching the material, and the methods of evaluating it (Al-Tall 1992; Abu Ze inah, 1997).

In this regard, Jardat and Abdul- Hamid (1980) pointed out that the Ministry of Education had developed and renewed all curricula, including the mathematics curriculum. The methodology used in this process aimed at highlighting the basic elements of the curriculum.

The process of setting the objectives for curricula, including the mathematics curriculum, involves the following steps:

- Setting the general objectives for the educational stage (compulsory and Secondary stage).
- Setting the special objectives of the curriculum for every grade.
- Setting the objectives for every unit of the curriculum of each grade.
- Defining the concepts and basic skills for all curricula.
- Determination of values and directions intended by each curriculum.

Determining the content of the curriculum requires the following steps

- a) Setting the curriculum content for both the primary and the secondary stage
- b) Setting the curriculum content for each grade.

- c) Setting the curriculum content for each unit in all grades.
- d) Dividing the curriculum content (basic educational units) between the two terms for all grades of both stages.

Methods for teaching were chosen carefully taking into account the suitability for the individual grade. This included the general and special educational activities and tools for each unit of the curriculum. With regards to the general and special ways of evaluation, modern and multiple choice exams for each grade, stage and unit of the curriculum were chosen. In addition, the number of periods for the curriculum of every grade should suit the basic content of the grade curriculum was also taken into consideration.

The experience of “Jordan’s National Team for Mathematics Curriculum” over the past 3–4 decades, working together with UNESCO to develop the mathematics curricula for all stages, has played an effective role in designing plans and curricula for compulsory and secondary stage. It has enhanced the officials' experience and practice in the process of preparing and designing curricula. The overall concept of the mathematics curriculum set by the Ministry of Education in Jordan evolved through this experience and in accordance with the recommendations, originating from the “Education Development Conference” held in 1987. All the activities involved were expected to be designed to reflect this concept. This curriculum also encompassed all branches of mathematics such as arithmetic, algebra, geometry and others so that the curriculum for each grade could include detailed plans for units that combine all related objectives, content and activities. These curricula concluded with the evaluation methods and types of questions that books might include (MOE, 1991; 1993).

All the developments that the education system (in Jordan) witnessed, that they were in accordance with the law of Education of 1964, including the clarification of education philosophy and objectives, the obligatory and free primary education, the establishment of the Curricula Department within the Ministry, setting the detailed features of the curriculum and the number of weekly periods, the proposed evaluation method and choosing the proper educational tools. This statute is considered the point from which to launch the change in education and curricula in Jordan. This study also rests on this statute while reviewing the phases of the development of curricula in Jordan through the academic years 1964/1999.

1.6 Statement of the Study and Significance

1.6.1 Statement of the Study

The Arab symposium held in Jordan in 1984 finalized the general principles and proposals for developing the curricula in light of reality and current trends. Papers related to the process of curricula development in Arab countries, including Jordan, discussed the statement that the Arab curricula were still below the required level. This was due to the fact that Arab countries lack a unified social philosophy. As for the process of designing curricula, the symposium discussed a group of basic principles that should be considered when choosing the content of the curricula, including those stating that the content should be used as the means of achieving goals and should be relevant and appropriate to time dedicated for units of the curriculum. It should also be in accordance with the needs of the society and education system and it should be theoretically and practically integrated (MOE, 1984).

One of the recommendations of the “Education Development Conference” held in Jordan 1987 was related to the development of the mathematics curricula for the secondary stage. The symposium recommended this development to be a logical continuation of the project of promoting curricula for the Basic stage, while giving sufficient concern to the basic skills, relating them to reality, promoting students' ability to solve mathematical problems, reducing the number of abstract concepts like functions, relations and mathematical systems and to concentrate on trigonometry laws, special geometry and the solving of equations. Increasing the number of periods by one class for each grade was also amongst those recommendations (Jaradat, et al, 1988).

The mathematics curriculum in Jordan is one of the basic curricula taught to all students in public education. It is taken for granted that such curricula should be prepared according to intelligible scientific bases in terms of comprising a clear set of goals. These curricula are also expected to be relevant to the needs of the society, students, and in knowledge domain. There is also a need for integration between the curriculum of one grade with other grade curricula, as well as the need for the gradual evolution of concepts and skills throughout different grades.

Given all the above, one question comes to mind; has the process of developing mathematics curricula in Jordan witnessed real or formal development? This study

explores the evolution of curricula development by analyzing the mathematical content and the methodological frame of the curricula in comparison with universal standards of such content NCTM (2000). It also seeks the opinion of specialists and experts in mathematics curricula, while attempting to answer the questions of the study.

1.6.2 Questions of the Study

This study aims to explore the changes and developments in the mathematics curricula, which were approved by the Ministry of Education during the period (1964-1999). It also aims at highlighting the feature of every period of development and to review the reasons that lead to such changes. This will be investigated through answering these specific questions.

1. What developments have the learning objectives of mathematics curricula in Jordan witnessed during the period 1964-1999?
2. What developments have the mathematical content of mathematics curricula in Jordan witnessed during the period 1964-1999?
3. What developments have the instruction methods of mathematics curricula in Jordan witnessed during the period 1964-1999?
4. What developments have the evaluation methods of mathematics curricula in Jordan witnessed during the period 1964 –1999?

1.6.3 Significance of the Study

This study is significant as being one of the rare attempts, in Jordan, to explore this subject. The study is also unique in the length of the period chosen, (1964-1999). As such, it can be referred to as a historical source for the evolution of mathematics curricula in Jordan, so that scholars benefit from its analysis and historical documentation of the period of the development of these curricula. It is also beneficial to the writers of school textbooks, since it provides a list of universal standards used to analyze the mathematical content of curricula. Officials in Jordan responsible for generating educational plans for teaching mathematics will also find this study of significance, feedback on future plans for developing mathematics curricula since this material is based on the curricula taught currently in Jordanian schools.

1.6.4 Limitations of the Study

The study was limited by the following factors:

- It was not possible to conduct interviews with all the officials who used to work in the Department of Developing Curricula and Schoolbooks in Jordan, since some of them couldn't be reached.
- Principles and Standards used to analyze curriculum content were limited to those Principles and standards issued by NCTM (2000),
- The analysis was limited to the content of the mathematics curricula assigned by the Ministry of Education during the period of 1964-1999.