

# Development of Scientific Concepts for Students of Special Education Classes and Their Peers in Regular Classes: A Comparative Study

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The science curricula are considered among the most important curricula taught in schools in Iraq. There is a growing interest in those curricula. One form of development is building and designing scientific curricula in a manner that absorbs the largest number of scientific concepts, which have become a cornerstone in the development processes. Teachers have begun practising the art of teaching and assimilation of the great number of scientific concepts. The growth and development of these concepts has become a matter of urgency for all teachers. It is worth noting that the science curricula in Iraqi schools are subjects both in the mainstream and the special classes. Hence, the idea of the present study is to tackle the growth of these concepts and compare the mainstream classes and special needs pupils' classes. The test is applied twice to measure the extent of development of these concepts among pupils, to compare them with the extent of development and learning of scientific concepts. The statistical means for comparisons between the arithmetic circles of elements of the general concept are used.

**Keywords:** *Development, Scientific Concepts, Pupils, Special Education.*

## Introduction

The direct observation of teaching the subject of the sciences in primary schools reveals that it is limited to memorising. This hinders pupils from experimenting and discovering facts and drawing conclusions. Pupils have no positive role. Thus, they feel bored. Teaching the subject in this way hinders the pupils' opportunities to discover their interests and the fields of the

subject, despite its richness with scientific concepts. The result is retardation of the pupils' mental abilities, disconnecting pupils from their surrounding environment, and the inability of developing knowledge structure (Muhammad, 2009: 18).

This subject is taught for a great ratio of pupils in normal as well as special classes in the same way, regardless of the fact that an extra effort is required when teaching the special needs pupils. This results in the special needs pupils not receiving the proper education that fits their special circumstances (Albaghdadi, 1979: 15).

This type of student, who is without ambition, is forced to deal with teachers and school that lack sympathy and tenderness, and is unaware of the causes of difficulties causing slow learning, and has psychological problems that consume energy (Bell, 1970: 11).

In this way, the process of growth becomes a problematic one that needs greater efforts. The large number of scientific concepts require them to acquire the concept and develop it in the subsequent stages.

### ***The Study Problem***

As a result of teaching the same scientific concepts in the regular and special education classes, the problem of the present study is in answering the following questions:

- A. What are the appropriate scientific concepts for the primary stage?
- B. What is the level of development of concepts for regular and special education pupils?
- C. What are the differences in the development of the concepts among regular and special education classes pupils?
- D. Considering the three elements of the concept (definition, example, and the rule of the concept), where do differences exist?

### ***The Study Objectives***

The present study aims to increase awareness of the development of scientific concepts among special education and mainstream pupils.

### ***The Study Hypotheses***

- A. Mainstream pupils' scientific concepts develop quicker than those of special classes.
- B. The development of concepts among regular classes differs from that of special education classes in the three elements of the concept (definition, example, and application).

### ***The Significance of the Present Study***

Education is an organised and a systematic process. It is an effective tool of qualifying the individual through developing personality and adjusting attitude via a set of activities by educational institutes. Education is not merely a tool for gaining knowledge. It is a comprehensive tool seeking to develop the learner to become a researcher and a scientist that aims at solving the problems, which develops the individual's intellectual and practical skills to be aware of the surrounding environment, in order to adapt to it (Almuqadam, 1999).

Special education is a modern issue that only dates back to the second half of the last century. It comprises a set of different fields of psychology. It tackles issues concerning abnormal individuals who noticeably differ from normal individuals in terms of intellectual, sensitivity, emotional, linguistic, and movement development. It requires the special interest of educators concerning the methods of diagnosing and educating them (Alrusan, 2001).

Special education is interested in giving each individual the appropriate teaching in light of their circumstances, abilities, readiness, tendencies, and interests, using all means, methods, and procedures that enable the pupil to master what he or she receives. The field of special education faced many challenges before developing to occupy a vital position in the world (Obaid, 2000).

Developing the personality of the pupil is an individual and a social requirement for normal pupils and more so for special needs students, as they need special care due to their abilities. Among the pupils of this category are the slow learning. Studies and research reveal that they have problems in behavioural adaption, both in the psychological and the social fields, (Sameen, 1987: 5). They also suffer from psychological and social stresses affecting their psychological and social adaptation (Alalwani, 1991: 3). Other studies indicate that these pupils are jealous and frustrated (Alimam, et al., 1993).

Behavioural phenomena and problems vary according to individuals and their circumstances. Some of them are psychological, social, or related to getting low scores, especially in tests, including scientific concepts. The two researchers find it necessary to study the development of scientific concepts for normal and special needs pupils through the following points that represent the significance of the present study:

1. Identifying the level of development of scientific concepts for the pupils of primary schools.
2. Providing curriculum designers with information about the extent of development of pupils' scientific concepts.

3. Accurately describing the differences between normal and special needs pupils, the development of their scientific concepts, and the nature of their knowledge structure.

### *The Procedures*

#### *The Study Community*

The community of the present study are primary school pupils in the city centre of Hilla, that has 86,389 pupils: 486 in the special education classes, and 85,903 in the regular classes for the 2016–2017 academic year. Table 1 shows the number of males and females in the research community.

**Table 1:** The number of the male and female participants in the study community

Classes	Males	Females	Total
Regular	45,043	40,860	85,903
Special education	247	239	486

#### *The Study Sample*

The two researchers selected the Safad School for Boys, and the Rayat Al- Islam School for Girls, following the intentional method. The sample size is 30 male and female pupils; 15 male and 15 female pupils for regular classes and special education classes. Table 2 shows the research sample.

**Table 2:** Breakdown of the research sample

School	Males	Females	Normal	Special education	Total
Safad for boys	15		8	7	15
Rayat Al-Islam for girls		15	7	8	15

#### *The Study Tools*

The study tools comprise two objective tests; oral and written to measure the development of scientific concepts prepared in line with the following steps:

- A. Analysing the content of the book of “sciences” for the primary stage, adopting the scientific concept as a unit for analysis, and identifying scientific concepts that extend

to more than one stage of study. This step resulted in identifying 13 scientific concepts taught from the third primary class to the sixth primary class.

- B. Showing the list that includes those scientific concepts with the prescribed books to a group of arbitrators to ensure the integrity of the analysis. It was agreed that 10 out of the 13 concepts meet the requirements of validity.
- C. Formulating objective paragraphs of the multiple-choice type by three paragraphs for each concept to measure the three elements of the concept (definition, example or no example, the rule of the concept).
- D. Presenting the paragraphs to the arbitrators to ensure the apparent validity of the paragraphs, as they measure scientific concepts.
- E. Extracting the stability factor for the two tests using the half-way split method. The value of the stability factor for the oral pre-test is 0.71, and for the post-written test it is 0.74, which are acceptable stability parameters for the study and research purposes.
- F. Applying the test in its primary form to a group of students for the purpose of extracting stability, difficulty or ease, recognition, the effectiveness of wrong alternatives, sufficient time for the test, and clarity of answer instructions.
- G. Preparing the final structure of the two tests and making them applicable.
- H. Applying the concept test to the third class pupils, which is an oral test prepared and applied according to the instructions for using oral tests that are used in the final exams for this stage for pupils from regular and special education classes. The second test is applied to the sixth class primary pupils. It is an objective written editorial test for pupils in regular and special classes. Subsequently, the paragraphs are corrected to follow the process of developing concepts and determining any of the concept elements, in which there is no development.

### ***Previous Studies***

#### ***A. Sameen (1987)***

This study deals with the adaptive problems of behaviour for slow learning children and their normal peers. The researcher uses the American Association for Abnormality Adaptive Behaviour Measures to apply it to a sample of 115 male and female pupils chosen randomly from the fourth primary class. The researcher uses the statistical tools to analyse data. The results reveal that behavioural problems for children are: cleanliness, food, personal health, concepts of time and numbers, aggression, social disharmony, insubordination, extra movement, and undirected activity. The results indicate statistically significant differences for the benefit of normal children considering independent functions, linguistic development, numbers, time, self-direction, and assuming responsibility. The differences are statistically significant for the benefit of the slow learning children in terms of aggression, antisocial

behaviour, insubordination, and withdrawal ahead of participation and level of activity, (Sameen, 1987: 160).

### ***B. Najwa (1996)***

This study aims at proposing a program for developing scientific concepts in children aged five to nine years old, through identifying the variables enabling the child. The research sample is 50 male and female children. The researcher prepared the parameters and the proposed program. She concluded that there are statistically significant differences in the average scores of children in light of rank, time, and place, before and after applying the proposed program for the post stage.

## **The Theoretical Framework**

### ***The Development of Concepts and Special Education Pupils***

#### ***Defining the Concept***

There are many definitions of the concept, according to its various aspects. Some scholars consider one of the mental operations, abstraction. Tchelid defines it as the generalisations resulting from abstracting the basic distinctive features of some sensory events and classifying them. Majdi Aziz states that it is a mental structure resulting from abstracting one or more features of various situations, including that feature which is given a name or a symbol referring to it in all situations. The dictionary of education states the following meanings for the concept:

- A. An idea or representation for the mutual item that distinguishes groups and categories.
- B. A general or an abstract mental image or a thing.
- C. An idea or a mental image.

#### ***Composing the Concept***

Biajeh, Broner, and Janieh present opinions concerning the topic. They all agree that composing concepts is a complex activity, in which all basic mental functions of attention, linking, concluding, and abstracting are practised. Biajeh believes that basic concepts are composed in the period between seven to eight years and 11 to 12 years. Then, they integrate in the 14 to 15-year-old. This long period is preceded by a preparatory period from two to seven years old. However, sensory realisation hinders the integration process. Thus, he calls the last period “the sensory period”. It is clear that Biajeh links the development of the concept with the child’s growth stages. Yet, it is possible to state that concepts are composed through sensory identification of things and partial situations. Then, comes the stage of classifying these things

into groups and finally, the mutual features are determined and expressed verbally. Biajeh states that each concept is comprised of two components:

The first is the form or the mental image in the mind about a certain idea. The second is the content, the essential meaning which adapts, changes, and grows. Biajeh is more interested in the mental operations leading to the concepts than his interest in the concepts themselves, as products of the process of thinking. According to Biajeh, the concept is an intellectual procedure that is not derived from the sensory features of things directly. It is characterised by the child's attention to the relationships between things which leads him or her to the opposite; the possibility of getting back to the starting point; the procedural thinking; the concepts.

### ***Stages of Children's Development of Concepts***

Vygotsky concludes the three stages of independent development of concepts are:

- The mysterious compromising stage: in this stage, children randomly gather elements more than basing that on inference. The results are reached through attempt and error.
- The stage of thinking, complications, and compounds.
- The basis of a child's collection in this stage is not the intended. It comprises six sub-stages:
  - The consistent complexities stage: in this stage, children gather elements considering one of the common characteristics – colour.
  - The stage of gatherings: in this stage, children gather elements considering a common feature.
  - The sequential complexities stage: in this stage, children combine the elements and make an optional last series
  - The diffused complications stage: children collect the elements in a chain.
  - The semi-concepts stage; false concepts: children realise the types of surface simulations based on the physical properties of subjects and elements, and understand the full meaning of the concept and similarities of concepts that are often used to learn, memorise, and understand characteristics.
  - The concept stage: in this stage, children can realise one property at a time. So, they are not able to take all the qualities at one time. They may reach a level of maturity to obtain the concept.

### ***Factors Influencing the Concepts of Childs***

Children differ in their grasp of concepts, although they may be at the same age, level, and maturity. The important influencing factors in the development of children's concepts are:

- A. Senses: these are the channels through which experiences are conducted on their way to the brain. So, their status and efficiency are influenced.
- B. Intelligence: plays a significant role in the formation of concepts. Smart children realise the aspects of the situation more than other less intelligent children do.
- C. Learning opportunities: as the teacher contributes to the formation of concepts, he or she should provide learning opportunities for the child.
- D. Type of experience: the development of concepts depends initially on the perceived direct experience. The child subsequently gets a lot of concepts through indirect experiences.
- E. Gender: since children are trained from early childhood in thinking and working in the same way as individuals, gender appears in the meanings that relate to different things and experiences and increases the differences between genders due to their gender training.

### ***Special Education***

Special education is a modern topic in the field of education. The beginnings of this topic date back to the second half of the last century.

The topic of special education brings together several sciences from the fields of psychology, education, and the social sciences. It addresses the subject of special education for the non-ordinary individuals who noticeably differ from ordinary individuals in their mental, sensory, emotional, dynamic, and linguistic characteristics (Alrusan, 2001).

The efforts of psychologists, educators, doctors, and other specialists interested in the topic, had a great influence on the development of the concept, especially in Europe and the United States. Frubil, Biadgel, Stras, and Kirk are among those interested in this field (Al-Azza, 2002).

The interest in special education, the serious thinking of appropriate programs, strategies and technologies that help special needs pupils get educated and rely on themselves, are all good indicators of the educational system (Kar, 2001:33).

In this way, the field of special education occupies a prominent position as a result of the interest of researchers, education scientists, psychologists, doctors, and other special education specialists (Obaid, 2000: 4).

The concept of special education has been defined differently according to several people. Ahmed (1989) defines it as providing the appropriate education for each individual in light of their circumstances and capabilities. It is also defined as a set of procedures and methods used to provide educational services to special education pupils (Jabir, 1995: 28).

In light of what has been mentioned, it is possible to conclude that special education is a set of systematic individual educational methods and equipment, aimed at providing everything needed by the special needs pupils to fulfil their goals (Obaid, 2000).

### ***The Goals of Special Education***

The number of special education goals varies according to education and those who are interested in this field. They can be listed as follows:

- A. Identifying non-ordinary pupils through the tools of measurement and diagnosis that are suitable for each category of special education classes.
- B. Preparing educational programs for each category of special education.
- C. Preparing methods of training for each special education category in order to implement and achieve the goals of educational programs, on the basis of the individual educational plan (Obaid, 2000: 22–23).
- D. Preparing educational and technological means for each special education category to facilitate the education process.
- E. Preparing scientific staff to teach, rehabilitate, and train these groups to be able to manage dealing with each category (Al-Azza, 2002: 13–14).

The goal of special education, in general, is to provide services to the special needs pupils in order to provide the appropriate conditions for them to be able to achieve their goals by realising their potential and developing them to the maximum level. (Al-Abadi, 2004: 8).

### **Data Analysis and Discussion**

- A. The regular classes pupils scored higher than the special education classes. This is due to individual differences.
- B. The scores of both tests rise at the item of definition and decrease at the items of example and application for both groups. This is due to the fact that teaching is directed towards achieving behavioural goals like memorisation.
- C. Despite the fact that the concepts are taught for more than one year, no development is noticed, especially, at the levels of example and application.
- D. The amount of increase and development of the elements of the concept is less than the required level. That is obvious in the differences between the scores of the arithmetic circles between the pre- and post-tests.

## The Results

In applying the two tests and estimating the results, scores were issued of ‘one’ for correct answers and ‘zero’ for the wrong ones. Table 3 shows the arithmetic averages and the amount of increase and development of the scores for each element of the concept.

**Table 3:** The arithmetic averages and the amount of increase and development of the scores for each element of the concept

Regular classes sample				Special education classes sample		
Test	Definition	Example	Application	Definition	Example	Application
pre	7	5.8	5.6	4.7	4.1	2.7
post	8.06	6.9	6.2	5.86	4.7	3.4
increase	1.06	1.1	0.6	1.16	0.6	0.7

## Conclusion

We concluded the study as follows:

1. There are deficiencies in the preparation and design of science curricula in Iraqi schools. This is reflected in the amount of growth and development of the concepts among students in special education classes or regular classes.
2. Learners in our Iraqi schools face a difficulty in learning and developing scientific concepts, especially when the concept elements are represented in the example and application, which are more difficult than the element of definition.
3. Most students get good results in concepts tests that measure the definition component, which indicates that teaching focusses on behavioural goals at the level of recall only, without the goals that relate to assimilation and application.
4. Regular students outperform students in special education classes because of individual differences and differences in capabilities and special needs.
5. There are no special education curricula in the Iraqi educational system for special education classes. No books or activities have been designed for them, and this is what creates difficulty for the students and causes their academic failure.

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