

**Does attendance kindergarten affect on pupils' mathematics achievement of primary school in Makkah, Saudi Arabia? And what are the teachers' expectations?**

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Journal of Personality and Social Psychology

## **Does attendance kindergarten affect on pupils' mathematics achievement of primary school in Makkah, Saudi Arabia? And what are the teachers' expectations?**

### **Abstract**

The purpose of this study was to investigate if there are any significant differences in the mathematical attainment of pupils' grade one of primary school in Makkah, Kingdom of Saudi Arabia (K.S.A) between those pupils who had attended kindergarten and their peers who had not, and whether this effect continued into the second and third grades in mathematics attainment. Also the study aimed to investigate the role that teachers' expectation for their students' achievement might play in accounting for any differences.

This study was limited to 685 primary fourth grades pupils (special need not include) who had progressed through the first, second and third grades of the primary school in the city of Makkah (K.S.A) in the academic year of 2002-2003 drawn from the 40 primary schools, randomly selected from the four areas in the city of Makkah (North, South, East, and West of Makkah) 20 schools for boys and 20 schools for girls. 417 of pupils sample had attended kindergarten (294 boys and 123 girls) and 268 of pupils had not (106 boys and 162 girls). Two main methods of data collection were used in this study: a) mathematical scores of final exam the total mathematical scores that the pupils had achieved in the three grades (first grade 1999, second grade 2000, and third grade 2001) were collected from the administration office of each of the schools, and b) teachers' questionnaire consisted of questions to elicit information on the teachers' view about the importance of kindergarten education, as well as their view about the academic and social adjustment differences, if any, between primary school pupils with kindergarten education background and their peers without such an experience. The result of the study indicated that: (1) the pupils who had attended kindergarten significantly out-performed their peers who had not attended kindergarten in the first grade and the effect was continued in the second and third grades; (2) the gender of pupils who had attended kindergarten did not affect mathematical attainment in the three grades of primary school, although the girls who had not attended kindergarten were better than the boys. This trend of the impact of kindergarten education on mathematics achievement at the early primary school level was corroborated by the opinions of the primary school teachers, who concurred with the notion of the positive effect of kindergarten education on its recipients. Finally the results concluded that there is a strong indication that attending kindergarten has been shown to be effective in supporting the mathematical education of primary age children. If this is so, then it appears to us that all children should attend kindergarten before joining primary school, therefore, it is recommended that Saudi Arabian government should work towards universalizing kindergarten education. Integrating kindergarten education into the current basic education could do this.

*Keywords:* attending kindergarten; teachers' expectation; mathematical attainment; early childhood education; gender.

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## **Does attendance kindergarten affect on pupils' mathematics achievement of primary school in Makkah, Saudi Arabia? And what are the teachers' expectations?**

### **1. Introduction**

Research evidence suggests that the education provision in the early years is not only seen as important, but a vital element in the balanced development of a child from early years to adulthood. On early experience Sylva and Lunt (2003) indicated that research evidence leaves no room for doubt that the first five years of life are important for emotional, intellectual and social development. This is a time when a child is developing most rapidly, and is learning more than at any other time in his life. Schweinhart and Weikart (1986) confirmed the argument made by Sylva and Lunt, and emphasised that: good early childhood experiences help a child to acquire an interest in learning, a willingness to try new things and to trust adults, a strong sense of independence, and to avoid negative behaviour. Hadeed (1994) has shown that preschool education seeks to expand the breath of experiences for the child making a contribution to the child's intellectual development. However French (2004) confirmed the argument made by Hadeed and emphasised that preschool children undergo rapid intellectual and linguistic development. Cognitive processes that operate continually and without conscious effort or awareness on the part of the child power much of this development. However, for these cognitive processes to yield optimal development in cognitive and linguistic realms, children need to be immersed in an environment that is both experience-rich and language-rich. An experience-rich environment fuels development by providing events and materials that can be comprehended, represented, and further processed by the child, extensive opportunities for self-directed exploration, and adult support in interpreting experience. A language-rich environment includes ample opportunities for young children's authentic communication with adults because the adults' use of language is strongly redolent with an experiential environment and so supports children's acquisition of both the meaning and pragmatic functions of the language. Tudge and Doucet (2004) they also indicted that children's early mathematical experiences play a significant role in the development of their understanding of mathematics, and serve as a foundation for their cognitive development. Starkey et al (2004) have identified that socio-economic related differences in mathematical knowledge begin in early childhood.

In the case of the Kingdom of Saudi Arabia (K.S.A.) kindergarten is not part of the formal education yet, since the child can join the primary school without having been to kindergarten (Al-Hokeel, 1992, p.28). Children who join the primary school at the age of six without being well prepared at home or through a kindergarten institution that enabled them to acquire some new cognitive, behavioural or social skills may face problems in acclimatization or academic achievement. It has been noticed, through the experience of teachers of Mathematics in the primary and intermediate schools, that the curve of progress of pupils in the primary school is low in mathematics in general and particularly in the basic skills: addition, subtraction, division, multiplication and solving some simple calculation questions (Ministry of Education and General Presidency for Girls Education, 2001). According to Mohy-Aldeen (1989) the reasons for this include the concentration on memorization, ignoring individual differences among pupils, presenting mathematics in uninteresting ways, and using abstract ways unrelated to the child environment to present mathematical concepts making them disinterested in such concepts.

Kindergarten education is known to foster the development of some basic social skills and young learners lacking such skills risk 'peer rejection' and academic failure (Knight and Hughes, 1995). Taiwa and Tyolo (2002) they found that the scores in reading and mathematics achievement were much higher for kindergarten children than for non-kindergarten children. The same results have been repeated in studies of Fast (1957), Al-Haras (1977), Awaad and Nagi (1978), Hamad (1983), Bowlin and Kenneth (1991), Daniels (1995), Robbin (1996), Dorothy (1996) and Huffman and Speer (2000). On the other hand Al-Okaily (1986) and Stipek and Byler (2001) identified a modest advantage in academic achievement for children who entered kindergarten during the first year of school, but this advantage disappeared by second and third grades. While a study by Maripatricia, (1996) showed that there was no significant difference between the experimental and control groups in mathematics achievement in relation to a variable of attending kindergarten.

### ***1.1 Kindergarten goals in the Kingdom of Saudi Arabia***

The educational policy of the Kingdom of Saudi Arabia has defined the goals of the kindergarten stage as follows:

1. To refine the child's innate character, and looking after his/her moral, mental, and physical growth in sound natural conditions that are consistent with the teachings of Islam.
2. To establish the religious orientation based on monotheism, which is naturally consistent with innate character.
3. To introduce the child to the rule of conduct and facilitate the absorption of Islamic virtues and valid interests in the presence of a good example to follow for the child.
4. To familiarize the child with the school environment, prepare him/her for school life, and move him/her gently to shared social life with peers and friends.
5. To provide the child with a wealth of true expressions, simple basics, and information that is appropriate for his/her age and relevant to his/her surrounding environment.
6. To train the child on applying motor skills, getting used to sound habits, and train his/her senses for the best possible utilization.
7. To encourage the child's creative activities, expand his/her aesthetic taste, and allow his/her energy to function under guidance.
8. To fulfill childhood needs, please the child, and refine him/her without pampering or exhaustion.
9. To be on the alert in order to protect children from dangers, treat early misbehaviour, and face childhood problems appropriately (Al-Hokeel, 1992, p. 290-291).

It is evident now that the previous goals seek to achieve comprehensive growth of the child religiously, morally, physically, and linguistically. The General Presidency for Girls Education, being the main authority responsible for kindergarten, has established detailed goals for kindergarten focusing on the following aspects:

1. Religious and linguistic education of the child.
2. Bringing up the child in a healthy and physically fit manner.
3. Preparing the child for elementary school and educating him/her.
4. Social education of the child (General Presidency for Girls Education, 1978, p.8).

### ***1.2 Kindergarten education curricula***

Until recently the programmes and activities in kindergartens were left to the teacher's own resourcefulness and consideration. For a variety of reasons, the kindergarten educational programmes and curricula were not specifically drawn up to be adopted by all kindergarten institutions in the Saudi Arabia. Perhaps the most important reason for this was the fact that provision of kindergarten education was widely available in the private sector. This was the main reason why the State decided, in 1980, to give the General Presidency for Girls' Education full responsibility for supervising kindergarten education in Saudi Arabia. Accordingly, the presidency embarked on constructing an organized curriculum and also well-defined aims for this stage.

The initial curriculum, designed by the Presidency included activities such as religious and moral education, Arabic language, simple arithmetic and science education, the development of children's artistic skills, physical education, health and social education (General Presidency for Girls' Education, 1984, pp. 13-44). In respect of the curriculum designed by the Presidency for kindergarten education in Saudi Arabia, Marwa and Al Rawaf (1980) commented that:

[t]his new curriculum represents a reliable and comprehensive programme source for kindergarten teachers to rely upon. It contains educational and psychological knowledge relating theories to experience in this field. This new curriculum is characterized by a balance between academic subjects and free and organized activities (Marwa and Al-Rawaf, 1980, p. 3).

This experiment by the Presidency represents the first serious, organized, attempt at drawing up educational programmes and activities for kindergarten education in Saudi Arabia.

Efforts by the Presidency to improve kindergarten provision, its curriculum and programme continued through the 1980s. The Presidency has also been involved with the Arab Gulf and UNESCO in a comprehensive project aimed at developing early childhood education. In the light of this project, improvements have been introduced in the curriculum and an experimental, new curriculum was introduced in 1988.

With regard to teachers' preparation and training, the picture which emerged with Saudi Arabian experience clearly reflected a degree of under achievement. For a long period, in Saudi Arabia, the training of kindergarten teachers relied mainly upon individual and non-governmental efforts, including those of "the Gulf-Girl Association for Welfare". In spite of its limitations, the efforts of this Association represented the main source for dealing with the training of kindergarten staff in the Gulf. In addition, very recently, some universities (such as King Saud University) have started to offer training leading to a degree in early childhood education and related fields. Of this, Hassan remarked that:

[i]gnorance of teachers and kindergartens' supervisors of the characteristics of the childhood stage and their Ignorance of the sound ways of dealing with children, lead them to commit major wrongs while undertaking their tasks. This eventually leads to the maladjustment of children in relation to education (Hassan, 1986, pp. 250-251).

Dealing with children at this stage in their development is not as easy as some people may think. The kindergarten stage requires staff with exceptional qualities, with the result that staff preparation, and in-service training, for work with this age group needs to be considered seriously if kindergarten education is to achieve its goals.

Kindergartens under the supervision of the General Presidency for Girls' Education, work on a part-time system. The typical kindergarten day begins at 8.00 a.m. and ends at 1.00 p.m; as was pointed out in a report of the Presidency (1984), the majority of public kindergartens are annexed to primary or intermediate schools.

However the Saudi kindergarten programmes aims at getting children to acquire mathematical concepts and skills related to sensory recognition of things, measurement by tangible experience, classification of things and issuing judgments on them, developing concepts related to numbers and relationships (e.g. comparison, contrast, matching, addition, subtraction), developing concepts related to time (hour, day, week, month) and measurement (e.g. length, weight, size), and recognition of some geometrical shapes (e.g. triangle, square, rectangle, and circle) (General Presidency for Girls Education , 1992).

### ***1.3 Do teachers' expectations affect pupil achievement?***

Research suggests that teacher expectations can predict changes in student achievement and behavior (Tauber, 1998). Rosenthal and Jacobson (1992) borrowed the term 'Pygmalion effect' from a play by George Bernard Shaw ('Pygmalion') in which a professor's high expectations radically transformed the educational performance of a lower-class girl. '*Pygmalion in the Classroom*' describes an experiment carried out in an elementary school (which the authors call Oak School) to test the hypothesis that in any given classroom there is a correlation between teachers' expectations and students' achievement. In the experiment, Rosenthal and Jacobson gave an intelligence test to all of the students at an elementary school at the beginning of the school year. Then, they randomly selected 20 percent of the students - without any relation to their test results - and reported to the teachers that these 20% of students were showing "unusual potential for intellectual growth" and could be expected to "bloom" in their academic performance by the end of the year. Eight months later, at the end of the academic year, they came back and re-tested all the students. Those labeled as "intelligent" children showed significantly greater increase in the new tests than the other children who were not singled out for the teachers' attention. This means that "the change in the teachers' expectations regarding the intellectual performance of these allegedly 'special' children had led to an actual change in the intellectual performance of these randomly selected children" (p. vii-viii).

Rosenthal and Jacobson (1992) indicated that there are many determinants of a teacher's expectation of her pupils' intellectual ability. Even before a teacher has seen a pupil deal with academic tasks she is likely to have some expectation for her behaviour. If she is to teach a 'slow group,' or children of darker skin colour or children whose mothers are 'on welfare,' she will have different expectations for her pupils' performance than if she is to teach a 'fast group,' or children of an upper-middle-class community. Before she has seen a child perform, she may have seen her score on an achievement or ability test or her last years' grades, or she may have access to the less formal information that constitutes the child's reputation. The same trend has been observed by Bamburg (1994), who showed that teacher expectations do play a significant role in determining how well and how much students learn. In this paper we want to explore the relationship between the possible background factors to the educational achievements of a sample of primary school children in Makkah (KSA) in mathematics and to compare this evidence with their teachers' beliefs about the importance of such background factors as predictors of educational success.

## **2.The research problem**

In the light of the above, the study reported here aimed at finding out whether there were significant differences on the mathematical attainment of grade one pupils primary age children in Makkah (K.S.A) who had attended kindergarten and their peers who had not and whether this effect continuity into the second and third grades of primary schooling. The study was guided by the following research questions:

1. Is there a significant difference in the mathematical attainment of grade one primary age children in Makkah who had attended kindergarten and their peers who had not and, if so, does this effect continue into the second and third grades?
2. Is there a significant difference in the mathematical attainment of the boys and girls who had attended kindergarten and their peers who had not?
3. What are grade one teachers' in Makkah opinions and expectation regarding the achievement and the social adjustment level of the two groups of pupils (kindergarten attendees and non-attendees) in primary school?

## **3.The research methodology**

### ***3.1 The study sample***

This study reported here was limited to 685 primary fourth grades pupils (special need not include) who had progressed through the first, second and third grades of the primary school in the city of Makkah (K.S.A) in the academic year of 2002-2003 drawn from the 40 primary schools, randomly selected from the four areas in the city of Makkah (North, South, East, and West of Makkah) 20 schools for boys and 20 schools for girls. 417 of pupils sample had attended kindergarten (294 boys and 123 girls) and 268 of pupils had not (106 boys and 162 girls).

### ***3.2 The study methods***

Two main methods of data collection were used in this study:

*3.2.1 Mathematical scores of final exam:* (mathematics score refers to the marks of the final exam of mathematics that had been obtained by the fourth grade primary pupils in first, second and third grades). The total mathematical scores that the pupils had achieved in the three grades (first grade 1999, second grade 2000, and third grade 2001) were collected from the administration office of each of the schools.

#### ***3.2.2 Teachers' questionnaire***

The teachers' questionnaire consisted of questions to elicit information on the teachers' view about the importance of kindergarten education, as well as their view about the academic and social adjustment differences, if any, between primary school pupils with kindergarten education background and their peers without such an experience. The teachers' questionnaires went through two stages. In the first stage, a preliminary questionnaire (using open-ended questions) was implemented (see appendix B). The second stage questionnaire involved developing a mixed open and closed-ended question based instrument that was developed in the light of the analysis of the data collated from the Stage One (see appendix C). Both questionnaires were developed and administered in Arabic and the responses translated into English for analysis.

##### ***3.2.2 (a) The stage one questionnaire***

A preliminary written questionnaire using open-ended questions was designed to provide information concerning any possible inaccuracies, ambiguities and inadequacies for the second stage questionnaire, thus enabling any necessary refinement prior to the implementation of the second stage questionnaire. The aim was to see to what extent the questionnaire revealed the real characteristics and attitudes of the teachers. The teachers were requested to indicate their views as to whether it was important for children to go through kindergarten before coming into grade one, as well as their views on observable academic and adjustment differences between pupils with kindergarten background and those without. Their opinions were also sought on the factors affecting pupils' success in the first grade, and the effect of pupils' parents' education level on academic achievement. The open-ended questionnaires were distributed to 50 teachers of primary school, grade one. The teachers were randomly chosen from 20 primary schools in the city of Makkah to participate in the study.

##### ***3.2.2(b) The stage two questionnaire***

The main aim of the second stage teachers' questionnaire (using a mix of open and closed-ended questions) was to support teachers' views that had been obtained from the first stage questionnaire. This questionnaire consisted two main parts. Part one contained four questions. The purpose of this part was to obtain information on some basic characteristics of respondents, including sex, educational attainment and in-service training, and teaching experience. Part two consisted of both close-ended and open-ended items requesting information on teachers' views about the aims and objectives of kindergarten education, the factors which affect attainment in academic achievement and whether they conjecture a relationship between attending kindergarten and ability of pupils' academic achievement. The close-ended teachers' questionnaires were distributed to 150 teachers of primary school, grade one. The teachers were randomly chosen from 40 primary schools in the city of Makkah to participate in the study.

#### **4. Data analysis**

After collecting the data, a comparison was conducted using 'independent sample t-test' (Kinnear and Gray , 2000); Pallant, 2003) to determine the differences between the various groups (male attenders and male non-attenders and female attenders and female non-attenders) in mathematical attainment in the primary school first grade pupils. This statistical system was repeated to determine the difference between the groups in the study in their mathematical attainment in the second and third grades.

While the open-ended questions in the teachers' questionnaires were analysed qualitatively. However the teachers' responses to the close-ended questions were analysed quantitatively (Taiwa and Tyolo, 2002).

#### **5. Results**

##### ***5.1 Overall mathematical attainment in the three grades in the primary school***

The results of impact of attending kindergarten on the mathematical attainment of primary age children are presented in Table 1(see appendix A). As can be seen an independent sample t-test was conducted to compare the mathematical scores for pupils who had attended kindergarten and their peers who had not in the first, second, and third grades of the primary school. The results of the analysis indicated that the mathematical scores of pupils in the first grade who had attended kindergarten were higher and statistically significant ( $M= 93.83$ ,  $SD= 8.36$ ) than their peers who had not ( $M=91.6$ ,  $SD=11.23$ ;  $t(683) = 2.982$ ,  $P=0.003$ ). However, the same trend was seen with the mathematical scores of pupils in the second grade who had attended kindergarten ( $M= 91.18$ ,  $SD= 9$ ) and those who had not ( $M= 88.15$ ,  $SD=12.29$ ;  $t(683) = 3.717$ ,  $P=0.000$ ), and also the trend continued in the mathematical scores of pupils in the third grade who had attended kindergarten ( $M= 94.09$ ,  $SD= 8.1$ ), and peers who had not ( $M= 90.52$ ,  $SD= 9.34$ ;  $t(683) = 7.124$ ,  $P=0.000$ ).

##### ***5.2 Overall mathematical attainment in the three grades of the primary school by gender***

As can be seen from Table 2 (see appendix A), an independent sample t-test was conducted to compare the mathematical scores for boys and girls who had attended kindergarten and their peers who had not in the first, second, and third grades of primary school. The results of the analysis indicated that there was no significant difference in mathematical scores of boys in the first grade who had attended kindergarten ( $M= 93.44$ ,  $SD= 8.77$ ) and girls who had attended kindergarten ( $M=94.77$ ,  $SD=7.23$ ;  $t(415) = -1.484$ ,  $P=0.138$ ). The same trend was seen with the mathematical scores of boys in the second grade ( $M= 90.97$ ,  $SD= 8.6$ ) and girls ( $M=91.68$ ,  $SD=9.9$ ;  $t(415) = -0.734$ ,  $P=0.463$ ), and also in the third grade for boys ( $M= 90.01$ ,  $SD= 8.49$ ) and girls ( $M=91.74$ ,  $SD=11.06$ ;  $t(415) = -1.728$ ,  $P=0.085$ ).

Also from the results contained in Table 2, the mathematical scores of girls in the first grade who had not attended kindergarten were higher and statistically significant ( $M= 93.98$ ,  $SD= 8.31$ ) than the boys ( $M=87.96$ ,  $SD=13.89$ ;  $t(266) = -4.432$ ,  $P=0.000$ ). The same pattern was again repeated in mathematical scores of girls in the second grade who had not attended kindergarten ( $M= 91.48$ ,  $SD= 10.27$ ) compared with the boys who had not attended kindergarten ( $M=83.07$ ,  $SD=13.39$ ;  $t(266) = -5.807$ ,  $P=0.000$ ). This trend continued into the third grade for girls ( $M= 89.91$ ,  $SD= 12.35$ ) and boys ( $M=74.13$ ,  $SD=15.82$ ;  $t(266) = -9.134$ ,  $P=0.000$ ).

##### ***5.3 The teachers' views***

###### ***5.3.1. The stage one questionnaire***

The pupils' teachers' views were sought to provide additional evidence for the rationalization of the emerging results. Thirty-four stage one open-ended teachers' questionnaires were returned from the 50 questionnaires that were distributed to teachers of primary school, grade one. All the respondents agreed that it was important for all children to go through kindergarten. The teachers' comments on first graders' performance, based both on their observation and experience, supported the finding that pupils with kindergarten experience tend to out-perform their peers without such a background in grade one. They claimed that pupils with kindergarten education experience are better prepared for primary school education in that they would have acquired some pre-reading skills and counting skills during their kindergarten education. In the opinion of the respondents the acquisition of these skills put the kindergarten group ahead of the other group in communicating, counting, and holding pencils as well as in writing and drawing. All the respondents also agreed that high education level of parent positively affected in pupils' academic achievement. Three major themes emerged from the teachers' responses. These centred on the following:

1. the aims of kindergarten;
2. the acquisition of some basic skills from kindergarten; and
3. the factors that may determine pupil success.

#### *5.3.1(a) Aims of kindergarten*

The respondents indicated that when children went through kindergarten before admission into grade one classes, they tended to become easily adapted to the classroom situation and the school environment as a whole. For they are used to the school set-up, they socialize easily with both the teachers and children. Due to this favourable adjustment, learning seems to be easier for them than those without kindergarten experience. In support of this observation, some typical responses of some of the teachers are reproduced below.

1. All the teachers said "it is important because it gets them ready for grade one".
2. All the teachers said, "It is important in helping the child acquire religious foundation".
3. All of the teachers said "it is important to helping the child's acquisition of skills for the future".
4. All the teachers said "it is important in making the child more cooperative with other children".
5. All the teachers said "it is important in helping the child deal with others without feeling shy".
6. Thirty-three (out of 34) of the teachers said "it is important because it makes the child feel accustomed to being away from parents.
7. Thirty-two (ditto) of the teachers said, "It is important for the social and psychological preparation of the child".
8. Nineteen (ditto) of the teachers said "it is important in getting the child to bear responsibility for him/her self".
9. Fifteen (ditto) of the teachers said, "It is important to introduce the child to a simple curriculum".
10. Ten (ditto) of the teachers said "it is important in providing a better alternative to leaving the child with a baby-sitter".

#### *5.3.1(b) Acquisition of some basic skills from kindergarten*

In response to the second theme, the teachers stated the differences in learning characteristics between pupils with kindergarten experience and those without kindergarten experience were as follows:

- (a) *kindergarten graduates*: from the teachers' responses, it was noted that kindergarten graduates were able to communicate freely with the teacher and their classmates. They brought with them from kindergarten some pre-reading skills, which enabled them to be quicker in doing some related tasks. Most of them could respond to instructions in mathematics and had fully developed some fine motor skills in that they could, for example, hold pencils correctly.
- (b) *non-kindergarten graduates*: it was gleaned from the teachers' responses that children without kindergarten background were shy, scared of speaking to the teacher and other children. They could not hold pencils properly and were shy to communicate freely. To support this, some typical statements from the teachers are reproduced below.
  1. All the teachers said "Kindergarten children do not cry and they know what school is, while their peers who did not go to kindergarten cry and demand to go back home with their parents on their first day in school".
  2. All the teachers said "Children with kindergarten background can communicate freely with other children, can write their names. Those without kindergarten background are shy, can not hold pencil properly and can not write their names".



3. Thirty-three (out of 34) of the teachers said “it is important in helping the child with counting and holding pencils as well as in writing and drawing”.
4. Thirty (ditto) of the teachers said, “Children with kindergarten background learn fast because they understand what is needed in class. Those without kindergarten background are shy, whisper when they speak”.
5. Twenty-nine (ditto) of the teachers said “Kindergarten children often learn fast and show interest whenever they are given some work to do. The children who did not go to kindergarten always need most of the teacher’s help”.
6. Fourteen (ditto) of the teachers said, “Kindergarten children freely participate in class but those without kindergarten need to be attended to fully”.
7. Nine (ditto) of the teachers said, “Children with kindergarten background perform most activities on the basis what they learned from kindergarten but the other group have nothing”.

### 5.3.1(c) *The factors that determine pupil success*

From the teachers’ responses, it can be noted that they believe that pupils’ success depended equally on a variety of background factors including parents’ educational level, early home teaching, intellectual ability, attending kindergarten background and interest the subject. To support this, some typical statements from the teachers are reproduced below.

1. All the teachers said, “Kindergarten affects pupils’ success because children with kindergarten background come with some skills and they already know most things about school life”.
2. All the teachers said “intellectual ability affect pupils’ success at school”.
3. All the teachers said, “The academic ability of parents especially the mother increase the academic ability of pupils”.
4. Thirty-three (out of 34) of the teachers said “the success of pupils’ in first grade is influenced by interest in the subject”.
5. Twenty-four (ditto) of the teachers said, “Following up and reinforcing by the parents at home were reported as the main reason success of pupil”.
6. Twenty (ditto) of the teachers said, “Using various instructional materials for help the child to understand confirmed such a motive reason success of pupil”.
7. Twenty (ditto) of the teachers said “telling stories during the lesson”.
8. Nineteen (ditto) of the teachers said “co-operation between teachers and home increase the pupils’ success”.
9. Nineteen (ditto) of the teachers said “making the subject easy to understand is effect in pupils’ success”.
10. Fourteen (ditto) of the teachers said, “Pupils’ success depended on constant praise with encouragement”.

### 5.3.2 *The stage two questionnaire*

One hundred and thirty eight stage two teachers’ questionnaires were returned from 150 questionnaires that were distributed to teachers of primary school, grade one. This questionnaire consisted of two main parts, as follows.

#### 5.3.2(a) *Personal characteristics of teachers*

The questions in this section of the questionnaire were designed to provide information on four basic variables including sex, educational attainment, training in the first grades of primary school programme, and teaching experience in the first grade in primary school. Returns are presented in the following univariate frequency distribution forms.

Table 3 (see appendix A ) shows that 54.3 percent of teachers’ respondents were male and the remaining 45.7 percent of teacher respondents were female.

In respect of level of educational attainment and qualifications, the largest group (53.6 percent) had obtained a first university degree. On other hand 24.7 percent of teachers’ respondents had obtained the diploma of the Teacher Training Institute. The group under “other” (21.7 percent) had obtained certificates in fields related to preschool education (see appendix A Table 4).

As regards in service training three-quarters (74 percent) of teachers had not received any training on methods of teaching children. Otherwise 26 percent of teacher had been training courses on methods of teaching children in the first years of primary school (see appendix A Table 5).

In respect of teaching experience in first grade of primary school is shown in Table 6 (see appendix A). The majority of teachers (55.8 percent) had experience from one to ten years, while 38.4 percent of teachers had experience from eleven to twenty-one years. The remaining (5.8 percent) of the teachers did not indicate their experience.

### 5.3.2(b) Teachers' views

In this section of the questionnaire, teachers were asked to indicate their opinion about the effects of parents' education level on pupils' academic ability, the factors which determine pupils' success, and the goals of kindergarten education. Their views were also obtained in relation to the importance of teaching methods on pupils' mathematical achievement and their teaching methods' experience that they considered made mathematics more appealing to the pupils. In respect of the factors that may determine pupils' success in the first years of primary school, the respondents indicated that parents' educational level as a prior element that influences the success of pupil in the first years of primary school (100 percent). While the early home teaching of pupil (96.3 percent) came in the second ranked and the third ranked was intellectual ability (88.4 percent) followed by attending kindergarten (86.3 percent) and the interest the subject (80.3 percent) (see appendix A Table 7). When teachers were asked about other factors that influenced pupils' success in the first grades of primary school in addition to those indicated on the questionnaire, 23 (out of 138) of teachers indicated that cooperation between teachers and home, constant praise with encouragement, following up and reinforcing by of the parents were reported as the main reason success of pupil.

From Table 8(see appendix A) it can be seen that the majority of the teacher respondents (82.5 percent) agreed that mothers' educational level was more effective than fathers' educational level in the success of pupil in the first years of primary school, however 24 (out of 138) of the teacher respondents (17.4 percent) believed that both of educational level of father and mother influenced pupils' success. It is interesting that all the respondents claimed that fathers' educational level was not affective on pupils' success.

Table 9 (see appendix A) shows the teachers' attitude towards the aims of kindergarten education. The responses can be summarised as follows:

1. all respondents indicated that the kindergarten was important in making the child more cooperative;
2. ninety-six percent (out of 138) of respondents indicated that the kindergarten was important in the social and psychological preparation of the child;
3. ninety-five percent (out of 138) of respondents indicated that the kindergarten was important in helping the child acquire a religious foundation;
4. ninety-one percent (out of 138) of respondents indicated that the kindergarten was important in supporting the child's acquisition of skills for the future;
5. ninety percent (out of 138) of respondents indicated that the kindergarten was important in helping the child to deal with others without feeling shy;
6. eighty-eight percent (out of 138) of respondents indicated that the kindergarten was important in preparing the child for the next stage of education;
7. eighty percent (out of 138) of respondents indicated that the kindergarten was important in helping the child feel accustomed to being away from his or her parents; and
8. twenty-two percent (out of 138) of respondents indicated that the kindergarten was important in providing a better alternative than leaving the child with a baby-sitter.

When the teachers were asked about other aims of early childhood education in addition to those indicated on the questionnaire, they indicated that promotion of the child's abilities was an important aim of kindergarten education, followed by helping the child to increase the academic achievement, while getting the child to responsibility for himself ranked next and providing a healthier environment seems to be the least important.

From Table 10 (see appendix A) it can be seen that all the respondents agreed that the teaching methods of the teacher increased the ability of pupils in mathematics. When the teachers were asked about their teaching methods' experience that they considered made mathematics more appealing to the pupils, they indicated that constant encouragement, with rewards presented to the pupils, was the most important way of making mathematics appealing to the pupils, followed by using a variety instructional materials to help the child to understand. However, some of the teachers indicated that making the subject easy to understand and teacher being cheerful when teaching the pupils were considered to be one of the important teaching methods that

make mathematics appealing to pupils, as well as using play to learn during the lessons (see appendix A Table 11).

Based on above findings, the following main conclusions can be suggested tentatively. There is a positive effect from attending the kindergarten related to the mathematics aspect of pupils' achievement in first grade of primary school. As regard of sex, the result indicated that no difference between the boys and girls who had attended kindergarten in the mathematics achievement in the first grade. Although the mathematics achievements of girls who had not attended the kindergarten were consistently better, and statistically significant, than boys who had not attended kindergarten. The mothers who were employed are most positively correlated with pupils' mathematics achievement of both the pupils who had attended kindergarten and had not when compared with their peers whose mothers were not employed, however fathers' employment status did not seem to affect the pupils' mathematics achievement test scores. Both the pupils who had attended kindergarten and their peers who had not with mothers who had a high level education scored higher in mathematics achievement tests in the first grade than peers whose mothers had a low level of educational achievement. Otherwise the pupils with high level of father education are more positively affected by attended kindergarten in mathematics achievement in the first grade than their peers with low level of father education, although the educational level of fathers did not seem to affect the pupils' mathematical achievement in non-attended kindergarten. The pupils with and without experience of attending kindergarten, and whose parents had taught them at home before joining primary school, scored higher in mathematics achievement tests in the first grade than their peers who had not been taught at home by their parents. Both the pupils who had and who had not attended kindergarten, and whose parents had introduced them to instructional materials before joining school scored higher in mathematics achievement test in the first grade than their peers whose parents had not introduced them to instructional materials at home prior to joining school.

The pupils' teachers concurred with the notion of the positive effect of kindergarten education on its recipients. They believed that kindergarten education is useful in assisting grade one pupils in the primary school to learn. They were of the opinion that pupils with kindergarten education experience are better prepared for primary school education in that they would have acquired some pre-reading skills and counting skills during their kindergarten education. The pupils' teachers also believed that pupils without kindergarten education background tend to adjust much more slowly than their peers with such an exposure to the school environment, at least during their early days in the primary school. The pupils' teachers tended to agree with about the aims of early childhood education for young children. They were of the opinion that the most important of the aims of early childhood education included making the child more cooperative, the social and psychological preparation of the child, helping the child acquire a religious foundation, the child's acquisition of skills for the future, helping the child to deal with others without feeling shy, preparing the child for the next stage of education and helping the child feel accustomed to being away from his or her parents. The pupils' teachers were also in agreement concerning the influential factors on success of pupil in the first years of primary school. They believed that the most important factors which determine pupils' success are parents' educational level, early home teaching, intellectual ability, attending kindergarten and interest the subject, respectively.

## **6. Discussion**

### ***6.1 Attending kindergarten***

Our results suggest that the mathematical performance of pupils who had attended kindergarten in the first grade was better than those who had not attended kindergarten and this affect was continued into the second and third grade of primary school. The same results occurred in studies of Robbin (1996), Daniels (1995) and Taiwa and Tyolo (2002). The study reported here suggests that the pupils with pre-school education experience significantly out-performed their counterparts without such experience in the mathematics. Children who have gone through some form of early childhood intervention tend to acquire certain basic skills, which enable them to make an easier transition into primary school environment (Myers, 1992). Bennett (2000), based on a review of Ginsburg and Baron (1993) and Charlesworth (1997), noted that young children have a natural curiosity regarding mathematical events and that they build up a storehouse of mathematical knowledge through numerous preschool experiences.

## **6.2 Gender**

The gender of pupils who had attended kindergarten did not appear to affect the mathematical performance in the three grades of primary school. This finding is consistent with the studies of Berk (2000) and Mushrif (1985) who both indicated that both boys and girls perform equally well on tests of basic mathematics knowledge. On the other hand, our results also indicated that the mathematical performance of girls who had not attended kindergarten was better than boys who had not attended kindergarten. This result contrasts with by studies of Brown (1991) and Lummis and Stevenson (1990) who suggested that boy's attainment was significantly better than girls in mathematics, while girl's attainment was significantly better than boys in reading scores. Whilst our study contradicts the findings of Brown (1991) and Lummis and Stevenson (1990) in relation to mathematical achievement, we have no data in relation to reading scores.

Prior kindergarten experiences and gender are also as mention above factors that may have important influences on a child's academic readiness. This may be because boys mature at a slower rate than girls, there has been concern that there may be a feminization of the curriculum for children during the early years in school, possibly leading to detrimental effects, especially for boys (Gullo, 1991; Gullo and Clements, 1984; Lee, 1973).

## **6.3 Teachers' expectations**

What is interesting here is that while our data indicate, in congruence with the findings of Sammons et al (2004), that experience of kindergarten is a significant predictor of potential educational achievement in the early years of primary school, the teachers of the children who had been to kindergarten ascribed to that experience lesser importance than a range of background factors. Such a discrepancy might call into question the strength of the influence of the self-fulfilling prophecy argument put forward by Rosenthal and Jacobson (1992). What appears to be happening is far more complex. Whilst attendance at kindergarten did, with statistical positive significance, act as a positive predictor of success, if the self-fulfilling prophecy arguments hold, then the children's teachers were 'predicting' based on the 'wrong' indicators. Within the policy and practice context of early years education in KSA this raises two issues. One relates to the universal availability of free kindergarten school experience, the other to the professional development of early years experience in relation to the positive influence of kindergarten school. As Sammons et al (2004) point out; pre-school learning can have a significant impact on combating social exclusion by offering (economically?) disadvantaged children a better start in primary school. In KSA, where kindergarten school places are restricted by either occupational status (with free places for state employees) or financial considerations (for fee paying kindergarten schools), the adoption of a free kindergarten school experience for all young children would have significant beneficial consequences. What should also be remembered, however, is that although attending kindergarten can prepare young children for early educational success we should not fall into the trap of seeing kindergarten as an educational panacea for all. As Mitchell and Ward (2004) warn us, we should not see kindergarten solely as the mechanism for overcoming a 'deficiency' in young children, a deficiency predicated on the assumption the childhood is a stage in the developmental process towards adulthood, and so prioritising the educative strand of pre-school experience as the eventual demands of schooling are privileged. Kindergarten is just one of the experiences which young children should enjoy pre-school, illustrating the important tension between an individualistic developmental model of childhood which foregrounds individual rights and stages of development and a socio-cultural analysis of childhood which may privilege 'children' over the 'child'.

## **7. Conclusion and recommendation**

the results concluded that there is a strong indication that attending kindergarten has been shown to be effective in supporting the mathematical education of primary age children. If this is so, then it appears to us that all children should attend kindergarten before joining primary school, therefore, it is recommended that Saudi Arabian government should work towards universalizing kindergarten education. Integrating kindergarten education into the current basic education could do this.

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## Appendix A

**Table 1:** Overall mathematical attainment of pupils who had and who had not attended kindergarten in the three grades of primary school

Grades	Groups	Number of case	Mean	Std. Deviation	T	Sig.
First	Attended kindergarten	417	93.83	8.36	2.982	0.003*
	Not attended kindergarten	268	91.6	11.23		
Second	Attended kindergarten	417	91.18	9	3.717	0.000*
	Not attended kindergarten	268	88.15	12.29		
Third	Attended kindergarten	417	90.52	9.34	7.124	0.000*
	Not attended kindergarten	268	83.67	15.82		

\*The mean difference is significant at the .05 level.

**Table 2:** Mathematical attainment of male pupils who had and who had not attended kindergarten vis-à-vis their female peers in the three grades of primary school

Grades	Groups	Gender	Number of case	Mean	Std. Deviation	t	Sig.
First	Attended kindergarten	Boys	294	93.44	8.77	-1.484	0.138
		Girls	123	94.77	7.23		
	Not attended kindergarten	Boys	106	87.96	13.89	-4.432	0.000*
		Girls	162	93.98	8.31		
Second	Attended kindergarten	Boys	294	90.97	8.6	-0.734	0.463
		Girls	123	91.68	9.9		
	Not attended kindergarten	Boys	106	83.07	13.39	-5.807	0.000*
		Girls	162	91.48	10.27		
Third	Attended kindergarten	Boys	294	90.01	8.49	-1.728	0.085
		Girls	123	91.74	11.06		
	Not attended kindergarten	Boys	106	74.13	15.82	-9.134	0.000*
		Girls	162	89.91	12.35		

\*The mean difference is significant at the .05 level

**Table 3:** Sex composition of teachers.

Sex	Frequency	Percent
Males	75	54.3
Females	63	45.7
Total	138	100

**Table 4:** Educational attainment

<b>Educational Attainment</b>	<b>Frequency</b>	<b>Percent</b>
Intermediate College Diploma	34	24.7
Bachelor	74	53.6
Others	30	21.7
Total	138	100

**Table 5:** Training courses relating to the first grade of primary school

<b>Responses</b>	<b>Frequency</b>	<b>Percent</b>
Teachers had received training	36	26
Teachers had not received any training	102	74
Total	138	100

**Table 6:** Years of Experience in teaching first grade of primary school.

<b>Teachers experience</b>	<b>Frequency</b>		<b>Percent</b>	
1-5 years	46		33.3	
6-10 years	31		22.5	
11-15 years	20		14.5	
16-20 years	15		10.9	
21 years or more	18		13.0	
No response	8		5.8	
Total	138		100.0	

**Table 7:** Responses to the question:

Is success of pupil in the first years of primary school influenced by?

<b>Statement</b> <b>Responses</b>	<b>Strongly agree</b>		<b>Agree</b>		<b>Disagree</b>		<b>Strongly disagree</b>		<b>No response</b>	
	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>
Parents' educational level	90	65.2	48	34.8	0	0	0	0	0	0
Early home teaching	103	74.6	30	21.7	4	3.7	0	0	1	0.9
Intellectual ability	66	47.8	56	40.6	2	1.9	2	1.9	12	11.1
Attending kindergarten	70	50.7	45	35.6	7	6.5	1	0.9	0	0
Interest the subject	73	52.8	38	27.5	7	6.5	2	1.9	18	16.7



**Table 8:** Responses to the question:

Which of educational levels of the parents is more influential on the success of pupil in the first years of primary school?

Statement Responses	Strongly agree		Agree		Disagree		Strongly disagree		Total	
	F	%	F	%	F	%	F	%	F	%
Mother's educational level	80	57.9	34	24.6	0	0	0	0	114	82.5
Father's educational level	0	0	0	0	0	0	0	0	0	0
Both of them	20	14.5	4	2.9	0	0	0	0	24	17.4

**Table 9:** Responses to the question:

What are the aims of kindergarten in relation to the following issues?

Statement Responses	Strongly agree		Agree		Disagree		Strongly disagree		No response	
	F	%	F	%	F	%	F	%	F	%
Helping the child to deal with others without feeling shy.	57	41.3	72	52.2	4	2.9	0	0	5	3.6
Preparing the child for the next stage of school.	59	42.7	63	45.6	15	10.8	1	0.7	0	0
Providing a better alternative to leaving the child with a baby-sitter.	26	18.8	47	34.0	30	21.7	4	2.9	31	22.4
To make the child more co-operative.	88	63.8	50	36.2	0	0	0	0	0	0
To help the child acquire a religious foundation.	98	71.0	33	23.9	0	0	0	0	7	5.1
To make the child feel accustomed to being away from their parents.	50	36.2	60	43.5	28	20.3	0	0	0	0
Social and psychological preparation of the child.	90	65.2	43	31.2	5	3.6	0	0	0	0
The child's acquisition of skills for the future.	67	48.6	58	42.0	5	3.6	2	1.4	6	4.3

F; Frequency

%; Percent

**Table 10:** Responses to the question:

Does teaching method of the teachers influence on pupils' mathematical achievement?

Responses	Frequency	Percent
Strongly agree	110	79.7
Agree	28	20.3
Disagree	0	0
Strongly disagree	0	0
No response	0	0
Total	138	100

**Table 11:** Responses to the question:

What are the important teaching methods that make mathematics appealing to pupils?

<b>Teachers experience</b>	<b>Frequency</b>	<b>Percent</b>
Constant encouragement with prizes presented to the pupil.	80	74
Using a variety of instructional materials to help the child understand.	40	37
Making the subject easy to understand.	31	28.7
Teacher cheerful when teaching the pupil.	30	27.7
Telling stories during the lesson.	20	18.5
Using play to learn.	15	13.8

**Appendix B**  
(Open-ended questionnaire)

Teacher's name .....

School .....

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**Question one:** Is it important for children to go through kindergarten before coming into grade one?  Yes       No      (Please give reasons for your answer)

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**Question two:** When you first meet your new grade one class are you aware of which children have attended kindergarten and which have not?  Yes       No

If yes how do you know?

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**Question three:** Do you notice any difference between pupils with high and low parents' education level in the way they learn?  Yes       No

'If yes' what the differences have you observed?

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**Question four:** What are the factors, which determine pupil success in first grade of primary school?

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Any further comments: .....

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**Appendix C**  
(Close-ended questionnaire)

Teacher's name .....

School .....

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Please answer all the following questions by inserting a tick (√) in the appropriate box or filling in the blank space as appropriate (please attach additional pages if you need to).

**Question one:** What are your qualifications?

- Intermediate College Diploma
- Bachelor
- Others

**Question two:** Years of experience in teaching in first grade of primary school

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Less than one year | <input type="checkbox"/> From 1-5 years    | <input type="checkbox"/> From 6- 10 years |
| <input type="checkbox"/> From 11- 15 years  | <input type="checkbox"/> From 15- 20 years | <input type="checkbox"/> From 21 up       |

**Question three:** Have you ever attended any training courses relating to first grade of primary school?

- Yes  No

**Question four:** If the answer to the last question was 'yes' what were these courses?

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**Question five:** In your opinion, has the success of a pupil in the first years of primary school influenced by:

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|-------------------------------|--------------------------|----------|--------------------------|-------|--------------------------|----------|--------------------------|----------|
| 1. Early home teaching        | <input type="checkbox"/> | Strongly | <input type="checkbox"/> | agree | <input type="checkbox"/> | Disagree | <input type="checkbox"/> | Strongly |
|                               | <input type="checkbox"/> |          | <input type="checkbox"/> |       | <input type="checkbox"/> |          | <input type="checkbox"/> |          |
| 2. Intellectual ability       | <input type="checkbox"/> | Strongly | <input type="checkbox"/> | agree | <input type="checkbox"/> | Disagree | <input type="checkbox"/> | Strongly |
|                               | <input type="checkbox"/> |          | <input type="checkbox"/> |       | <input type="checkbox"/> |          | <input type="checkbox"/> |          |
| 3. Attending kindergarten     | <input type="checkbox"/> | Strongly | <input type="checkbox"/> | agree | <input type="checkbox"/> | Disagree | <input type="checkbox"/> | Strongly |
|                               | <input type="checkbox"/> |          | <input type="checkbox"/> |       | <input type="checkbox"/> |          | <input type="checkbox"/> |          |
| 4. Interest in the subject    | <input type="checkbox"/> | Strongly | <input type="checkbox"/> | agree | <input type="checkbox"/> | Disagree | <input type="checkbox"/> | Strongly |
|                               | <input type="checkbox"/> |          | <input type="checkbox"/> |       | <input type="checkbox"/> |          | <input type="checkbox"/> |          |
| 5. Parents' educational level | <input type="checkbox"/> | Strongly | <input type="checkbox"/> | agree | <input type="checkbox"/> | Disagree | <input type="checkbox"/> | Strongly |
|                               | <input type="checkbox"/> |          | <input type="checkbox"/> |       | <input type="checkbox"/> |          | <input type="checkbox"/> |          |

**Question six:** If you agree or strongly agree the success of pupil in the first years of primary school influenced by parents' educational level. Which dose the most influence?

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|-------------------------------|-------|----------|---|-------|----------|----------|
| 1. Father's educational level | ف     | Strongly | ف | agree | ف        | Strongly |
|                               | agree |          |   |       | Disagree | Disagree |
| 2. Mother's educational level | ف     | Strongly | ف | agree | ف        | Strongly |
|                               | agree |          |   |       | Disagree | Disagree |
| 3. Both of them               | ف     | Strongly | ف | agree | ف        | Strongly |
|                               | agree |          |   |       | Disagree | Disagree |

**Question seven:** What do you think about the aims of kindergarten in relation to the following issues?

- |   |   |                |   |       |   |          |   |                   |
|---|---|----------------|---|-------|---|----------|---|-------------------|
| 1. Helping the child to deal with other with out feeling shy.             | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 2. Preparing the child for the next stager.                               | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 3. Providing a better alternative to leaving the child with a baby-sitter | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 4. To make the child more co-operative.                                   | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 5. To help the child acquire religious foundation.                        | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 6. To make the child feel accustomed to being away from parents.          | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 7. Social and psychological preparation of the child.                     | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
| 8. The child's acquisition of skills for the future.                      | ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |

**Question eight:** Do you think that teaching method of the teacher influence on pupil mathematical achievement?

- |   |                |   |       |   |          |   |                   |
|---|----------------|---|-------|---|----------|---|-------------------|
| ف | Strongly agree | ف | Agree | ف | Disagree | ف | Strongly Disagree |
|---|----------------|---|-------|---|----------|---|-------------------|

**Question nine:** if you agree or strongly agree please give the three most important ways to your self which you consider make mathematics appealing to pupils:

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