

Needs Assessment for a Training Program of Parents to Promote
Increased Parent Involvement in Mathematics Education

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ABSTRACT

In this study, it was aimed to provide the initial data to be used in the establishment of a new parent training program which aims to increase the effective and efficient parent involvement in mathematics education and to identify the factors behind parent involvement.

Sample was formed by 337 selected students from one Imam Hatip Lycee, one Eight Year Elementary School, one Anadolu Lycee, and one Private College; 257 parents of these students; and 17 mathematics teachers from these schools.

Regarding the demographic and specific characteristics of subjects, current status in parent involvement, awareness about the need for parent involvement, perceived adequacy of parent involvement, willingness to participate to the training program was determined by three questionnaires. These questionnaires had four parts basically the same which differ with respect to the status of the subjects. Data was cross-tabulated and analyzed by t-test and one-way ANOVA when appropriate.

The domains of the parent involvement was identified as effective communication among the groups (ECG), effective home study with child (EHSC), mathematics study with fun (MF), factors behind achievement and underachievement in mathematics (FMA), the amount and the type of reasonable financial support (FS), attitudes towards mathematics (ATM), active involvement (AI) attitudes towards parent involvement (API).

Among students, specifically school type and math-performance; and among parents, the level of education, the level of English proficiency, income level,

occupation type, and school type of their children were identified as related with their needs in parent involvement domains.

Anadolu Lycee students were identified as more aware about the needs towards parent involvement in general and needs towards parent involvement domains specifically. Teachers were seen as the most aware group about parent involvement and how it should be. In addition, teachers were the group who saw parents as the least adequate in parent involvement in all domains. Parents generally meet with teachers at PTAs and help to their children before exams. Parents were seemed to be aware of the need for parent involvement in the domains ECG, MF, AI, and API whereas teachers identified the need for parent involvement under the domains MF, FMA, and FS. Parents were seeing themselves as adequate in the domain of FS only. Students indicated their parents need for training on the domains of ECG, EHSC, and MF. Meanwhile, teachers identified the need for training of parents on all domains in mathematics education.

To sum up, the majority of the sample was seemed to support a training program to promote effective and efficient parent involvement.

ÖZET

Bu çalışma ile matematik başarısında etkili ve yeterli aile katılımını arttırmaya yönelik bir eğitim programının geliştirilmesi için gerekli ilk verileri elde etmek ve aile katılımının ardındaki faktörleri belirlemeye çalışmak hedeflenmiştir.

Örnekleme bir Imam Hatip Lisesi, bir İlköğretim Okulu, bir Anadolu Lisesi ve bir Özel Okul öğrencilerinden seçilen 337 öğrenci, bu öğrencilerden 257 sinin velisi, ve bu okullardan ulaşılabilen 17 matematik öğretmeni oluşturmuştur.

Araştırmaya katılanların demografik ve bazı diğer özelliklerine göre şu andaki aile katılımı durumu, aile katılımı ihtiyacına olan farkındalık, aile katılımı yeterlik algıları, ve olası bir eğitim programına katılım durumları farklılıklarını ortaya çıkarmaya yönelik temelde aynı ama grupların niteliğine bağlı olarak farklılık gösteren bir veri toplama aracı öğrenci, veli ve öğretmenlere uygulandı. Veriler sayı ve yüzdelerden oluşan dağılım tablolarına ek olarak t-test ve bir yönlü varyans analizi kullanılarak test edildi.

Aile katılımı alt alanları, veli, öğretmen ve öğrenci arası etkili iletişim (ECG), çocukla birlikte etkili ev çalışması (EHSC), eğlenceli matematik (MF), matematik başarısı ardındaki ailesel faktörler (MFA), finansal katılım (FS), matematiğe olan bakış açısı (ATM), aktif katılım (AI), ve aile katılımına olan genel tutum (API) olarak belirlendi.

Öğrencilerde özellikle devam ettikleri okul çeşidinin ve matematik performanslarının; velilerde ise eğitim düzeylerinin, İngilizce yeterliliklerinin, gelir düzeylerinin, mesleklerinin ve çocuklarının devam ettiği okul çeşidinin aile katılımı

alanları arasından hangisine ve ne düzeyde eğitim ihtiyacı olduğunu belirlemede etkili olduğu görüldü.

Anadolu Lisesi örnekleminin gerek aile katılımı gerekse aile katılımının alt boyutlarına olan genel ihtiyaç konusunda diğer okul örneklemelerinden daha çok haberdar oldukları gözlemlendi. Öğretmenlerin aile katılımının , nasıl olması gerektiği konularında en farkında olan grup olduğu gözlemlendi. Bu bağlamda velileri en yetersiz gören grup da yine öğretmenler olarak belirlendi. Velilerin çocuklarının matematik öğretmenleriyle en çok Veli Toplantıları'nda görüştüğü, ve çocuklarına da sınav öncesi matematik çalışmasında yardımcı oldukları belirlendi. Özellikle, velilerin ECG, MF, AI, API alanlarında aile katılımı eğitimine olan ihtiyacın farkında oldukları, öğretmenlerin ise özellikle MF, FMA, FS konularında velilerin eğitilmesi için ihtiyaç olduğunun farkında oldukları belirlendi. Velilerin kendilerini bir tek FS konusunda yeterli algıladıkları, öğrencilerin velilerin FS, API, FMA ve ATM dışındaki alanlarda eğitilmesi gerektiğini öğretmenler ise velilerin aile katılımı alanlarının hepsinde eğitiminin faydalı olacağını belirtiyorlar.

Aynı zamanda örneklemin büyük çoğunluğunun da aile katılımını etkin ve etkili şekilde arttırmaya yönelik bir programa destek verdikleri gözlemlendi.

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LIST OF ABBREVIATIONS

PTA	Parent-Teacher Meetings
ECG	Effective Communication within parents-teachers-students
EHSC	Effective Home-Study with Child
MF	Mathematics with Fun
FMA	Factors that affect Mathematics Achievement
FS	Financial Support
ATM	Attitudes Towards Mathematics
AI	Active Involvement
API	Attitudes toward Parent Involvement
ANPI	Awareness about the Need for Parent Involvement
PAPI	Perceived Adequacy in Parent Involvement

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INTRODUCTION

University entrance exam results show that general mathematics achievement has been gradually declining. Besides this decline; new technologies and advances in science force educational systems to reorganize mathematics education. The factors behind underachievement and high achievement have been investigated by various researchers. These studies indicate the importance of the parent role. Hence parent involvement has recently become a key-concept. Some programs are established in order to increase the degree and positive effect of parent involvement. This study will investigate the need for such training programs for parents in the Turkish system.

Parent Involvement

Parent Role in School Achievement

In the last three decades, the idea of the alterable variables that affect student achievement has gained greater importance over the other issues. According to Bloom one of the leaders of this idea, environment is an alterable factor, that is, to achieve needed changes in the environment, might lead to desired changes in the learning level of the children, and this in turn will lead to increased achievement in students.

Researchers look for the possible alterable characteristics in the family environment where a person's life is mostly spent. A change within the parents' place in their children's education leads to an overall alteration in the achievement levels of children. Hosford (1973) posits that although large groups of learners take the same schooling processes, family and home explain a great variation in school achievement. Similarly, the Coleman Report indicates that variation in the family background determine the achievement level of children much more than school-to-school variations (Hosford, 1973). Tyler (in Keesee, 1990) states some questions such as "Which behaviors does the family consider important?", "How is effective school learning rewarded at home?", "What opportunities does home furnish for the transfer of what is learned in school?", "What opportunities are provided at home for learning the behaviors which the school emphasize?", and so on. He argues that these questions might help us to determine these family characteristics directly related with student achievement.

Home influences in science attitudes and achievement is studied by Dimit and Yahya (cited in Finley et al, 1992). Dimit concludes that the mothers' educational level, and especially their occupation (white-collar positions) are related positively with attitudes in science project completion and science fair involvement of their children. In parallel with Dimit, Yahya found that the educational level of the parents is related to student attitudes towards science.

Schleicher (1989, Reynolds, 1992) defines "parent involvement" as the cooperation between home and school, or establishing a bridge between the remote subjects and child's life experiences, to achieve interconnection of the school with the other socializing agents in society, in order to overcome the child's alienation in mathematics education.

Ardaç (1990) shows that there are alterable and unalterable characteristics of parents that lead to student achievement and achievement motivation. Furthermore, identification of these characteristics enables the study of the specialties of the parent involvement in education. Sutherland (1988) argues that, the characteristics of parents which make their involvement valuable, or less valuable, their enthusiasm about parent involvement, their needs about powers and responsibilities have to be carefully considered if feelings of frustration and disillusionment are to be avoided, both among parents and among school authorities. According to Ilg and Ames (1965), the best parents tend to be those who have the greatest appreciation for the difficulties the school faces, and for what it is trying to accomplish. And they continue by saying conversely that, it is often the most demanding parents, from the school's point of view, who turn out to be the least responsible. The strength of the general attachment of parents to schools is shaped by the attitudes of teachers and school authorities (Sutherland, 1988). Past experiences of parents with school may determine the level of their involvement in the school activities of their children. They may even be unwilling to enter the school since their own experiences of school had been disappointing (Sutherland, 1988). Hence, while identifying the specialties of parent involvement, it is advised to assess their attitudes towards mathematics by researchers.

In recent decades, home-school cooperation picks the supporters from the educational research world. As Galton & Blyth (1989) argue; to the extent that cooperation is regarded as a real part of the actual curriculum, the intended effect of parental participation can be achieved. Schools may be responsible for more didactic, formalized teaching, however home may be recognized as teaching through games and the experience of sharing (Ilg & Ames, 1965). Families are primary settings for

important educational processes such as teaching and learning, modeling and imitation, performing and criticizing. These are educationally significant and necessary for success in and through the school. Families educate as schools educate but they share different public expectations and responsibilities (E.C.L., 1993; Hohmann, Banet & Weikert, 1979, cited in Bergman, 1990). In general, parents experience the first cooperation at the pre-school level. To harmonize these experiences with primary school and other educational levels, is the overall aim (Galton & Blyth, 1989). According to a report of The Council of Europe, parents should participate in the implementation of all the conditions related with work and life in school. Also, they ought to be represented at all levels, local, regional and national and in all branches of teaching, in a broader term, of education (Galton & Blyth, 1989). "Parents on the whole are deeply interested in the education of their children." (Ilg & Ames, p.317). The old days when the parents were totally responsible for educating their children or when this responsibility was laid completely on the shoulders of the educators have indeed changed. In the latter one, the parent was called only in the case of trouble in the school. Now, both parents and schools work together in the education of the child, since "the effectiveness of their cooperation, especially in the early school years, may well determine the entire course of the child's education" (Ilg & Ames, 1965, p.318). This really indicates the importance of home-school cooperation.

The major goal of parent involvement is to improve the family's capabilities to provide a learning environment at home that emphasizes the positive elements in cognitive and emotional factors in child learning (Bergman, 1990). Two things should be considered while engaging in parent involvement. The first one is the type of activities in which parents are engaged and the types of resources and assistance

which are offered to parents and families as a function of parent involvement. The other factor is the attitude versus context, in which those activities are presented.

Parent involvement may generally involve at least one or a combination of the following activities: reading aloud or listening to what their children read, playing informal games at home, being a part of student projects, tutoring and evaluation, rewarding or punishing behavior, providing books from possible sources, parent-led discussions of T.V. shows, participating in the classes (as an opportunity), consulting teachers with regard to homework, learning assessment, and educational planning, discussions between inspectors, headmasters, teachers, and parents (Pritchard, 1981; cited in Galton & Blyth, 1989)

" Open Days" or " Open Nights" is an example of parent involvement in which parents visit the school to see the exhibitions of work or they watch classes going on " normally " or they discuss with individual teachers. This type of involvement gives the schools an opportunity to explain and display their work. Moreover, it provides opportunities for teachers and parents to get to know each other and become acquainted (Sutherland, 1988).

Cooperation between home and school can be classified as confirmatory (e.g. supporting school aims) or compensatory (to overcome the deficits on both sides), but mostly complementary (when the whole educational process is taken into consideration) (Galton & Blyth, 1989). In addition, when the degree of involvement is thought, pseudo-participation may take place as well as half and full participation (Galton & Blyth, 1989). To achieve the full participation is the desired aim. The effectiveness of the cooperation between home and school is shaped by the educational context, the age of the students, and the goals of the intervention, as much as its degree and the type of involvement. Hence, deciding upon its

effectiveness is really a matter of issue. The general parameters of parent involvement are seen as teaching parents specific intervention skills providing social and emotional support, exchanging information between parents and professionals, developing appropriate parent-child relationships, and assisting parents in accessing community resources (White, Taylor and Moss, 1992).

Some obstacles prevent the possible gained benefits from parent involvement. For example, although teachers and parents should not be seen as adversaries in educational matters, it may be expected that the proposals to bring parents to participate in the work of the schools can cause uneasiness to many teachers. In general, teachers favor parents to discuss the progress and make inquiries or complaints about it, or even express enthusiasm and support for the school's work (e.g. raising funds). But also, they oppose involving parents in decisions about teaching methods. Hence, taking the teachers' and parents' view, may diminish these unwanted conflicts between them. Galton & Blyth (1989) argue that existing problems preventing parent involvement are, resistance on the part of the schools (due to extra-work, inadequate training or the time constraints), lack of parental engagement (because of little self-confidence or interest), and unnecessary conflicts between home and school (due to insufficient administrative support or inadequate planning). The parents who seem to want a more active role in their children's mathematics achievement claim that the schools do little to encourage them to be involved in the education of their children. They need to be given a boost of confidence. Similarly, Servais & Varga (1971) state that, there are parents who cannot make the necessary efforts because of lack of time or lack of educational background. Also wrong ideas about mathematics learning may prevent parents from helping their children in primary school. Another obstacle is the negative attitudes of

parents towards mathematics because of their past experiences. Coping with poorly educated parents, is another issue. It is thought that they cannot give help by themselves, and teachers alone can not deal with diverse learning problems. Parent involvement should answer the questions of how to support the children's school learning (e.g. daily reviews of homework) and how to strengthen or train certain abilities (e.g. home learning recipes, or computerized instructions.) In other words, overall aims of parent involvement are to make parents aware of their children's learning difficulties, to train them in school supportive functions and to increase certain skills of the children (e. g. in reading and calculation) (Galton & Blyth, 1989).

The stage for cooperation is set by formal structures and hidden concepts however its realization depends quite strongly on the attitudes of the participants, i.e. what headmasters, teachers, and parents actually expect from cooperation respectively, and which functions are assigned to parents (Galton & Blyth, 1989). When each participants' expectations from cooperation are taken into consideration, it is observed that while parents value their children's educational status by school success in terms of their grades, and expect life-relevant aspects of the education, headmasters regard personal development and overall education as outputs of home-school cooperation. Teachers take the position between these two groups in home-school cooperation. They recognize effective teaching of social skills but not moral education as their responsibility, although their views differ according to their children's age and their own cultural background (Galton & Blyth, 1989).

Parent involvement is a critical component in children's educational and cognitive development. Helping with homework or visiting the school i.e. parent involvement at home or in school; has a positive influence on the child's academic achievement and school adjustment (Reynolds, 1992).

Holden & Edwards (1989, cited in Reynolds, 1992) argue that advantage of parent involvement is its openness to direct measurement by multiple sources (of parents, teachers, and of children) and educational alteration relative to other influences. They also state that unlike its attitudinal counterparts, parental behaviors naturally occur hence, they are more likely to be stable and reflect the child's behavior.

Ensuring parents and teachers working together toward common goals, results in the maximum effectiveness of parent involvement. If the initial contact of parents and the teacher is on a friendly basis, then the following contacts can also be effective (Lakin, 1995). On the other hand, according to Crystal & Stevenson (1991), if parents are unaware of their children's problems, providing assistance which might help to correct the problems, would be difficult. Helping children with homework can be counterproductive if parents are working at cross purposes with the classroom teacher. In order to avoid such conflicts, teachers may be trained about parental expectations, as in the USA.

Two general types of assistance exist: assistance that occur within the family and outside assistance (e.g. engaging a tutor, buying extra materials, and special after school or Saturday programs in mathematics). Crystal & Stevenson (1991) use the words "direct" and "indirect" to define the assistance of parents to their children's math education. Direct assistance covers monitoring homework, working with the child on drill books, giving unspecified active assistance as parents' sayings "I will help you" or "I will explain it to you". Indirect assistance on the other hand includes; seeking help or advice from others or more teaching learning skills only peripherally related to mathematics.

With the participation of attentive, involved parents, evaluation of the children's mathematics achievement can be critical and effective (Crystal & Stevenson, 1991). Sutherland (1988) indicates the factors behind parents being invited back into the school activities, as the growing awareness of the bad effects of parental apathy on the education of children as well as democratic principles. Parents need scheduled conferences with the teacher so they may be given easier access to the school both to question and to inform, with the aim of increasing opportunity for communication between parents and teachers (Ilg & Ames, 1965)

According to Galton & Blyth (1989), with some variations, there is an overall trend in all European Countries since 1970's towards matching home and school education. They also continue by saying that in the preceding century, parents' responsibility to send their children to give them a school and moral upbringing. As a result, schools were expected to educate the younger generation beyond parental competencies. However, in the last three decades, an unexpected and rapid trend has forced parent involvement in various countries. Participatory democracy, researches indicating great family influences on the learning process, parents' increased level of education, and finally changing expectations of society towards the educational system are generally believed to be the reasons behind this trend. In fact, research shows that parent involvement is a major concept especially in studying achievement. Even these studies lead many commercial producers to offer books and materials which enable parents to teach their children (Sutherland, 1988).

Parent Involvement in the World

The first legal attempt at parent participation was in Denmark after the mid-nineteenth century. At the beginning of this century, Dewey and Peterson realized that parental participation should be indisputable in the educational system in general, especially in primary schools if child-centered education is the desired aim. After the Second World War, parental support and cooperation gained importance till educational planning and curriculum developments were affected negatively. After the mid-1960s especially early childhood and compensatory education, and partially participatory democracy stressed the need for parental cooperation, again. In the 1980s, under the impact of the competition for better examination results home-school cooperation suffered (Galton & Blyth, 1989). An overview of the activities on parent involvement in several countries, can be found in the following paragraphs.

Expectations from parent involvement, acceptance of the cooperation by partners(home, school, and child), conflicts between partners, show great variety with respect to traditions, legal framework, ideologies, and the situational demands (Galton & Blyth, 1989). In some countries representation of the parents in the formal school system varies so that it can be consultation, decision-making, extra curricular activities, school rules, or even the employment of teachers and principals. In addition, parent participation, may be in the form of increasing parents' awareness of the teaching aims.

Since the early 1970's, countries like Denmark, France, Germany, Italy and Norway started to respond to the public demand for parental participation at the class and school level with extended legal arrangements.

According to a European survey, principals in several EEC countries stated that parents contact the school about twice a year on average, by phone and 2.5 times by meeting the teacher. Moreover, parents' visits to classes in session, if the teacher is consulted before-hand, seem to be possible in about 60% of European schools (with a range from 88 % of German schools to 36 % of the French), which unexpected class visits are mentioned for an overall 35 % of schools (ranging from 52% in Ireland to 4 % in Germany) . Furthermore, about 50 % of parents are said to have access to the school records of their children in Belgium, Germany, Italy and the Netherlands. In Denmark for example, they can expect regular information on their child's progress and they may participate in selecting optional courses for their children. Schools arrange about two class meetings per year. In some countries (e.g. Germany, and Italy) such meetings are obligatory. (Galton & Blyth, 1989, p. 326).

An overall look at the European countries' past shows that a centralized educational policy due to the large school systems and homogeneous curricula, leave little room for parental participation. Some attempts still exist to increase the parent involvement . For instance, the National Board of Education in Finland tries to achieve cooperation by sending verbal reports to parents with a feedback slip to answer, and the booklets explaining home-school cooperation. At last, by the 1984 School Law, "close mutual understanding and collaboration with the home" is identified as the task of the comprehensive schools (Galton & Blyth, 1989).

In Norway, the Ministry of Education conducted some pilot projects in 1982. In these projects; one parent and two pedagogical consultants offered guidance to parents and schools about the ways of the mutual understanding of parents, and teachers, as 'experts', and on the ways of coordinating life and school learning through complementary action. As a result of these projects, some schools immediately developed some visits to home. Parents were able to participate in language and mathematics lessons especially during the first grade. This obviously made learning more relevant to the children. At the national level, one interesting development was an international training camp for parent representators, schools administrators and teachers. In the case of a centralized school system, the government seems to avoid giving parents any role in decision-making within school affairs but on the other hand tries to increase the level of cooperation (Galton & Blyth, 1989).

In some countries, parent involvement is allowed up to a degree due to achievement-oriented teaching. On the other hand in the Netherlands, parents have the rights to influence the school, even in initiating changes in the curriculum, and employment of the school principal finance. In addition, demonstration lessons are organized for parents as in the same direction of establishment of well organized home-school relations (Galton & Blyth, 1989).

In England for example, parents have the 'right' to provide suitable education if it is necessary it may even be tutoring for their children. Several British studies in England also show (Schleicher 1972; Sharrock 1970; Trigard et al, 1981; Warnock 1978, see in Reynolds, 1992) that good home-school relations result in healthy and successful development in the emotional, social and cognitive domain. Cooperation in England could be in the form of inviting parents to workshop meetings to discuss

their children's progress, offering opportunities to see their children at classes in session, and involving parents with special knowledge to give talks. In addition, most of the schools arrange parents' evenings and open days and invite new parents before their children start school, and some of them send written reports to parents (Cyster et al, 1979; Department of Education and Science 1978 b; Wolfenndale 1983, cited in Galton & Blyth, 1989). In Switzerland, some cantons have school laws by which parents' evenings are compulsory, and parent representatives on advisory school councils are enabled (Galton & Blyth, 1989). There are some unique programs for parent involvement such as the Parent Plus Program in Chicago, the Home-enrichment Program at the Hebrew University and the Lothian Educational home-Visiting Scheme in Scotland (Galton & Blyth, 1989).

In some countries such as the USSR (old USSR, now Russia) and Germany, the aim of the parent-school cooperation is support for the schools and to submit educational goals of the state. On the other hand, in some other states such as the GDR, parents had the right to educate their children but they cannot influence schools. But also, in some particularly decentralized democracies (i.e. of Netherlands, and of USA), participatory models of cooperation are approved (Galton & Blyth, 1989).

There are methods by which parents can easily become involved in their children's mathematics education. In the USA and in Europe, some printed materials are available so that these provide parents' games and activities that engage children in mathematical thinking and problem solving, and at the same time, build their self-confidence and appreciation for mathematics (Hartog & Brosnan, 1994).

Need for Parent Involvement

A number of researches show that a child spends most of his/her time in the sphere of the home-environment, up to age of 16 while only 14 percent of his time is spent at school (Galton & Blyth, 1989). Therefore, family's influences on children's development, such as the attitudes, learning readiness and even scientific subjects, is very important. For child's success, the educator needs the parent as much as the parent needs the educator. Teachers may be informed about the child's home behavior while the parent should know how the child is doing at school.

As expectations of society change, parents' expectations from school also change. Teachers and administrators as well as politicians see the value of cooperation (Galton & Blyth, 1989). Recently, parents are having more time and interest in their children because of new technology and new facilities, and resultantly, they seem to be ready for extended cooperation with the school. Matthews (1988) argues that there is a high value in establishing links between parent and child, especially when they are able to share a task or interest. Parent involvement will increase the parent-child relationships as in the form of transference of interest between mother and child. Parent involvement functions like a bridge between the school and the home. Matthews (1988) states that family workshop projects attempt to introduce the family into the sphere of influence. Then, parent's motivation increases, and also it extends the choice of role models, and widens the participation field. Not only the children's motivation will increase but also the

motivation of the parents will differ to some extent by the increasing competency the individuals are bringing to the situation (Galton & Blyth, 1989; Matthews, 1988).

To be able to make this renewal of parent participation a genuine reform, the views of teachers and of pupils should be assessed as well as the other teaching staff of schools (Sutherland, 1988). Often, the goals of parents and school may be competitive and conflicting. For instance, to satisfy parental pride some parents push their children into college, professions or social activities where the child is neither capable nor suited to it. Unfortunately, they do it unconsciously without seeing the fact that they are concerned with what they want their children to be, rather than what their children actually are (Ilg & Ames, 1965). Cooperation between home and school may increase child achievement in school together with helping to solve some problems within the learning process. Parents see that their child is released from struggling and suffering for a grade whose demands far exceed his abilities and become a comfortable and effective student in a grade more suited to him. Then, parents reach a position to do a great service for other parents (Ilg & Ames, 1965). If parent involvement can be used effectively then it can reduce these conflicts and optimize children's education (Galton & Blyth, 1989).

Galton & Blyth (1989) argue that subject specific and adequate parental participation strategies are needed. Although there are some attempts, much more specific, correct and adequate ways are required. To compensate for short-comings on both sides (that is of home and school), to protect the child from competitive and conflicting educational goals, to counterbalance unfavorable social conditions, and to make education more effective; cooperation between home and school is favored and thought as indispensable (Galton & Blyth, 1989).

Several studies show that parent involvement which is a key factor in effective involvement, is also a key factor in effective schooling. What is done at home has a stronger correlation with children's school achievements and learning process than teaching and curricula do.

The home situation for example, explains a larger part of the variance in the mathematical, linguistic, or political knowledge of children at age 10-11 than do school conditions or even teacher competence. And the home influence on school achievement is not only highly correlated with the socioeconomic status of the family, but it is also, strongly related to the extent of parental cooperation with the school (Fehrmann, 1987; and Lynch &Pinlott, 1976, cited in Galton & Blyth, 1989, p.325).

They also argue that educational success under the comprehensive school system depends on the support that the child receives from home, so the home takes on a central and not merely a peripheral role.

Bridge's answers (1976) which gives the answer to the question "why to involve parents?" were first, the schools make contact with the child relatively late in life, after basic learning patterns are already formed; second, the schools spend fewer hours a day in contact with the child, so that if home and school influence were of equal weight, the family's influence would still be greater because there is more of it; and finally, the family and schools are not equally powerful, because school controls only a narrow range of reinforcers .

To sum up, White and his colleagues (1992), give some rationales about why parents should be involved. To begin with parents deserve a voice in their children's education since they are responsible for the welfare of their children, also involved

parents provide political support. In addition, the child spends the majority of his or her time with the family, so parents understand the needs of the child and how to manage these needs. Also, parents provide funds and this enables the same outcomes with less cost, and finally intervention studies can be much more beneficial.

Parent Involvement in Mathematics Education

Parents may generate a positive math environment in their children's school by visiting the school and seeing if the children are actively engaged in mathematics, or are talking about mathematics, or are working together to solve math problems, have their mathematics work on display, or by using manipulatives (objects that children can touch and move) in classroom, or by exploring a math program with the child's teacher, curriculum coordinator or principal.

If the role of parent involvement in the mathematics learning of children is considered as suspect, the theories of learning may be referred to, to analyze the role of the environment, since the family is the most close component of it, to the children. Here, by closeness, high contact is meant. These learning theories are named as behaviorism, differential (or mediational) behaviorism, gestalt constructivism, developmental constructivism, dialectic constructivism, psychoanalytic behaviorism, and cognitive science theory (see Campbell & Grinstein, 1988).

Mathematics education as a social science, shapes what we call the culture of mathematics learning, that is the cultural context of the school within which

mathematics is learned (Cotton, 1991). So if this context is restricted only to the school environment then insufficient level of learning occurs. But one needs to learn also mathematics in different contexts such as in everyday life, in which the family can help the child. So, if one can make use of this source of learning for the child as suitable and as effective as possible, it would not be a dream to expect the benefits this activity in the short run.

Wigley (1992), Greenwood (1994), Crystal and Stevenson (1991), Burton (1992) and Rawson (1992) all argue that active learning of students is a necessity in mathematics learning. Parent involvement not only enables active learning of students but also the active participation of parents in the education process. Even before going to kindergarten, children learn about numbers.

Children's problems in learning mathematics are such problems in calculation, difficulty with applied or "word problems" and motivational problems specifically related to mathematics, and cognitive or psychological difficulties such as difficulty in grasping new concepts or remembering things learned previously, motivational problems related to school or to learning in general, and problems of carelessness (Crystal & Stevenson, 1991). They first encounter with these problems, when they first start learning mathematics. Although, some children have the chance of attending a kindergarten, the usual way of formal initiation with mathematics is in the primary school.

The Primary school is the place where the school makes the first influence on an individual's life. Up to that point, most of the time parents are responsible for their children's education, but from that time on, school enters into the lives of the individuals as an education agent. It is the transition period of children from a home educated environment to the school educated environment. In the primary school, in

the first years, mathematics is one of the primarily emphasized subjects other than reading and writing. Moreover, it is a science on which other sciences are built. Obviously a powerful achievement in mathematics in primary school leads to success in other fields and in other levels. Campbell & Grinstein (1988) argue that the pervasiveness of computers and technological advances together with the pressures of worldwide economic competition, also public dissatisfaction with student performance, new advances in mathematical research not yet included in the curriculum, and finally competition in the world with other nations for military and space supremacy, are the factors that shape the society's demands on the mathematics education curriculum. Moreover, all jobs need math in one way or another. From the simplest thought of how long it will take to get to work, to determining how much weight a bridge can hold; all jobs require math. Everyone uses math; the school teacher, the fast food worker, the doctor, the gas station attendant, the lawyer, the housewife and the painter. As Hartog & Brosnan (1994) argue mathematics is a subject which is indeed necessary to function adequately in society.

As Schleicher (1989) points out, at the primary school level the value of close cooperation between home and school is beyond doubt. An important aspect of the home-school cooperation, is that it leads to life-relevant education in mathematics. Galton & Blyth (1989) posit that parent involvement gains importance because of the natural forces of the community towards the mathematics education curriculum to make the curriculum parallel with the child's life experiences. Home influence is particularly strong at the primary-school age, since practical application of what is 'learned' is the easiest and the most meaningful experience in the child's everyday life.

Today the overall opinion with regard to primary education seems to be that close cooperation is necessary because the complex school system with its differentiated subject areas tends to deviate from children's experience and their environmental context. (Galton & Blyth, 1989, p.324).

Hartog & Brosnan (1994) posit that the task of nurturing children's confidence in their ability to apply their mathematical knowledge to solve real-life problems is a challenge that each parent faces today. Parents can help their children develop good study habits, and they can make mathematics a part of their daily living; as gardening and playing games or at the same time when they travel and they cook. In the first year mathematics of primary school, children are not yet aware of the real meaning of mathematics but they link mathematics to their mother's shopping activities. As the time passes, they learn about the mathematics much more in the school context. Apparently, primary school is a transition between the real world context and the context of the family of the child. So, it is for sure that in the primary school period, most of the things in a child's mind are shaped with regards to the meaning of education. John Holt says " What we can do, ..., is to help the children find our labels for the ideas they have already grasped." (cited in Cotton, 1991). Family is the base of givers of such labels so they should maintain this duty throughout their life, since the child will always assume that he or she can learn many more things from parents and that is where the parent involvement studies can bring benefits that are worth thinking about. Mothers are seen by their children as one of their most important teachers. Schools can acknowledge and take advantage of this. Children come to school with a wealth of mathematical knowledge and schools can build on these experiences (Cotton, 1991).

As Dessart & Suydam (1988) point out, attitudes of both students and teachers and, of course, of parents are critical ingredients in the learning process. Adults mostly feel that they are poor at mathematics and unable to help. They feel that they do not understand the mathematics that their children are being taught. Cotton (1991) posits some questions to be answered by the future studies such as: 'Why do children see learning as something which happens at home or other places and work as something which we do in school?', Mothers are seen by children as one of their most important teachers. How can schools acknowledge and take advantage of this?, Children come to school with a wealth of mathematical knowledge and experience. How can schools build on this?'

Student attitudes can be considered in two dimensions; their attitudes toward the subject of mathematics, and their attitudes toward instructional organization of mathematics (Dessart & Suydam, 1988). According to a study of Jacobs (1974, cited in Dessart & Suydam, 1988) higher achievers hold more positive attitudes toward mathematics than lower achievers and also there is a positive correlation between mathematics achievement and the attitude toward mathematics. Also Spickerman (1965, cited in Dessart & Suydam, 1988) found that favorable attitudes toward mathematics is associated with aspirations for high grades in mathematics, and the converse idea is also supported. Students with both favorable and unfavorable attitudes toward the subject, value mathematics as a useful subject. Today, anxiety is seen, as the most important factor, behind unfavorable attitudes toward math.

According to Hartog & Brosnan (1994), although parents can find time to read a story to their children thereby instilling a love for literature, they often neglect to instill a love and appreciation for mathematics. Even more than neglecting, they are often at a loss as to how to do it. Parents have the opportunity to use games and

activities at home to explore math with their child. These activities are intended to be fun and inviting, using household items such as paper, pencil, crayons, decks of cards, coins, empty containers, markers, dice, coupons, newspaper, buttons, bottle caps, old keys, or rocks. By means of these activities parent and child communicate about math while investigating relationships; that is they "talk math". This enables the child to be an active learner rather than a passive agent of the learning process.

If parents and teachers work cooperatively in enriching children's experience with mathematics, children can be motivated. Their desire to please both their teachers and parents makes them much more motivated. Even this motivation may serve the idea that mathematics is not just a school subject but an everyday subject that makes life more interesting and understandable (Hartog & Brosnan, 1994).

Some parents may feel inadequate in helping their children with mathematics. This is one of the reasons why we need so called parent involvement programs that deals only with mathematics (Hartog & Brosnan, 1994). Those who want to become more involved in their children's mathematics education, but who are hesitant to take the initiative on their own, may want to look to the teacher for guidance (parent involvement programs may do that work also). Hartog & Brosnan (1994) propose teacher's assistance as setting up a system of home study, helping parents understand the sequencing of mathematical skill development, suggesting materials and activities that are entertaining and suitable for their children's level and which can be done in a reasonable amount of time, providing clear guidelines on how to use materials, giving feedback on the success and failures of home activities and knowing when to stop working with a child on an activity so that a good working relationship is maintained. There is a lack of practical suggestions for how parents' competencies can be made useful for cooperation. And also, there are some studies

dealing with the parents of handicapped children, but unfortunately the result of these studies have not yet been adapted to the context of primary school (Galton & Blyth, 1989). To summarize, parent participation is still limited to consultation and participation in extra-curricular activities. Mostly parents do not understand the importance of their support for school teaching and on overall education. Since they have the tendency to look at school more with personal concerns than collective ambitions (Galton & Blyth, 1989). One more important thing is the roles of the participating groups should be redefined according to the degree of parent cooperation intended. (i.e. whether parents advise, participate or decide in school affairs) (Galton & Blyth, 1989).

Hartog & Brosnan (1994) propose parents utilize technology to provide mathematical activities. They give the example of WINGS which is a software package that simulates the operation of a factory production line with problems to solve involving flaws in production. Family Math and Family Computers both developed by Project EQUALS are two other examples of software to help parents teach their children mathematics. It provides learning activities that parents can do with their children, information on equity issues in mathematics education. It also builds awareness of the importance of problem-solving skills and the ability to talk about mathematics, and helps parents develop a positive attitude toward their role in their children's mathematics education (Lakin, 1995).

Needs Assessment

Adult educators all around the world try to conduct programs for people with the aim of fulfilling their needs. The first step in preparing such a program is to conduct a needs-assessment (Knowles, 1980; Okcabol, 1994). The main aim in doing a needs-assessment is to attract the target people to the program. A program designed regarding the needs of the target people, can be much more attractive and of course much more effective. A needs assessment is a formal analysis for the identification of needs of the target people and for ordering these identified needs in terms of importance (Okçabol, 1987).

Needs Assessment in Adult Education

"Need" is defined as the discrepancy between the real state and the required, desired status (Knowles, 1980; Pennington, 1981, cited in Husseini, 1992). In other words, it is the deficiency of something, which, if present, would help individuals (Okcabol, 1987). Under the light of these definitions, Knowles (1980) lists the main sources of needs as universal human needs, maturation needs, psychological development needs, need to learn, needs to prevent oneself being out of date, and finally recurring needs. Among these, he puts the need for "family improvement" under the category of need to learn.

Adult education is differentiated from formal education in terms of a learning event, because participation in adult education is voluntary as opposed to compulsory participation to formal education. So, adult education programs should be designed with the aim of satisfaction of these needs as these are the primary forces for individuals to participate (Okçabol, 1987).

When the needs are classified with respect to who possess them, in general, three types of needs exist such as the needs of the learners, to develop certain skills, to achieve some learning objectives; the needs of the organization; the needs of the staff, to improve operations of the organization and the needs of the community that is, for developing public understanding and involvement (Okcabol, 1987).

While conducting a needs assessment, factors such as the philosophy, goals and values of agency or institution, the nature of the population served, and of course available resources for conducting the needs assessment should be taken into consideration (Grabowski, 1982, cited in Bergman, 1990). The steps for conducting a needs assessment is such that first, a target must be determined, second a method to contact the target must be identified, third some measurement scheme must be developed and fourth, data must be interpreted by the decision makers (Cook, 1989, cited in Bergman, 1990). Survey method (by means of interviews and questionnaires) is the most commonly used among other needs assessment techniques such as group analysis, performance review, records, reporting, Q-sort, nominal group technique and Delphi-technique (Knowles, 1980; Bergman, 1990, Okcabol, 1987).

Needs Assessment in Parent Education

There is a general agreement on the importance of needs assessment in planning parent education programs, since it is considered to be an important phase in program planning, modifying an ongoing program and in providing high turn out for an adult education program (Okcabol, 1987). They should identify the needs, beliefs and practices of parents before planning a parent education program. Such an approach will definitely contribute to the success of parent education programs (Bergman, 1990). As, Bergman (1990) states, the needs assessment for this type of parent training will facilitate the development of programs tapping those needs and also help to match program content and structure to the needs and characteristics of parents. According to Powell (1986, cited in Bergman, 1990) major concern of program designers and researchers especially in the area of parent education, should be to match program content and structure to the needs and characteristics of parents in the years ahead.

Parent training programs in mathematics education basically should aim at the following:

1. to give clues to parents, to help their children's mathematics achievement in school,
2. to increase the contribution of parents to their children's mathematics education,
3. to increase parents' awareness to their children's learning and

- problems in mathematics afterwards,
4. to reduce misconceptions of parents such as gender discrimination, grade-based study, reward/punishment paradox,
 5. to inform parents about the ways of helping and its disadvantages and advantages , enable them to respond to their children as accurately and as fast as possible,
 6. to reduce the mathematical anxiety among the parents, and to reduce the feeling that in the case of failure the only reason can be the IQ level of the children,
 7. to help parents with children gifted in mathematics.

Up to now, the focus of the studies in the area of needs assessment in parent education is on assessing the needs of parents whose children have learning or behavioral problems, and mental retardation (Bergman, 1990). But from now on, it is a fact that we need more diversity in the area of parent education.

Statement of Purpose

This study is designed to assess the needs of parents, regarding the views of parents, teachers, and students, towards establishment of a parent training program by which, increasing mathematics achievement of their children will be aimed. The role of "parents' attitude toward mathematics" in their children's mathematics

achievement will be analyzed. Possible factors that determine the degree of parent involvement in their children's mathematics achievement will also be identified.

Research Questions

This study will attempt to answer the following basic questions;

1. To what extent do parents feel that parent involvement training in mathematics education is important?
2. To what extent do other groups (children & teacher) feel that training for parents is important?
3. What are the ongoing parent involvement activities?
4. For which specific areas do parents perceive a need for training?
5. What is the relationship between the perceived and attributed needs of parents for training and their demographic and specific characteristics?

Significance of the Study

Parent involvement is a key concept in shaping student achievement, especially in mathematics achievement. In some countries, there are some programs to enhance a much more effective and high level of participation of parents. Although, these programs have significant positive results, the needs of the parents

and expectations of students and teachers from such a program may differ from one society to another. Such programs regarding the needs of Turkish parents and the views of children and teachers would be quite beneficial for students' achievement in mathematics. Hence, this study will be a first step towards the establishment of a training program for parents, aimed at increasing the mathematics achievement level of their children.

It is generally accepted that high mathematics achievement reflects high level thinking skills and competency in other subjects. Furthermore, high mathematics achievement leads to self-confidence in children. So, it is evident that mathematics achievement is important. There are number of educators who are in favor of emphasizing mathematics achievement over general subject matters achievement.

This study will attempt to assess the attitudes of all three corners of the educational triangle, that is of teachers, parents, and children toward parent involvement in mathematics education. These three subgroups of society are strongly related and affected by each other. In this study, the parents' needs in the mathematics achievement of their children will be analyzed from the views of each group. The result of this study would enable educators to understand the level of parent involvement, and whether groups would like to see parent involvement in mathematics achievement or not if so what would be the features of parent involvement. Briefly, this research may function as a starting point and provide initial information for the establishment of such a program.

Although there are some established programs for parent education in Turkey, this study would be the first attempt to assess the needs towards establishment of a training program of parents specifically for parent involvement in mathematics education.

REVIEW OF LITERATURE

Research on parent involvement

After the Coleman Report studies began to concentrate on parent involvement after Coleman Report. The "Coleman Report" indicated that family background factors (e.g. socioeconomic status, parents' expectations from the child, family structure) is much more related with achievement than all of the schooling inputs put together (teacher's level of education, racial composition of the student body, presence of multiple tracks per pupil expenditure (Coleman, 1966; cited in Bridge, 1976).

Then comes the role of parental characteristics (each parents' occupation and education, number of siblings, sex, race, aspirations, expectations, etc). And it was indicated that the father's occupation and education are positively correlated with the attained level of education of children not as the number of siblings do (Sewell, 1970; Duncan, 1972; cited in Bridge, 1976 and Stevenson & Baker, 1987).

Bridge (1976) hypothesized some reasons for lack of parent involvement. These are; a) they do not believe it would make a difference for their children, b) lacking networks of schools with parents, c) less educated parents would prefer face-to-face communications rather than printed words, d) time constraints of working parents, e) parents' anxiety in interacting with school personnel due to differences in ethnicity, language, or social class, etc.), f) mostly, lower class parents do not believe that they have the right to participate in school innovations.

Stevenson & Baker (1987) directly searched for the relationship between parent involvement and the child's school performance. Results of the study show that parents of younger children get more involved in schooling, than parents of older ones, and, this is directly related with high school achievement.

Family characteristics have been studied from the point of view of the degree of effectiveness of the home-learning environment which parents create for the child. In fact, familial characteristics behind the child's cognitive development and subsequent school performance attracted researchers' attention over the other characteristics (Scott-Jones, 1984; Dave, 1963; Wolf, 1966; cited in Stevenson & Baker, 1987). Studies of Dave and Wolf set the stage for the research which focus on the relation between familial environmental factors and school achievement (Marjoribanks, 1979; Plowden, 1976; cited in Stevenson & Baker, 1987). One important finding was the positive correlation between the educational level of parents and the child's school achievement (Heyns, 1978; cited in Stevenson & Baker, 1987). Stevenson & Baker (1987) added that parents who are more involved in school activities are more likely to have children who are performing well in school.

Some of the literature on the parent involvement focuses on the partnership between schools and parents, some focuses on the role of parents in the normal development process, and some focuses on programs to teach effective child-rearing skills (White, Taylor, Moss, 1992). In the last two decades, there is a growing amount of literature on the subjects such as non-formal and informal education, learning then climate and environment, and the consequences of matching or mismatching educational inputs. In addition, research concentrates on home deficits and partial home effects on school learning such as socioeconomic status, cultural

differences and parent education, conflicting aspirations, attitudes, and experiences of home.

Among these, Korpinen (1980, cited in Galton & Blyth, 1989) analyzed parents' and teachers' expectations of attitude and experiences towards home-school cooperation. The results of the study show that educated parents support home school contact, mostly in the grade 1 level and finally if the child is doing well. If parents do not see any reason to have contact with the school then teachers favor 'personal discussions' with parents since this makes mutual understanding about the pupils easier. Similarly, they have conflicts in the essential obstacles to cooperation. That is teachers see classes that are so crowded and schools, but parents see rigid school structures as reasons for the lack of cooperation; but they agree on the fact that the system is named as, a 'teacher centered system' and, upon the teachers' lack of experience or inability to cooperate with parents.

Dornbusch et al (1987), analyzed the relation between parenting style and adolescent school performance. He indicated that while authoritarian and permissive parenting styles are negatively correlated with grades, authoritative parenting is positively correlated. Hess & Halloway (1984, cited in Dornbusch et al, 1987), state that verbal interaction between mother and children, expectation of parents for achievement, positive affective relationships between parents and children, parental beliefs and attributions about the child and finally discipline and control strategies are five processes which link family and school achievement. Also, there is strong evidence that high achievement in the adolescent years is associated with at least one of these family processes (Kandel & Lesser, 1969; Morrow & Wilson, 1961; Rickberg & Westby, 1967; Shaw & White, 1965; Swift, 1967; Weinert & trieber, 1982; cited in Dornbusch et al, 1987). They concluded that the higher the parents'

educational level, the more possible to be authoritative rather than authoritarian or permissive. So they concluded that parenting style is the moderating variable between the parents' educational level and school achievement of children.

Grolnick & Ryan (1989) searched for the nature of parental influences on children's school-related adjustment and performance, and they concluded with the statement that maternal involvement (with high SES) and achievement is related. Grolnick & Ryan (1987, cited in Grolnick & Ryan, 1989) conceptualize "parent involvement" as the extent to which the parent is interested in, knowledgeable about, and takes an active part in the child's life. They continue by saying that "involvement reflects the parents' dedication and positive attention to the child-rearing process and is a facilitator of both identification and internalization of social values" (Grolnick & Ryan, 1989, p.144).

Bergman (1990), searched for the answers to the following questions; respondents' felt adequacy in major areas of parenting, specific areas in which the respondents perceive a need for education, the differences between felt adequacy levels of the respondents with respect to their demographic characteristics, and finally, differences between the perceived need of the respondent for education with respect to their demographic characteristics. She states that the majority of the respondents perceived a need for parent education in the area of cognitive development as well as discipline and guiding child's behavior, general personality development and communication within the family.

Reynolds' (1992) study investigated correspondence among parents, teachers and children in ratings of parent involvement. He indicated similar findings as other studies that favor the positive influence of parent involvement in school as well as the advantage of obtaining multiple measures from different sources.

Crystal and Stevenson (1991) tried to identify the mothers' perceptions of elementary grade children's problems with mathematics. They argue that if parents are unaware of their children's problems, it is obviously difficult for them to provide assistance that might help to convert the problems.

White, Taylor, and Moss (1992) state that parent involvement has mixed results that is, it increases the benefits that are gained from the program but in general it is not highly needed. But they explain that this is similar to most of the studies that were analyzed, stating that the parent involvement was restricted to being an intervenor.

Wang & Wildman (1995) showed that parental education and encouragement, are important factors in the improvement of student achievement. They also posit that strengthening the impact of positive family commitment factors (e.g. father's and mother's educational level, confidence in student performance) and controlling the influence of negative parent variables (e. g., helping children with homework, talking about school, rewarding of good grades and purchasing games and books), are the only ways to enhance family commitment in education. They conclude that parents can; express confidence in students' abilities, encourage students to do their homework but remember that the homework is supposed to be finished by students rather than parents, spend time talking to students about their school activities, promote students' intrinsic interest in science whereby learning science becomes its own reward, to improve student achievement.

Pedersen, Elmore & Bleyer (1986) found out that 'parent attitudes' is the most significant predictor of mathematics achievement. Researches in general, show that variables related to mathematics achievement are, attitude toward mathematics, spatial visualization ability, sex, parents' attitudes (Aiken, 1972; Levine, 1976;

parsons, Adler, & Kaczala, 1979; cited in Pedersen, 1986), career interests and participation in mathematics courses (Pedersen, 1986). Especially for grades 5 through 11, there is positive correlation between parent and student attitudes toward mathematics (Parsons, Adler & Kaczala, 1982; Wilhelm & Brooks, 1980; cited in Pedersen, 1986). Tsai and Walberg (1983, cited in Pedersen, 1986) indicated the direct effect of the level of parent education on the mathematics achievement of 13-year-old children.

Research on Parent Education

The crucial role of parents in the development and education of their children brings specific attention to parent education (Bergman, 1990). Parent education is important in building and reinforcing family responsibility, enhancing the quality of family-life and parent-child relationship in the future and empowering parents to help sustain improvements over time (Bergman, 1990).

Being aware of how family factors can influence children's development and also how parent education programs can help parents in their child rearing styles. This enables researchers and program planners to increase the children's chance for successful and productive lives (Oyamade, & Washington, 1989, cited in Bergman, 1990).

Discontinuous and controversial interactions with the child restrict the development of all children. Reviews of intervention programs and attitudinal mismatch of parents and teachers show this undoubtedly (Gordon, 1970; Schleich, 1975; Hansenn, 1986; Henderson, 1981; cited in Galton & Blyth, 1989).

Bergman (1990) states that, the main purpose of the parent education programs is to strengthen self-confidence, import knowledge and skills to parents in order to enhance their existing ability to foster the physical, mental, social, and emotional development of their young. According to Bergman (1990), parent education programs vary with respect to their goals, content, and material used, underlying theory, the frequency of contact, location and background of participants and the communicator. Bergman (1990) states that, parent education must identify and support common wisdom and local practices while introducing new ideas if effective parent education is to be achieved. Parent education programs should also consist of both the mother and father in order to be effective. In recent years, the role of fathers and their impact on child development takes growing interest.

Ira Gordon (in Bergman, 1990) played a major role in the development of parent education and in the expansion of the programs and research project focusing on parent participation. He introduced the linkage of home, school and community into parent education. His basic assumption was that the behavior of parents and other family members influenced a child's learning. To him, there are three sets of family factors which are associated with the intellectual behavior and personality development of children. These are:

1. Demographic factors (e.g. family organization, family income, ethnic background, quality of housing),
2. Cognitive factors (amount of academic guidance that families provide for their children, level and style of thought at home, quality of verbal interaction),
3. Emotional factors (consistency in the management procedures used with

the child, parental expectations, emotional security and self-esteem of the parents, their sense of control over their own lives and environment, their protective attitude toward the young child, time devoted to the child).

In addition, orderliness and routine of the family, the existing pattern of work habits and trusting attitude toward other agencies influence the child's affective, social and intellectual development.

Parent education programs enable an increase in the level of parents' consciousness and awareness of their importance on their children's lives. Also, these programs make parents recognize their own children and feel happy (Bergman, 1990).

Gordon (1990) also states three types of parent education programs such as;

1. The Parent Impact Approach (i.e. deficit model assumption) has the goal of improving the family's capacity to provide an enriched learning environment at home. But since demographic factors are not emphasized, this is a limited approach.
2. School Impact Programs (from systems perspective) carry the aim of making schools more responsible to parents and helping educators recognize and understand family variables and their ethnic background (Leber, 1985; cited in Bergman, 1990).
3. The Community Impact Model assumes that home, school and community factors are interrelated (Gordon, 1978; cited in Bergman, 1990). Parents take the roles of volunteer paid employee, teacher at home, audience, decision makers, and adult learner in this model.

The Parent Education Follow Through Program (PEFTP) (developed by I. Gordon and associates in 1968) is the most similar to the Community Impact Model

among the above three approaches. PEFTP is such that parents, school personnel and community representatives come together for workshops in interpersonal communication skills and leadership training (Bergman, 1990).

Parent education programs are mostly centered around the pre-school children and children from educationally disadvantaged parts of society, to become more responsible, responsive and successful school pupils. In addition, these promote awareness for mothers of their own strengths and potentials as home educators.

Similarly, The Home Instruction Program for Preschool Youngster in Israel, the Parent to Parent Program of the USA, and Early Childhood Development Program from Ireland are examples of those types of parent education programs (Bergman, 1990).

The leading studies were mainly centered on the reading problem of working-class children. Harringey Project (1982) for example asked parents of children in top infant classes (essentially from disadvantaged backgrounds) to listen to their children read aloud several times a week, with materials sent home. This simple and direct method showed significant desired changes in children's reading level. The Coventry Project on the other hand stressed the cooperation between teachers, parents and children. It confirmed the results of the Harringey Project as similar to other projects such as The Pitfield Project (Parents and Children and Teachers).

In short, observed effects of parent education programs on children are an increase in achievement level, in parents' program participation, and more importantly, infant responsiveness to parent behavior. Moreover, on parents; increased parental competencies in reading infant cues, increased use of positive and facilitative language interactions with child, open and flexible child rearing attitudes, and finally awareness of roles as educators were observed (Bergman, 1990).

Bergman (1990) searched the need for parent education programs in Türkiye and she identified that a greater majority (78%) of the whole sample indicated a need for participation in such a program.

Such parent training programs try to include the students as active learners who are initiators in the learning phase, rather than the object of teaching (Morgan, 1991). For example IMPACT is such a program where a child takes an activity home and translates it into something that a parent can participate in. This is an important step toward making that child responsible in some way for his/her education.

In 1985, a scheme parallel to PACT (Parents and Children and Teachers) carrying the aim of encouraging parents to join with teachers in helping their children while making progress in mathematics, was proposed. IMPACT (Inventing Mathematics for Parents and Children and Teachers) was a mirror to the project PACT (concentrating on the reading problem of working-class children) for mathematics education. A mathematics teacher, Ruth Merttens (1987) who was the chief person in that project, stated that " I was uncomfortably aware of the division between what I thought and taught as a teacher, and what I practiced and believed as a parent." (Bliss, in Steffe & Wood, 1990). The general aim of the IMPACT project was to involve parents in a structured way in their children's learning. According to Merttens (1987), a great deal of similar skills are used in both the formal and informal activities at home. Also to a high degree, the student initiates the activity and he/she becomes the main source of the instruction. In other words, the child is the initiator and tutor rather than the object of the teaching. The IMPACT project includes three types of materials to be sent home: data collecting exercises; doing, making or completing activities; games and investigations (Bliss, in Steffe & Wood, 1990; Morgan, 1992). In the project, contact with parents is considered to be

essential. Informal meetings of the parents with teachers are held to enable them to distinguish and understand their relative roles in these activities. IMPACT is designed for primary school children and for their parents. Holmes (1993), found out that there is a real difference between primary and secondary school so that parental participation decreases after the age 11. She described the reason for this turning point as most of the parents feel that they are not qualified to be able to help or that it is not their place to help and also it is due to the fact that they are not confident to get involved. She states that parents should be given confidence, and the children should be convinced of the possible benefits of their parents' involvement.

Related studies in Turkey

The Turkish educational system in primary and middle school years

From pre-school education to university are all included in the Turkish formal educational system, pre-school includes kindergarten and child care centers. Then the system is divided into three basic levels: elementary education, secondary education, and higher education. Up to July 1997 elementary education was composed of 5-year compulsory primary school and 3 years of middle school. At the secondary education level there are general high schools and vocational-technical high schools with 3-5 years depending on the nature of the lycees whether they are technical and/or where teaching medium is a foreign language.

The aims of the primary education in Turkey is generally taught to provide every Turkish child with all the necessary basic knowledge, skills, and needs required for effective citizenship raising him in a manner commensurate with his

interest, abilities and aptitudes and preparing him for further education (Galton & Blyth, 1989). In general, a single teacher takes the students from 1st grade to 5th grade of the primary school. The content of the primary curriculum gives emphasis on the knowledge and skills that are selected and organized according to the developmental tasks and needs of children of 6-12 years old. Rather than teaching individual subjects separately, the main approach is establishing natural links around life-problems. Also, extra-class activities are arranged around actual life situations and carried on in and out of the school building.

During the 3 years of the middle school, children learn the basics of individual subjects separately. Children face the first departure from home and also the number of teachers is generally restricted to one, parents do not want to lose the contact with the primary school teacher. But in middle school, as children grow up a little and as the number of teachers for a child increase so rapidly to more than ten, parents steadily lose contact and the value of cooperation with the schools of their children.

This year, compulsory education was legislated to be 8 years in July 1997. 8 Year Elementary Schools "İlköğretim Okulları" are not so widespread, yet. Recently, primary schools were expanded to renamed as 8 Year Elementary Schools.

Home-school cooperation in Turkish educational system

In Turkey, there are two main types of associations that bring parents and school together. One of these is the Parent-Teacher Association (PTA) "Okul Aile Birliği", the other one is the Association of School Protection "Okul Koruma Derneği". The main aim of the PTA is to strengthen the relations between school and

parents and to ensure a better educational environment for children. Each primary and secondary school has a PTA and each teacher and parent in these schools are "ex officio" members of this association. Parents and teachers come together mostly twice a year in PTA meetings ("Veli Toplantıları"). Parents are informed about the meetings by an invitation given to their children. Generally, parents go to the meetings to communicate with all the teachers and to learn about their children's achievement level.

The Associations of School Protection, on the other hand, are organized by local people especially by graduates of those schools who are interested in the physical and quality development, and financial problems of the school. The active members of this organization are mostly these dedicated people and the teachers. But sometimes, some parents (especially the ones who fund some establishments in the school system) are also invited to the Association of School Protection.

Parent Education Programs in Turkey

In Turkey, there are two widely known working programs. These two programs have their roots on İlhan Şükrü Aksel's first attempt for parent education i.e. in "Mediko Sosyal" and "Askeri Tıbbiye", in 1962-63 (Yavuzer, 1996). One is called AÇEP (Anne-Çocuk Eğitimi Programı="Mother-Child Education Program") carried on by Kağıtçıbaşı, Sunar and Bekman (since 1982) and the Mother-Father School -"Ana-Baba Okulu" conducted by Yavuzer (since 1989). The general aim of the former is to foster cognitive development of the child and to sensitize the mother to the child's social, emotional, cognitive and physical development. As output of the program, formative evaluations indicate significant differences in children's social

and emotional development and mothers self-confidence and self-concept. On the other hand, the latter program is established by generating the ideas of Gordon's Parent Effectiveness Training (Gordon, 1975, cited in Bergman, 1990) (Yavuzer, 1996). The differentiating points between these two programs are attempts for involving fathers as well as mothers in "Ana-Baba Okulu". Although first one is directly beneficial to the parents from the low socioeconomic status (SES), the second one could also reach the high SES, while its main aim is the low SES (Yavuzer, 1996).

METHODOLOGY

Population and Sample

In this study, the needs of Turkish parents were assessed for a training program to increase their children's mathematics achievement. The target for this study was the "parents". Needs of parents were identified by not only the needs of the parents but also as the needs of children and teachers as well as their expectations from parent involvement. Therefore, the main population of the study was not only parents but also, teachers and students.

Sample of the study was selected by convenience sampling. Four schools; one Imam Hatip Lycee, one Eight Year Elementary School, one Anadolu Lycee, and one Private School were selected to represent their groups. Then, two 6th grade classes were selected randomly from each four schools. Students in these selected classes, their parents and mathematics teachers formed the sample of the study.

There were 337 students in these randomly selected eight 6th grade classes. Among their parents 257 of them returned the questionnaires. Among 25 mathematics teachers in these four schools, 17 of them were cooperative with the researcher (Table 1).

Table 1. The distribution of the whole sample with respect to four types of schools

Type of School	students		parents		teachers	
	n	%	n	%	n	%
Imam Hatip Lycee	103	30.6	63	24.5	5	29.4
Eight Year Elem. Sch.	72	21.4	58	22.6	2	11.8
Anadolu Lycee	112	33.2	111	43.2	6	35.3
Private College	50	14.8	25	9.7	4	23.5
Total	337	100	257	100	17	100

Instruments and Operational Definitions

Three questionnaires named as parent, teacher and student questionnaires which contain basically the same question in four parts, were used as the data collection instruments. Slight differences on the formulation of the questions occurred to the nature of the subjects. These questionnaires were used to assess 5 main variables of the study. The independent variables of the study was demographic and some specific characteristics of the sample. Dependent variables were, the current status of parent involvement, awareness about the need for parent involvement (ANPI), perceived adequacy in parent involvement(PAPI), and willingness to participate at a training program for parent involvement in mathematics education.

Independent variables

1. Demographic and some specific characteristics of the sample were assessed by some of the questions in the first part of the questionnaires (see Appendices 2, 3, 4). Demographic and specific characteristics were obtained by self-reports of the subjects. These include gender, school type, parent age, math-performance of the students (current self-reported math grades), number of siblings who attend to school, status of the family (defined from the marital status of the parents i.e. intact vs. divided), occupation of the parents, educational level of the parent and his or her spouse(both were asked since studies point to the educational level of each parent as determinants of the level of parents involvement), family

income, parents' English proficiency, teacher experience (the year of experience in the profession). Categorical variables in the study were measured by subjects ranking their particular category at each question.

Dependent Variables

1. Current status of parent involvement was assessed by the last three questions in the first part of the parent and student questionnaires and by the last question in the first part of the teacher questionnaire (Appendices 2, 3, 4). The current status was operationally defined by three variables; the frequency of the parent-teacher meetings, the frequency of the parents' help to their children's mathematics study, and finally frequency of providing private tutoring.

2. Awareness about the need for parent involvement (ANPI) was identified by 8 domains for parent involvement such as ECG (Effective Communication within Groups), EHSC (Effective Home-Study with Child), MF (Mathematics with Fun), FMA (Factors that affect Mathematics Achievement), FS (Financial Support), ATM (Attitudes Towards Mathematics), AI (Active Involvement), API (Attitudes towards Parent Involvement). These domains were assessed using the 31 items in the second part of the each questionnaire. The scores of each domain was calculated by summing up the scores of each item belonging to that domain (see Appendix 1).

The first major domain ECG refers to those activities as official meetings and unofficial contacts between parents, teachers, and students. EHSC refers to those activities as helping homework assignments and daily scheduled help. Games,

experiences from everyday mathematics, and the activities which cover how to enjoy mathematics while studying are identified under the domain MF. Parents' misconceptions; such as gender discrimination, grade-based study, reward/punishment paradox, feeling inadequate, high achievement in mathematics as solely a result of high IQ, are named as FMA. FS consists of seeing private tutoring, supplementary books, calculators, and computer facilities as the only way to overcome underachievement in mathematics. ATM refers to those attitudes towards mathematics due to bad and good early experiences, math-anxiety, lack of interest, and exaggerated interest. AI refers to those activities such as active role in course content decision, participating mathematics lessons, choosing course book. Finally, suspicion towards parent involvement in mathematics lessons and lack of interest was named as API.

In the item development process, 52 items were generated first for 8 above mentioned domains through the review of literature. Then, 12 judges were asked to rate how appropriate each item was for each domain. Then, the best 44 items with highest ratings were selected and others were deleted. A pilot study was carried out at a 6th grade class in the sampled Private College which was not one of the 6th grade sampled. For the reliability, alpha coefficient was found to be 0.5714 with item total correlations which varied between -0.1943 and 0.4765. 13 items with negative item total correlations were deleted, and then, 31 items remained as the results of the reliability analysis. For the construct validity judgemental ratings were obtained. And these items were included in the second part of the final version of the questionnaire.

3. Perceived adequacy in parent involvement was assessed by 7 questions located in the third part of the questionnaires each one indicating how adequate parents were perceived (inadequate, somewhat adequate, adequate) for each one of

the ECG, EHSC, MF, FMA, FS, ATM, API domains of parent involvement. A sum of the scores of these questions was identified as the score of perceived adequacy in parent involvement.

4. Willingness to participate in a training program was assessed by the last question (considered as the fourth part) of the questionnaires. Willingness to participate at a training program was assessed by a single item about the conditions in which parents would like to participate (Appendices 2, 3, 4).

Data Collection

Data was collected by the parent, teacher and student questionnaires (Appendixes 2, 3, 4). Researcher administered student and teacher questionnaires with the help of the guidance counselors of selected schools. Parent questionnaires were sent to parents by students.

Analysis of Data

In analyzing the categorical variables in the questionnaires, frequency distributions, and Chi-square test were used. T-test, and one-way analyses of variances (one-way ANOVA) were ran on the continuous variables to see the differences among independent categorical variables. When the result of one-way ANOVA indicates significant differences, Scheffe multiple ranges procedure (at $p = .05$) was applied as Post-hoc analysis to see which groups make differences. Analysis

of the data was carried with the Statistical Package for Social Sciences (SPSS) for Windows (Release 6.1).

RESULTS AND DISCUSSION

Demographic and Specific Characteristics of the Sample

The sample was made up of 337 students, 257 parents and 17 mathematics teachers. Demographic characteristics of the parents, students and teachers are summarized as followings.

Demographic and Specific Characteristics of Parents

The parent sample was made up of 153 (60%) mothers and 103 (40%) fathers. Half of the parents had at least two children who attend to school. Only, 5 % of the parents were found to be divorced, the rest of the families (90%) were intact. Average age of the parents was 39.

Parents were asked to state both their and their spouse's educational level. Their answers were cross-tabulated with respect to the four different types of schools. In Table 2, educational level of 257 mothers and 239 fathers were reported.

Table 2. Parents' level of education with respect by school type and gender

	Mother's education *						Father's Education *					
	0	1	2	3	4	n	0	1	2	3	4	n
Imam Hatip Lycee	16	67	5	13	0	63	13	56	13	11	9	63
Eight year elem. School	21	57	7	10	5.5	58	24	48	7	17	4	58
Anad. Lycee	4	2	5	39	51	111	4.5	1	1	18	76	111
Priv. Coll.	4	24	4	48	20	25	4	12	16	32	36	25
totals	11	32	5.5	27	24.5	257	11	26	7	17.5	39	257

* Educational levels
0: literate
1: primary school graduate

2: secondary school graduate
3: lycee graduate
4: university graduate

Anadolu Lycee students had highly educated mothers of which 51% were university graduates(8% found to have a masters degree or beyond). For mothers of the Private Lycee students this percentage was identified as 20 %. Among the mothers of Eight Year Elementary School students, university graduates were 5.5% . None of the mothers of Imam Hatip Lycee students were found to be university graduates. They were recognized as mostly primary school graduates (81%) whereas this dropped to 6% among the mothers of the students in Anadolu Lycee.

Fathers with university degree were constituting 76% (14% of them were having a masters degree or beyond) in Anadolu Lycee. Fathers of Private Lycee students were found to be 36% university graduate whereas this percentage was only 9 % for fathers of Imam Hatip Lycee students and 4% for fathers of Eight Year Elementary School students.

In terms of occupations, mothers were mainly house-wives(58%) whereas fathers were mainly businessmen(45%). Second large group of mothers were found to be working as civil-servants as were the fathers (Table 3).

Table 3. Parents' job distribution with respect to gender

	mother (%)	father (%)	total (n)
house-wife	58	0	89
owns his/her business	8.5	45	57
civil-servant	21	28.4	61
retired	8.5	4	17
worker	2	16.3	19
mathematics teacher	3	5	9
total	100	100	251

Anadolu Lycee parents were mainly (30%) civil-servants (55% mother, and 45% father). Worker parents (16% mother, and 84% father) were found only in Imam Hatip and Eight Year Elementary School. Sample was also analyzed for the parents as having an occupation as math-teachers. Only 2% of the whole sample was found to be in that profession.

Table 4 indicates the distribution of parents' level of income with respect to school types. Nearly three fourths (73%) of the parents of Imam Hatip Lycee students and 54% of the parents of Eight Year Elementary School students had an income level less than 40 million per month, whereas parents, who were in this income rate, was less than 8 % of Anadolu Lycee and Private College students. In terms of education and income, Imam Hatip Lycee parents seemed to be of the lowest lowest socio economic status of the whole sample.

Table 4. Parents' level of income with respect to schools

	less than 20 million (%)	20-39 million (%)	40-59 million(%)	60-80 million(%)	over 80 million(%)	total (n)
Imam Hatip Lycee	20	53	20	2	5	59
Eight Year Elem. School	14	40	29	9	9	58
Anadolu Lycee	1	1	21	27	50	108
Private College	4	4	8	20	64	25
total	9	22	22	16	31	250

Demographic and Specific Characteristics of Students

158 girls and 138 boys formed the student subjects. 51 % of them had a sister/brother who attend to school. 8% of them had at least 3 other siblings in their family who attend to school. Students who are the only child in the family attending school were constituting 25% of the whole sample.

Table 5 shows the math-performance level of the subjects with respect to four type of schools. 65% of Anadolu Lycee girls were identified as having math-performance grades higher than "3". In Private College, this percentage drops to 44%. The least percentage of girls having math-performance grades higher than "3" was found to be among Eight Year Elementary School girls as 23% following 32% of Imam Hatip Lycee girls. Girls having performance math-grade as "1" were found to be 30% in Eight Year Elementary School.

52% of Anadolu lycee boys had math-performance grades as "4" and "5". Private College boys with the same grades was about 42%. This percentage dropped to 22% among Eight Year Elementary School boys, where 32% of boys had the

lowest grade “1” (Table 5). T-test results showed no significant differences between girls and boys regarding math-performance.

Table 5. The percentage of the students' mathematics grade with respect to schools and genders

	Girls						Boys					
	g r a d e s						g r a d e s					
Sch. Type	1	2	3	4	5	n	1	2	3	4	5	n
Imam Hatip Lycee	7	20	42	27	5	101	0	0	0	0	0	0
E. Y. Elem. School	30	20	27	13	10	30	32	37	10	15	7	41
Anad. Lycee	5	10	20	41	24	41	3	13	32	39	13	71
Priv. Coll.	22	13	22	35	9	23	15	35	8	23	19	26
total	12	17	32	29	10	195	14	24	21	29	12	138

Demographic and Specific Characteristics of Teachers

Among the teacher sample, 30% of them were from Imam Hatip Lycee, 12% from Eight Year Elementary School, and 35% from Anadolu Lycee, and 24% of teachers were from Private College (Table 1). 60 % of mathematics teachers in the sample were identified as having at least 10 years of experience in teaching profession and only 12 percent were the novice teachers.

Current Status of Parent Involvement

Table 6 indicates the parents', teachers', and students' views upon the ways and frequency of P.T.M. (Parent-teacher meetings). It was identified that parents met

with the teachers mostly at PTA meetings (60%). Also they met when they see a need for it (due to emotional or disciplinary problems) (40%) or in case of teachers' request (28%) (subjects were able to mark multiple answers). Only 2% of the parents stated that they never met with the teacher, while 13 % met frequently. Student views did not differ significantly from parent views. Teachers stated that meetings with the parents in the case of a need other than failure (53%) happened to be more frequently than PTA meetings (41%) whereas meeting through failure was just 6%, among teachers.

Table 6. Groups' thought on the time of the meetings of parents with mathematics teachers (%)

time of meetings	students (n=337)	parents (n=257)	teachers (n=17)
teachers asks for	29	28	53
parents need for	36	40	
failure of student	13	16	6
PTAs meeting	54	60	29
frequently	20	13	41
never	4	2	0

Parents' and students' views about the frequency of study with child in mathematics was indicated in Table 7. Although, about 40% of parents stated that they never help, nearly 15% of them posit that they constantly help each evening. Helping before exams were stated by nearly one thirds of them, and about 15% of them study with their child mathematics once in a week. Parents' and students' views did not differ from each other significantly. Finally, data regarding the frequency of private tutoring returned no significant differences among the students in different schools.

Table 7. Frequency of cooperation with students when studying mathematics

time of cooperation	students (n=337) %	parents (n=257) %
each evening	15	11
once in a week	12	16
before exams	30	32
never	40	39

Awareness About the Need for Parent Involvement

As it was explained in the methodology chapter, ANPI was assessed by 31 Likert type items, distributed into 8 major domains (ECG, EHSC, MF, FMA, FS, ATM, AI, API). To see whether awareness about the needs for parent involvement varies among parents, students, and teachers as well as among school types one-way ANOVA were carried and significant differences were found on both comparisons (Table 8 through Table 11).

One-way ANOVA results indicate that there is significant difference on the level of awareness about the needs for parent involvement with respect to the group of subjects (Table 8). Scheffe multiple ranges test indicates that the mean score of teachers on ANPI was significantly higher than the mean scores of to students and parents. And also, the mean score of the parents on ANPI was significantly higher than students (Table 9). Results indicate that teachers were much more aware about the need for parent involvement activities rather than parents and students. Similar finding also held between parents and students.

Table 8. One-way ANOVA results of ANPI by three groups

Source of variation	D.F.	Sum of Squares	Mean Squares	F	p
Between Groups	2	2415.5295	1207.7647	11.9844	.0000
Within Groups	608	61273.0597	100.7781		
Total	610	63688.5892			

Table 9. Scheffe results of ANPI by three groups

Mean	Groups	Who	Grp. 1	Grp. 2	Grp. 3
107.2374	1	students			
110.2374	2	parents	*		
116.7059	3	teachers	*	*	

On the level of awareness about the need for parent involvement, significant differences were found over the school types (Table 10). According to Scheffe multiple ranges test result, mean score of the Anadolu Lycee subjects was the highest among other groups. Similarly, mean score of the subjects in Eight Year Elementary School was the lowest among other groups (Table 11). The results indicate that Anadolu Lycee subjects show the highest degree of awareness about the need for parent involvement than other subjects, whereas subjects from Eight Year Elementary School indicate the lowest degree.

Table 10. One-way ANOVA results of ANPI by school type

Source of variation	D.F.	Sum of Squares	Mean Squares	F	p
Between Groups	3	7788.2506	2596.0835	28.1899	.0000
Within Groups	607	55900.3386	92.0928		
Total	610	63688.5892			

Table 11. Scheffe results of ANPI by school type

Mean	Groups	School Types	Grp. 2	Grp. 4	Grp. 1	Grp. 3
103.4015	2	E. Y. Elem. School				
107.6329	4	Private College	*			
107.9766	1	Imam Hatip Lycee	*			
112.8297	3	Anadolu Lycee	*	*	*	

Further analysis were carried out to extract within which domains there is a significant difference among three groups of the subjects. Significant differences were observed with respect to three groups (parents, teachers, and students) on the following major domains: ECG, MF, FMA, FS, AI, and API (Table 12).

Table 12. One-way ANOVA of each domain of ANPI by three groups

Dimensions	Between Grps.			Within Grps.			F	p
	Df	SS	MS	Df	SS	MS		
ECG	2	47.07	23.54	608	20009.53	3.31	7.1206	.0009
MF	2	178.80	89.40	608	4763.43	7.83	11.4111	.0000
FMA	2	277.40	138.70	608	13983.64	23.00	6.0306	.0026
FS	2	71.59	35.80	608	3305.76	5.44	6.5837	.0015
AI	2	99.18	49.59	608	5796.34	9.53	5.2015	.0058
API	2	48.70	24.35	608	2447.76	4.03	6.0487	.0025

Scheffe multiple ranges test showed that the mean score of parents on ECG was significantly higher than of students (Table 13). The result indicate that parents have a much more clear understanding of Effective Communication within groups, than students.

Table 13. Scheffe results of ECG by three groups

Mean	Grps.	Who	Grp.1	Grp.2	Grp.3
7.5579	1	students			
8.0428	2	parents	*		
8.6471	3	teacher			

Scheffe multiple ranges test showed that the mean score of students on MF was significantly lower than of parents and teachers (Table 14). The result indicate that students were not aware of the importance of games and every day experience in parent involvement as much as parents and teachers.

Table 14. Scheffe results of MF by three groups

Mean	Grps.	Who	Grp.1	Grp.2	Grp.3
13.1157	1	students			
14.1089	2	parents	*		
15.0000	3	teacher	*		

Scheffe multiple ranges test showed that the mean score of parents on FMA was significantly higher than of parents and students (Table 15). The results indicate that teachers are much more aware of the factors behind math achievement and underachievement, than students and parents. But this is reasonable when the profession of them is considered .

Table 15. Scheffe results of FMA by three groups

Mean	Groups	Who	Grp.2	Grp.1	Grp.3
30.8560	2	parents			
31.2671	1	students			
35.0000	3	teachers	*	*	

Scheffe multiple ranges test showed that the mean score of teachers on FS was significantly higher than of parents and students (Table 16). The results indicate that teachers were much more aware of the importance of reasonable amount of FS (financial support) in parent involvement than of students and parents .

Table 16. Scheffe results of FS by three groups

Mean	Groups	Who	Grp.1	Grp.2	Grp.3
10.6024	1	students			
10.9728	2	parents			
12.5294	3	teacher	*	*	

Scheffe multiple ranges test showed that the mean score of parents on AI was significantly higher than of teachers (Table 17). The result indicate that parents are much more open to the idea of active involvement in mathematics education than of teachers.

Table 17. Scheffe results of AI by three groups

Mean	Groups	Who	Grp.3	Grp.1	Grp.2
10.8824	3	teachers			
12.4125	1	students			
12.9805	2	parents	*		

Scheffe multiple ranges test showed that the mean score of parents on API (active parent involvement) was significantly higher than of students (Table 18). The result indicated that parents had much more positive attitudes toward parent involvement than the students.

Table 18. Scheffe results of API by three groups

Mean	Groups	Who	Grp.1	Grp.2	Grp.3
6.5223	1	students			
7.0467	2	parents	*		
7.4706	3	teacher			

Further Analysis of Awareness about the need for Parent Involvement with respect to the Significant Demographic Characteristics

In order to gain additional knowledge and insight for the differences with respect to the demographic and specific characteristics, one way ANOVA was carried out for each domain of parent involvement in mathematics education. The information related to significant findings can be found on Table 19 through Table 52.

Table 19 indicates that student awareness on the domains; FMA, FS, and API differ significantly by the math-performance level of the students with varying level of significance. Among the domains of parent involvement only FMA, FS, and API differ significantly. Scheffe tests were applied to see the further differences among groups.

Table 19. One-way ANOVA of the domains of parent involvement by the students' math-performance grade.

	btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
FMA	932.4422	4	233.1105	7477.0774	328	22.7960	10.2260	.0000
FS	211.7419	4	52.9355	1787.0149	328	5.4482	9.7161	.0000
API	114.3488	4	28.5872	3025.9214	328	9.2254	3.0988	.0159

Scheffe multiple ranges test showed that the mean score of the students who had math performance grades as "5" were significantly higher on FMA than of students with math-grades less than "3" (Table 20). The result indicate that students with higher performance level in mathematics have a strong understanding of the

factors behind their achievement in mathematics than students with lower performance level.

Table 20. Scheffe results of FMA by the students' math-performance grade.

Mean	Groups	Math-grade	Grp.1	Grp.2	Grp.3	Grp.4	Grp.5
27.8333	1	1					
30.2879	2	2					
31.7396	3	3	*				
32.0761	4	4	*				
34.0821	5	5	*	*			

Scheffe multiple ranges test showed that the mean score of students with last semester math grades less than "3" was significantly higher on FS than students with performance math-grades over than "3" (Table 21). The result indicate that students with lower performance math-grades have a more clear vision of FS than students with higher performance math-grades. They probably attribute their failure to lack of financial support.

Table 21. Scheffe results of FS by the student's math-performance grade

Mean	Groups	Math-grade	Grp.5	Grp.4	Grp.3	Grp.1	Grp.2
9.1429	5	5					
9.9697	4	4					
10.6522	3	3	*				
11.3333	1	1	*	*			
11.7027	2	2	*	*			

Scheffe multiple ranges test showed that the mean score of the students with performance math-grades as "2" was significantly higher on AI (active involvement) than students with performance math-grades as "5" (Table 22). The result indicate that lower level of performance in mathematics implies much more positive attitudes toward active involvement of parents. These students probably need help and they seem to ask for it.

Table 22. Scheffe results of API by the student math-performance grade.

Mean	Groups	Math-grade	Grp.5	Grp.4	Grp.3	Grp.1	Grp.2
11.0270	5	5					
12.1042	4	4					
12.6739	3	3					
12.8333	1	1					
12.9697	2	2	*				

According to one-way ANOVA test, students' view differ significantly on EHSC, FMA, FS and API domains of parent involvement by school type (Table 23).

Scheffe tests were applied to see the further differences with respect to groups.

Table 23. One-way ANOVA of the students' view on the domains of parent involvement by school type.

	btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
EHSC	259.6540	3	86.5513	2126.0967	333	6.3847	13.5561	.0000
FMA	1523.5504	3	507.8501	6954.4140	333	20.8841	24.3175	.0000
FS	384.9487	3	128.3162	1677.7694	333	5.0383	25.4679	.0000
AI	342.9781	3	114.3260	2836.6895	333	8.5186	13.4208	.0000
API	36.2911	3	12.0970	1291.7919	333	3.8793	3.1184	.0263

Scheffe multiple ranges test showed that the mean score of Anadolu Lycee students and Private College students on EHSC were significantly higher than Imam Hatip Lycee and Eight Year Elementary School students (Table 24). The result indicate that students from Anadolu Lycee and Private College have a much more clear and correct knowledge of Effective Home Study with Child, than Imam Hatip Lycee and Eight Year Elementary School students.

Table 24. Scheffe results of EHSC by school type

Mean	Groups	Type of School	Grp.1	Grp.2	Grp.4	Grp.3
13.3786	1	I.Hatip Lycee				
13.4028	2	E. Y. Elem. Sch.				
14.7800	4	Priv. College	*	*		
15.2679	3	Anadolu Lycee	*	*		

Scheffe multiple ranges test showed that the mean score of Anadolu Lycee students on FMA was significantly higher than other students. Similarly, the mean score of Imam Hatip Lycee students on FMA was significantly higher than of the Eight Year Elementary School students (Table 25). The result indicate that Anadolu Lycee students are much more aware of the real factors behind their high achievement and underachievement than other students. Moreover, Imam Hatip Lycee students are much more conscious about their achievement correlates than Eight Year Elementary School students.

Table 25. Scheffe results of FMA by school type

Mean	Groups	Type of School	Grp.2	Grp.4	Grp.1	Grp.3
28.3472	2	E. Y. Elem. Sch.				
30.2200	4	Priv. College				
30.8447	1	I.Hatip Lycee	*			
34.0000	3	Anadolu Lycee	*	*	*	

Scheffe multiple ranges test showed that the mean score of Anadolu Lycee students on FS was significantly higher than the mean scores of the students from other schools. Meanwhile, the mean scores of Eight Year Elementary School students were significantly lower than mean scores of other students on FS (Table 26). The results show that while Anadolu Lycee students have the best idea about how financial support should be in parent involvement and what it should not be, Eight Year Elementary School students lack such an idea compared to other students.

Table 26. Scheffe results of FS by school type

Mean	Groups	Type of School	Grp.2	Grp.4	Grp.1	Grp.3
9.0556	2	E. Y. Elem. Sch.				
10.2800	4	Priv. College	*			
10.3786	1	I.Hatip Lycee	*			
11.9464	3	Anadolu Lycee	*	*	*	

Scheffe multiple ranges test showed that the mean score of Imam Hatip Lycee and Eight Year Elementary School students were significantly higher than Anadolu Lycee students (Table 27). The results indicate that Imam Hatip Lycee and Eight Year Elementary School students have much more positive attitudes towards active parent involvement in mathematics education than Anadolu Lycee students.

Table 27. Scheffe results of AI by school type

Mean	Groups	Type of School	Grp.3	Grp.4	Grp.1	Grp.2
11.1071	3	Anadolu Lycee				
12.1200	4	Priv. College				
13.3056	1	I.Hatip Lycee	*			
13.3495	2	Eight Y. Elem. Sch.	*			

Parents' view on domains of parent involvement significantly differs according to the educational level of the mother on the following domains: EHSC, MF, FMA, FS, and ATM (Table 28).

Table 28. One-way ANOVA of parent views over the domains of parent involvement by educational level of mother

	Btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
EHSC	45.0075	2	22.5038	1393.4305	255	5.4644	4.1182	.0174
MF	54.8086	2	27.4043	1834.5712	255	7.1944	3.8091	.0234
FMA	613.5272	2	306.7636	4708.9573	255	18.4665	16.6119	.0000
FS	97.6592	2	48.8296	1101.0269	255	4.3178	11.3090	.0000
ATM	64.5151	2	32.2576	866.2949	255	3.3972	9.4952	.0001
API	60.8738	2	30.4369	2336.9866	255	9.1647	3.3211	.0377

Scheffe multiple ranges test showed that the mean score of University graduate mothers on EHSC was significantly higher than primary school graduates (Table 29). The result indicated that mothers from higher level of education are much more aware of the role of Effective Home-School cooperation in parent involvement than mothers from lower level of education.

Table 29. Scheffe results of EHSC by educational level of mother

Mean	Groups	Ed. Level of mother	Grp.1	Grp.2	Grp.3
14.1532	1	prim.sch. grad.			
14.4699	2	lycee grad.			
15.2031	3	university grad.	*		

Scheffe multiple ranges test showed that the mean score of university graduate mothers on MF was significantly higher than primary school graduates (Table 30). Result indicate that university graduate mothers had a better understanding of the role of games and everyday experiences on the mathematics learning than the primary school graduate mothers.

Table 30. Scheffe results of MF by educational level of mother

Mean	Groups	Ed. Level of mother	Grp.1	Grp.2	Grp.3
13.6667	1	primary school graduates			
14.1205	2	lycee graduates			
14.8281	3	university graduates	*		

Scheffe multiple ranges test showed that the mean score of university graduate mothers on FMA was significantly higher than lycee graduate and primary school graduate mothers. Similarly, the mean score of the lycee graduate mothers was significantly higher than primary school graduate mothers (Table 31). Result indicate that mothers with high level of education have a much more clear view of the

parental factors behind mathematics achievement of their children than mothers with low level of education.

Table 31. Scheffe results of FMA by the educational level of mother

Mean	Groups	Ed. Level of mother	Grp.1	Grp.2	Grp.3
29.2613	1	primary school graduates			
31.2169	2	lycee graduates	*		
33.0938	3	university graduates	*	*	

Scheffe multiple ranges test showed that the mean score of primary school graduate mothers was significantly lower than lycee and university graduate mothers (Table 32). Result indicate that mothers with only primary education lack understanding of the real role of the financial support in parent involvement than mothers with high level of education.

Table 32. Scheffe results of FS by the educational level of mother

Mean	Groups	Ed. Level of mother	Grp.1	Grp.2	Grp.3
10.3243	1	primary school graduates			
11.1446	2	lycee graduates	*		
11.8438	3	university graduates	*		

Scheffe multiple ranges test showed that the mean score of university graduate mothers was significantly higher than the primary school graduate mothers (Table 33). The result indicate university graduate mothers have positive attitudes towards mathematics and they are much more aware how their attitudes may affect their children's success in mathematics than primary school graduate mothers.

Table 33. Scheffe results of ATM by the educational level of mother

Mean	Groups	Ed. Level of mother	Grp.1	Grp.2	Grp.3
11.1802	1	primary school graduates			
11.8193	2	lycee graduates			
12.4219	3	university graduates	*		

The parent's view on domains of parent involvement significantly varies by the educational level of the father on the following areas: MF, FMA, FS, ATM, AI, and API (Table 34).

Table 34. One-way ANOVA of parents' views on the domains of parent involvement by the educational level of father.

	Btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
MF	106.1228	2	53.0614	1783.2570	255	6.9932	7.5876	.0006
FMA	614.3023	2	307.1511	4708.1822	255	18.4635	16.6356	.0000
FS	81.2212	2	40.6106	1117.4648	255	4.3822	9.2671	.0001
PATM	91.0904	2	45.5452	839.7197	255	3.2930	13.8308	.0000
AI	59.8368	2	29.9184	2338.0237	255	9.1687	3.2631	.0399
API	41.1966	2	20.5983	1033.3344	255	4.0523	5.0831	.0068

Scheffe multiple ranges test showed that the mean score of university graduate fathers on MF was significantly higher than primary school graduate fathers (Table 35). Result indicate that university graduate fathers have much more clear vision of the role of games, and fun in mathematics education than primary school graduate fathers.

Table 35. Scheffe results of MF by the educational level of father

Mean	Groups	Ed. Level of father	Grp.1	Grp.2	Grp.3
13.3229	1	primary school graduates			
14.1435	2	lycee graduates			
14.7900	3	university graduates	*		

Scheffe multiple ranges test showed that the mean score of university graduate fathers was significantly higher on FMA than primary school and lycee graduate fathers (Table 36). Result indicate that university graduate fathers are much

more aware of the real factors behind students mathematics achievement, than fathers from lower level of education.

Table 36. Scheffe results of FMA by the educational level of father

Mean	Groups	Ed. Level of father	Grp.1	Grp.2	Grp.3
29.3958	1	primary school graduates			
29.9839	2	lycee graduates			
32.7600	3	university graduates	*	*	

Scheffe multiple ranges test showed that the mean score of university graduate fathers was significantly higher on FS than primary school graduate and lycee graduate fathers (Table 37). Result indicate that university graduate fathers have a much more clear understanding of the role of financial support in parent involvement than lower level of education.

Table 37. Scheffe results of FS by the educational level of father

Mean	Groups	Ed. Level of father	Grp.1	Grp.2	Grp.3
10.5000	1	primary school graduates			
10.5484	2	lycee graduates			
11.6700	3	university graduates	*	*	

Scheffe multiple ranges test showed that the mean score of university graduate fathers was significantly higher on ATM than fathers with lower level of education (Table 38). Result indicate that university graduates fathers have more positive attitudes towards mathematics and they are much more aware of the importance of their positive attitude toward mathematics when their children's success is thought.

Table 38. Scheffe results of ATM by the educational level of father

Mean	Groups	Ed. Level of father	Grp.1	Grp.2	Grp.3
11.1250	1	primary school graduates			
11.3871	2	lycee graduates			
12.4300	3	university graduates	*	*	

Scheffe multiple ranges test showed that the mean score of university graduate fathers was significantly higher on AI than primary school and lycee graduate fathers (Table 39). Results indicate that university graduate fathers have much more positive attitudes toward active involvement in mathematics education than fathers from lower level of education.

Table 39. Scheffe results of API by the educational level of father

Mean	Groups	Ed. Level of father	Grp.1	Grp.2	Grp.3
6.5729	1	primary school graduates			
7.0484	2	lycee graduates			
7.4900	3	university graduates	*	*	

To test the role of the English proficiency of parents on eight domains of parent involvement in mathematics education, one-way ANOVA were carried. Significant differences were found on the following areas; FMA, FS, ATM and AI (Table 40).

Table 40. One-way ANOVA of the parents' view of the domains of by English proficiency of parents.

	btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
FMA	191.5620	3	63.8540	5116.1112	253	20.2218	3.1577	.0253
FS	74.1990	3	24.7330	1120.6103	253	4.4293	5.5840	.0010
ATM	40.3864	3	13.4621	883.1389	253	3.4907	3.8566	.0100
API	82.2354	3	27.4118	2314.6673	253	9.1489	2.9962	.0314

Scheffe multiple ranges test showed that the mean score of parents with moderate level of English proficiency, was significantly higher than the mean scores

of parents with no English background (Table 41). Result indicates that knowing English is a differentiating factor on the effective financial support of the parents in parent involvement.

Table 41. Scheffe results of FS by English proficiency of parents

Mean	Groups	English Level	Grp.1	Grp.2	Grp.3	Grp.4
10.4017	1	none				
11.2903	2	little				
11.5082	3	moderate	*			
11.8235	4	high				

Scheffe multiple ranges test showed that the mean score of parents with high level of English proficiency, was significantly higher than the mean score of the parents with no English background (Table 42). Result indicate that knowing English at a high level is a differentiating factor on having positive attitudes toward mathematics. That is, parents with high level of English proficiency have more positive attitudes toward mathematics.

Table 42. Scheffe results of ATM by English proficiency of parents

Mean	Groups	English Level	Grp.1	Grp.2	Grp.3	Grp.4
11.3248	1	none				
11.8710	2	little				
11.9816	3	moderate				
12.7059	4	high	*			

To test the role of family income on eight domains of parent involvement in mathematics education, one-way ANOVA was carried. Significant differences were found on the following areas: EHSC, MF, FMA, FS, and ATM (Table 43).

Table 43. One-way ANOVA of the parents' view on the domains of parent involvement by family income

	btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
EHSC	86.8931	4	21.7233	1303.4629	245	5.3203	4.0831	.0032
MF	73.2127	4	18.3032	1719.4313	245	7.0181	2.6080	.0363
FMA	444.9591	4	111.2398	4709.2969	245	19.2216	5.7872	.0002
FS	66.9068	4	16.7267	1019.7962	245	4.1623	4.0186	.0036
ATM	108.9945	4	27.2486	784.2695	245	3.2011	8.5123	.0000

Scheffe multiple ranges test showed that the mean score of parents with level of income higher than parents with level of income less than 40 million on FMA. Similarly, the mean score of the parents with level of income higher than 80 million, was significantly higher on FMA than parents with level of income less than 20 million (Table 44). Result indicate that parents with highest level of income are much more aware of the parental factors behind mathematics achievement than parents with lowest level of income.

Table 44. Scheffe results of FMA by family income

Mean	groups	Family income	Grp.2	Grp.1	Grp.3	Grp.4	Grp.5
28.9643	2	20-39 million					
29.9545	1	less than 20 million					
30.2963	3	40-59 million					
31.4750	4	60-80 million	*				
32.4359	5	over 80 million	*	*			

Scheffe multiple ranges test showed that the mean score of parents with level of income over 80 million was significantly higher on FS than mean score of parents with level of income between 20 and 40 million (Table 45). The result indicate that parents with higher level of income have a better understanding of the role of FS in parent involvement than parents with lower level of income.

Table 45. Scheffe results of FS by family income

Mean	groups	Family income	Grp.2	Grp.4	Grp.1	Grp.3	Grp.5
10.3571	2	20-39 million					
10.7750	4	60-80 million					
10.8636	1	less than 20 million					
11.0000	3	40-59 million					
11.7308	5	over 80 million	*				

Scheffe multiple ranges test showed that the mean score of parents with level of income higher than 60 million was significantly higher on ATM than mean score of the parents with income level less than 40 million (Table 46). Result indicate that parents with a high level of income have more positive outlook towards mathematics than parents with low level of income.

Table 46. Scheffe results of ATM by family income

Mean	groups	Family income	Grp.1	Grp.2	Grp.3	Grp.4	Grp.5
10.2727	1	less than 20 million					
11.2321	2	20-39 million					
11.5000	3	40-59 million					
11.9750	4	60-80 million	*				
12.4744	5	over 80 million	*	*			

To see the role of the type of school on eight domains of parent involvement in mathematics education, one-way ANOVA was carried. Significant differences were found on the following ideas: EHSC, MF, FMA, FS, ATM, AI and API (Table 47).

Table 47. One-way ANOVA of the parents' view on the domains of parent involvement by school type

	btw. grps.			within grps.			F	p
	SS	df	MS	SS	df	MS		
EHSC	67.4187	3	22.4729	1364.669	253	5.3939	4.1663	.0067
MF	66.5347	3	22.1872	1818.4147	253	7.1874	3.0857	.0279
FMA	603.5969	3	201.1990	4704.0762	253	18.5932	10.8211	.0000
FS	142.3572	3	47.4524	1052.4521	253	4.1599	11.4071	.0000
ATM	112.8678	3	37.6226	810.6575	253	3.2042	11.7417	.0000
AI	73.2532	3	24.4177	2323.6495	253	9.1844	2.6586	.0488
API	46.8763	3	15.6254	1026.5634	253	4.0576	3.8509	.0101

Scheffe multiple ranges test showed that the mean score of parents from Anadolu Lycee, was significantly higher on EHSC than parents of Eight year Elementary School (Table 48). The result indicate that parents of Anadolu Lycee have a better understanding of EHSC than parents of Eight Year Elementary School .

Table 48. Scheffe results of EHSC by school type

Mean	Groups	Type of Sch.	Grp.2	Grp.1	Grp.4	Grp.3
13.8103	2	Eight Year Elementary School				
14.2063	1	Imam Hatip Lycee				
14.6400	4	Private College				
15.0541	3	Anadolu Lycee	*			

Scheffe multiple ranges test showed that the mean score of parents from Anadolu Lycee was significantly higher than the mean scores of parents of Imam Hatip Lycee (Table 49). Results indicate that Anadolu Lycee parents have a better understanding of the role of games and fun in mathematics education.

Table 49. Scheffe results of MF by school type

Mean	Groups	Type of Sch.	Grp.1	Grp.2	Grp.4	Grp.3
13.4286	1	Imam Hatip Lycee				
13.8793	2	Eight Year Elementary School				
13.9200	4	Private College				
14.6577	3	Anadolu Lycee	*			

Scheffe multiple ranges test showed that the mean score of parents from Anadolu Lycee was significantly higher than parents from Eight Year Elementary School and Imam Hatip Lycee (Table 50). Results indicate that Anadolu Lycee parents have a better understanding of the factors behind mathematics achievement.

Table 50. Scheffe results of FMA by school type

Mean	Groups	Type of Sch.	Grp. 2	Grp. 1	Grp. 4	Grp. 3
28.7931	2	Eight Year Elementary School				
29.8254	1	Imam Hatip Lycee				
31.0800	4	Private College				
32.4685	3	Anadolu Lycee	*	*		

Scheffe multiple ranges test showed that the mean score of parents from Anadolu Lycee was significantly higher than the mean scores of parents from Eight Year Elementary School and parents of Imam Hatip Lycee (Table 51). Results indicate that Anadolu Lycee parents have a much better understanding on the role of financial support on parent involvement, than the parents of Eight Year Elementary School and parents of Imam Hatip Lycee. It should be noted that their income level was low also.

Table 51. Scheffe results of FS by school type

Mean	Groups	Type of Sch.	Grp. 2	Grp. 1	Grp. 4	Grp. 3
9.8793	2	Eight Year Elementary School				
10.6667	1	Imam Hatip Lycee				
10.8400	4	Private College				
11.7477	3	Anadolu Lycee	*	*		

Scheffe multiple ranges test showed that the mean score of parents from Anadolu Lycee was significantly higher than the parents of Eight Year Elementary

School and parents of Imam Hatip Lycee (Table 52). Results indicate that Anadolu Lycee parents have more positive attitudes towards mathematics than Eight Year Elementary School parents and Imam Hatip Lycee parents.

Table 52. Scheffe results of ATM by school type

Mean	Groups	Type of Sch.	Grp. 2	Grp. 1	Grp. 4	Grp. 3
10.8448	2	Eight Y. Elem. Sch				
11.3175	1	I.Hatip Lycee				
11.4400	4	Priv.college				
12.4324	3	Anadolu Lycee	*	*		

The effect of sex on each major area of parent involvement was analyzed by t-test. Significant difference was found only on the area of ATM ($t=2.12$, $p=0.35$). The result indicate that gender (mothers' mean score is 11.91 with $s=1.84$ where fathers scored 11.4 with 1.96) of the parent only makes a difference on the attitudes of the parent toward mathematics. This contradicts the fact that traditionally mathematics was seen as male dominated area.

To see whether the frequency of parent help to their children is related to parent age, the spearman rank correlation coefficient was computed first and found as 0.504. Then t test was conducted whether correlation coefficient was meaningful and no significant relation was found. Age of the parents is not significantly related to the frequency of parent help.

Perceived Adequacy for Parent Involvement

One way ANOVA result indicates significant difference on the perceived level of adequacy for parent involvement over school types (Table 53). Scheffe

multiple ranges test showed that the mean score of Anadolu Lycee subjects on the perceived level of adequacy was significantly higher than Imam Hatip Lycee and Eight year Elementary School subjects (Table 54). Meanwhile, the mean score of Private College subjects was significantly higher than the mean score of Imam Hatip Lycee subjects. Results indicate that students from Anadolu lycee were more positive about their parents' adequacy in parent involvement when compared to Imam Hatip Lycee and Eight year Elementary School subjects. Similarly, Private College subjects were more confident with their parents' adequacy in parent involvement than Imam Hatip Lycee students.

Table 53. One-way ANOVA of the perceived level of adequacy for parent involvement by school type

Source of variation	D.F.	Sum of Squares	Mean Squares	F	p
Between Groups	3	487.1767	162.3922	18.5519	.0000
Within Groups	607	5313.3175	8.7534		
Total	610	5800.4943			

Table 54. Scheffe results of the perceived level of adequacy in parent involvement by school type

Mean	Groups	Who	Grp. 1	Grp. 2	Grp. 4	Grp. 3
14.0947	1	Imam Hatip Lycee				
15.2803	2	E. Y. Elem. Sch.				
16.0506	4	Priv. College	*			
16.9694	3	Anadolu Lycee	*	*		

One-way ANOVA indicated that perceived adequacy in parent involvement differed significantly with respect to the group of subjects (Table 55). Scheffe multiple ranges test indicated that the mean score of students on the perceived level of adequacy of parents in parent involvement was significantly higher than mean scores of teachers and parents (Table 56). Similarly, the mean score of parents was

significantly higher than that of teachers. Results indicated that students had more confidence on the adequacy of their parents' level of parent involvement than parents themselves and teachers. Similarly, parents had more confidence on themselves on the level of parent involvement than teachers have on them.

Table 55. One-way ANOVA of the perceived level of adequacy of parents involvement by three groups

Source of variation	D.F.	Sum of Squares	Mean Squares	F	p
Between Groups	2	422.5427	211.2713	23.8851	.0000
Within Groups	608	5377.9516	8.8453		
Total	610	5800.4943			

Table 56. Scheffe results of the perceived level of adequacy in parent involvement by three groups

Mean	Grps	Who	Grp. 3	Grp. 2	Grp. 1
12.5294	3	teachers			
15.2996	2	parents	*		
16.5371	1	students	*	*	

As it was explained in the methodology chapter, the degree or perceived adequacy for parents in parent involvement, was assessed by 7 likert type items deduced from the (ECG, EHSC, MF, FMA, FS, ATM and API) domains of parent involvement .

Table 57 presents parents' , teachers', and children's perceptions about the level of parent involvement on 7 major domains respectively. Parents see themselves as the most adequate in the Financial Support (FS) domain of parent involvement (59%). The parents see themselves as the least adequate in the Effective Home Study with Child (EHSC) domain of parent involvement (25%). They see themselves as

inadequate in the following domains also; Attitudes toward Mathematics (ATM), Factors that affect Math Achievement and Underachievement (FMA), Attitudes towards Parent Involvement (API), Mathematics with Fun (MF), Effective Communication within groups (ECG) and finally in Effective Home Study with Child (EHSC).

Table 57. Distributions of perceived Adequacy of Parents on parent involvement in mathematics education, with respect to three groups.

	parents (n = 257)				Students (n = 337)				teachers (n = 17)			
	adeq.		inadeq.		adeq.		inadeq.		adeq.		inadeq.	
	n	%	n	%	n	%	n	%	n	%	n	%
EHSC	65	25	192	75	128	38	209	62	1	6	16	94
MF	84	33	173	67	166	49	171	51	2	12	15	88
FMA	108	42	149	58	172	51	165	49	3	18	14	82
API	92	36	165	64	179	53	158	47	2	12	15	88
FS	152	59	105	41	208	62	129	38	8	47	9	53
ECG	78	30	179	70	123	36.5	214	63.5	6	35	11	65
ATM	116	45	141	55	172	51	165	49	5	29	12	71

Students also perceive parents as the most adequate in the domain FS, and the least in the domain ECG of parent involvement. It was identified that they see parents as adequate in more areas than parents themselves as in the domains, FS, API, FMA, and ATM. However, they see parents as inadequate in less number of domains than parents as in the domains, ACG, EHSC, and MF (Table 57).

Finally, teachers perceive parents to be most adequate in the FS domain of parent involvement. However, even this domain was cited by only 47 % teachers. Hence, they see parents inadequate in all domains (Table 57).

From the least to the most parents' adequacy according to their views was rank-ordered as EHSC, ECG, MF, FMA, ATM and FS. Similarly, their adequacy was rank-ordered as ECG, EHSC, MF, FMA, ATM, API and FS by students. Finally

teachers rank-ordered the parents' adequacy as EHSC, MF, API, FMA, ATM, ECG and FS from the least to the most.

Willingness to Participate to Training Program for Parent Involvement

Three sources i.e. parents, teachers, and students were requested to state their thoughts about parents participation to such a training program for parents. As a result only 14% of students, 13% of parents, and 18% of teachers think that such a program for parents is unnecessary or are not in favor of it. Time constraint is the most important factor for a parent while considering participation to such a program, and it was also perceived important by the teachers and students as well. Students desire their parents to participate to such a training program for parents. This was indicated even by the successful students (Table 58).

Table 58. Group views about parents' participation to such a program (in percentages)

points of view	students (n=337)	parents (n=257)	teachers (n=17)
should participate	35	24	24
in case of failure	19	23	24
time should be considered	37	46	24
not necessary	9	9	18
should not participate	5	4	0

As can be seen from the Table 58, students favor more their parents' participation to such a program than the other groups. Parents' and teachers' relative reluctance may be explained by other constraints that may prevent them participating to the program such as time and money constraints.

CONCLUSION

Summary

In this study, it was aimed to provide the initial data to be used in the establishment of a new parent training program which aims to increase the effective and efficient parent involvement in mathematics education and to identify the factors behind parent involvement.

Sample was formed by 337 selected students from one Imam Hatip Lycee, one Eight Year Elementary School, one Anadolu Lycee, and one Private College; 257 parents of these students; and 17 mathematics teachers from these schools.

Regarding the demographic and specific characteristics of subjects, current status in parent involvement, awareness about the need for parent involvement, perceived adequacy of parent involvement, willingness to participate to the training program was determined by three questionnaires. These questionnaires had four parts basically the same which differ with respect to the status of the subjects. Data was cross-tabulated and analyzed by t-test and one-way ANOVA when appropriate.

The domains of the parent involvement was identified as effective communication among the groups (ECG), effective home study with child (EHSC), mathematics study with fun (MF), factors behind achievement and underachievement in mathematics (FMA), the amount and the type of reasonable financial support (FS), attitudes towards mathematics (ATM), active involvement (AI) attitudes towards parent involvement (API).

Among students, specifically school type and math-performance; and among parents, the level of education, the level of English proficiency, income level, occupation type, and school type of their children were identified as related with their needs in parent involvement domains.

Anadolu Lycee students were identified as more aware about the needs towards parent involvement in general and needs towards parent involvement domains specifically. Teachers were seen as the most aware group about parent involvement and how it should be. In addition, teachers were the group who saw parents as the least adequate in parent involvement in all domains. Parents generally meet with teachers at PTAs and help to their children before exams. Parents were seemed to be aware of the need for parent involvement in the domains ECG, MF, AI, and API whereas teachers identified the need for parent involvement under the domains MF, FMA, and FS. Parents were seeing themselves as adequate in the domain of FS only. Students indicated their parents need for training on the domains of ECG, EHSC, and MF. Meanwhile, teachers identified the need for training of parents on all domains in mathematics education.

To sum up, the majority of the sample was seemed to support a training program to promote effective and efficient parent involvement.

Conclusions

Sample was first analyzed with respect to the demographic and specific characteristics that they possess. Among the four schools in the sample Anadolu Lycee was identified as having students with higher math-performance, parents with

higher level of education mostly working as civil-servants. Private College was following Anadolu Lycee, most of the time except that this school was recognized as having the parents with highest level of income. Eight Year Elementary School was identified with higher level of income, higher level of mother education, lower level of father education than Imam Hatip Lycee , but with mostly worker parents.

It was found that teachers were much more conscious about the need for parent involvement than parents and students; however parents concern more than the students. This finding seems parallel to the finding that students perceive parents much more adequate in parent involvement than they see themselves and teachers perceive them.

It was identified that mostly parents study with their child just before the exam date. Only 1 out of 4 parents stated that they study with their child so that while half of these parents study each evening, remaining half do it once in a week. When their concern about time constraints is thought, the low percentage of parents who study with their each evening is reasonable. They are most probably mixing effective, and efficient timing, as over timing. And resultantly, they conclude they have no time to achieve this.

Theoretically, PTA meetings seem to be the place where parent-teacher cooperation is possible. But, in practice it does not happen that way, because mostly parents try to speak with the teacher while many other parents wait in the queue. Then parents become uncomfortable and most probably they avoid going into deeply about their child problems in mathematics. But, still PTA meetings at least give a chance to parents and teachers to communicate. One important and promising finding is 1 out of 5 parents seem to meet with teachers frequently, although it would be

faulty to call these meetings as effective and efficient for students' mathematics achievement.

Anadolu Lycee subjects were not only recognized with highest level of confidence to their parents' adequacy level in parent involvement, but also were the most aware students than the rest of the students about the importance of parent involvement in mathematics education. Eight Year Elementary School subjects were recognized on the other hand, as the least aware subjects of the whole sample.

Data about the awareness of the needs for parent involvement (ANPI) indicates that parents have much more clear understanding of the need of effective communication among the groups (ECG) than students; students were not aware of the needs of mathematics study with fun (MF) as parents and teachers were. In addition, teachers were found to be much more aware of the need towards understanding the factors behind achievement and underachievement in mathematics (FMA) and the amount and the type of reasonable financial support (FS) than parents and students. Parents are on the other hand much more open to the idea of active involvement (AI) in parent involvement. Parents also possess more positive attitudes towards parent involvement in mathematics education (API) than students do.

The differences on 8 domains of parent involvement (ECG, EHSC, MF, FMA, FS, ATM, AI, API) with respect to the demographic and specific characteristics were investigated. School type, educational level, English proficiency, occupation and income were found to be significant factors on the awareness of parents toward these 8 domains. Similarly, school type and math-performance grade were found to be significantly related to the awareness of students.

Anadolu Lycee and Private Lycee students were found to be much more aware of the need of effective home study with child (EHSC) than Imam Hatip and

Eight Year Elementary School students. Anadolu Lycee students were identified as being much more aware than Eight Year Elementary School students on realizing the parental factors affecting mathematics achievement and underachievement (FMA). Anadolu lycee students scored high on financial support (FS) domain of parent involvement i.e. they were aware of the real amount and the degree of FS should be. It seems that Eight Year Elementary School students were the least aware while Anadolu Lycee students were the most aware in the student sample in terms of FS. Anadolu Lycee students were not favor of parent active involvement (AI) as much as other students.

Students with higher math-performance were much more aware of the needs about the factors behind their achievement(FMA), but lacks the same level of awareness about financial support (FS).

Anadolu Lycee parents were identified as being much more concious about the need for effective home study with child (EHSC) than the parents of Eight Year Elementary School students. Similarly, they were much more aware of the needs for the studying math with fun (MF), the reasonable amount of financial support (FS), and the factors behind mathematics achievement and unerachievement (FMA) than Imam Hatip Lycee parents and parents of Eight Year Elementary School students. On the attitudes towards mathematics (ATM), parents of the students from Anadolu Lycee were identified as much more aware than the parents of Eight Year Elementary School students.

The findings summarized above, high awareness of parents and students on Anadolu Lycee, may be explained by the findings that parents' of Anadolu lycee students educational level is significantly higher than the parents. In addition, these parents were the most concerned parents since the majority of them returned the

questionnaires. Although the gender of the parents were not found as a factor on the parent involvement in general, it is interesting to find that, mothers' and fathers' educational level were somewhat affecting differently towards their views upon the awareness of the needs in the domains of parent involvement. Mothers with higher educational level were identified as much more aware on the domains of EHSC, MF, FMA, FS, and ATM than less educated mothers. Meanwhile, fathers with higher educational level were identified as much more aware of the needs towards the following parent involvement domains; FS, ATM, and AI.

Parents' level of English proficiency was thought to be related with their persistence on parent involvement, because of their possible anxiety towards helping their children insufficiently, since they do not know English. It was identified that parents with high level of English proficiency were much more aware of the needs towards FS and ATM domains of parent involvement. In addition, high level of income of the family was identified as high level of awareness towards needs on the domains FMA, FS, and ATM.

In terms of their perceived needs of parents towards parent involvement, parents identified themselves as adequate in the domain of FS, but inadequate in other domains while students saw their parents adequate in the domains of FS, API, FMA, and ATM, whereas teachers identified parents inadequate in all domains of parent involvement. Students perceived that their parents need to be trained in ECG, EHSC and MF. Mathematics teachers perceive needs for parent training in all 8 domains.

And to sum up, majority of the parents, teachers, and students support the idea of establishing such a training program. Even though, parents support the establishment of such a program their main concern is the time constraints. If any

program be established it would regard the free time of parents. This time consideration may allow not only mothers but also fathers to take role in their children's mathematics education. Some parents state that they may participate to such a program only in the case of their children's failure. This is parallel with the findings that there are still many parents who do not have cooperation with their child studying mathematics.

Limitations

In this study generalizability is limited to similar population as the students in 6th level, their parents, and their mathematics teachers in four type of schools. There were no boys in Imam Hatip Lycee sampled. So, generalization do not cover boys in the Imam Hatip Lycee.

Another limitation is related with the rate of return of the parent questionnaires. Third limitation is related to the small number of mathematics teachers in the sample.

The low reliability of the ANPI part of the questionnaire applied at the end of the 2nd semester is another limitation of the study. The researcher did not attempt to develop full scale measurement test of the ANPI. The purpose was just to have instrument to collect general data to see the insight of parent involvement which would be used later in the development of such a test.

Recommendations

This study tried to extract a general view of parent involvement domains and their relative importance. Further studies which will try to identify the ingredients in each 8 domains of parent involvement are needed. Especially misconceptions of parents that lead to underachievement of students should be analyzed to avoid this.

In addition, this study searched for the need of parent involvement for 6th grade students. Similar studies may be carried out to investigate the differences in the needs for parent involvement training for the other grades.

Furthermore, specific studies that will investigate the parent involvement and parent involvement training needs for other subjects such as science and social sciences are needed.

This study is a first attempt in assessing the needs of parents for a training program about parent involvement to mathematics education from three sources i.e. students, parents and teachers. In spite of its limitations, study yields useful information for the development of a training program of parents for parent involvement to mathematics education. Program planners can make use of the initial information already presented in formulating learning objectives and determining course content from the domains of parent involvement identified in this study.

APPENDIX 1

**LIST OF THE MAJOR AREAS WITH RELATED ITEMS IN
“ANPI” PART OF THE QUESTIONNAIRE**

Major areas of parent involvement in mathematics education	Item numbers under each major parent involvement areas
Effective communication within the groups: (ECG) between parents-teachers-students	<p>1. Veli ve öğretmen öğrencinin matematik dersindeki durumu hakkında devamlı ilişki içersinde olmalıdır.</p> <p>2. Bir çocuğun matematikte başarılı olabilmesi için veli-öğretmen iletişimi gereksizdir.</p>
Effective home study with child: (EHSC) homeworks	<p>3. Ebeveynin, çocuğun ödevlerinde çözemediği zor problemleri çözmesi, çocuğun öğrenmesi açısından faydalı olur.</p> <p>4. Aile, çocuğun matematik çalışabileceği sakin, sessiz, ve iyi ışıklandırılmış bir ortam sağlayabilmelidir.</p> <p>5. Çocuğun çalışıp çalışmadığının anlaşılması için matematik defterinin aile tarafından denetimi yeterlidir.</p> <p>6. Çocuk bir soruyu çözemediğinde ona destek olunup kendisinin çözmesi beklenmelidir.</p>
Mathematics with fun: (MF) games, experiences from everyday mathematics	<p>8. Ders zamanı, öğrenme amaçlı da olsa oyun oynanmamalıdır.</p> <p>9. Matematik oyun yoluyla da öğretilir.</p> <p>10. Aile çocuğu küçük alışverişler için çarşıya göndererek akıldan hesap yapmasını teşvik etmelidir.</p> <p>11. Aile oyun seçiminde çocuğun matematik bilgilerini kullanabileceği oyunları dikkate alabilir.</p> <p>7. Matematik dersi derste öğrenilir.</p>

<p>Factors that affect mathematics achievement and underachievement: (FMA) parents' misconceptions, gender discrimination, grade-based study, reward/punishment paradox</p>	<p>12. Bir çocuğun matematikte başarılı olabilmesi için zeki olması gerekir.</p> <p>13. Yabancı dil bilmeyen aileler özel okullarda okuyan çocuklarına yardımcı olamazlar.</p> <p>14. Matematik başarısı ödüllendirilmelidir.</p> <p>15. Matematikten yüksek not almak, matematiğin iyi öğrenildiğini gösterir.</p> <p>16. Veliler, modern matematik bilmedikleri için çocuklarına matematikte yardımcı olamazlar.</p> <p>17. Veli çocuğu matematikten düşük not aldığında, nedenlerini çocukla birlikte bulmaya çalışmalıdır.</p> <p>18. Çocuk matematik dersinde başarısız olduğunda cezalandırmak yararlı olur.</p> <p>19. Kız çocukların matematikteki başarısızlığı erkeklere oranla daha kabul edilebilir bir durumdur.</p>
<p>Financial support of the Parents: (FS) private-tutoring, helping books, calculator, computer facilities</p>	<p>20. Matematik başarısı için yardımcı ders kitapları almak yeterlidir.</p> <p>21. Bir çocuğun matematikte başarılı olabilmesi için iyi ve ileri model bir hesap makinesi olması gerekir.</p> <p>22. Matematikte başarısız çocuğa ilk olarak özel ders aldırarak gerekir.</p>
<p>Attitudes toward mathematics: (ATM) parents' bad old experiences with mathematics, lack of interest to their children's mathematics achievement, interest more than needed, parent's anxiety, math-phobia</p>	<p>23. Matematik düşünmeyi öğretir.</p> <p>24. Matematik bilmek teknolojiyi anlamayı sağlar.</p> <p>25. Matematik zor bir derstir.</p>

<p>Active involvement of parents: (AI) active role in course content decision, entering math. Lessons, choosing course book, etc.</p>	<p>26. Velinin izleyici olarak çocuğunun matematik derslerine katılımı yararlı olabilir.</p> <p>27. Veliler de matematik müfredat programındaki kitapların seçimi konusunda söz sahibi olabilirler.</p> <p>28. Veliler için, onların girebileceği saatlerde ek matematik dersleri konup (e.g. akşam veya hafta sonu) çocukların matematik eğitimiyle daha içli dışlı olmaları sağlanabilir.</p> <p>29. Matematik dersi müfredatını oluşturma aşamasında velilerin görüşünü almak çocukların eğitimi açısından hiçbir yarar sağlamaz.</p>
<p>Attitudes toward parent involvement: (API) parents' anxiety towards parent involvement</p>	<p>30. Bir çocuğun matematik başarıları ve başarısızlığında ailenin etkisi yok denecek kadar azdır.</p> <p>31. Bir çocuğun matematik dersinden başarısız olması kendi sorunudur.</p>

APPENDIX 2

MATEMATİK EĞİTİMİNDE ETKİLİ AİLE KATILIMINI SAĞLAMAYA YÖNELİK EĞİTİM PROGRAMLARI İÇİN GEREKSİNİMLERİ BELİRLEME ÇALIŞMASI 'VELİ ANKETİ'

Bu çalışma ile velilerin, çocuklarının matematik eğitimine etkin katılımlarını arttıracak eğitim programlarına olan gereksinim belirlemesi hedeflenmiştir. Lütfen her soruyu dikkatle okuyarak size en yakın gelen cevabı işaretleyin. Yardımlarınız için şimdiden teşekkür ederim.

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PART I

1. Cinsiyetiniz () Kadın () Erkek
 2. Medeni durum
() Evli () Boşanmış / dul
 3. Yaşınız.....
 4. Şu an nasıl bir işte çalışıyorsunuz?
() Ev Hanımı () İşçi () Sözleşmeli
() Serbest Meslek () Emekli
() Memur () Matematik Öğretmeni
() Üniversitede matematik alanında öğretim üyesi
Diğer.....
 5. Sizin ve eşinizin eğitim durumu
() () İlkokul mezunu
() () Ortaokul mezunu
() () Lise mezunu
() () Yüksekokul mezunu
() () Üniversite mezunu
() () Lisansüstü yapmış
 6. Öğrenimine devam eden kaç çocuğunuz var?
() 1 çocuk () 2 çocuk () 3 çocuk () 4 ve daha fazla
 7. Ailenizin aylık gelirini nasıl tanımlarsınız
() 20 milyondan az
() 20 - 39 milyon arası
() 40 - 59 milyon arası
() 60 - 80 milyon arası
() 80 milyondan çok
 8. İngilizce'yi ne düzeyde biliyorsunuz?
() -hiç bilmiyorum () - çok az biliyorum () -orta düzeyde biliyorum () - çok iyi biliyorum
 9. Çocuğunuzun matematik öğretmeniyle ne zaman görüşüyorsunuz?
() Öğretmen çağırdığı zaman
() Gereksinim gördüğüm zaman
() Yalnız veli toplantılarında
() Belirli aralıklarla
() Çocuğumun olası bir başarısızlığında
() Hiç görüşmem
Diğer.....
- Not: 9. soruda birden fazla şık işaretleyebilirsiniz.
10. Çocuğunuzun matematik çalışmasına yardım etme sıklığınız
() Her akşam () Yazılılardan önce

- () Haftada bir kere () Hiç bir zaman
 11. Çocuğunuz bu dönem matematikten özel ders aldı mı?
 ()-hiç almadı ()-bir iki defa, sınavlardan önce ()-düzenli olarak aldı

PART II

* Lütfen izleyen sorulardaki cümlelere ne derecede katıldığınızı 5 ölçekten size en uygun geleni işaretleyerek belirtiniz. Beş ölçek 1-hiç katılmıyorum, 2- katılmıyorum, 3- emin değilim, 4-katılıyorum, 5-tamamen katılıyorum; seçeneklerinden oluşmaktadır.

- | | Hiç
katılmıyorum..... | Tamamen
katılıyorum |
|---|--------------------------|------------------------|
| 1. Veli ve öğretmen öğrencinin matematik dersindeki durumu hakkında devamlı ilişki içerisinde olmalıdır. | 1 | 2 3 4 5 |
| 2. Bir çocuğun matematikte başarılı olabilmesi için veli-öğretmen iletişimi gereksizdir. | 1 | 2 3 4 5 |
| 3. Ebeveynin, çocuğun ödevlerinde çözemediği zor problemleri çözmesi, çocuğun öğrenmesi açısından faydalı olur. | 1 | 2 3 4 5 |
| 4. Aile, çocuğun matematik çalışabileceği sakin, sessiz, ve iyi ışıklandırılmış bir ortam sağlayabilmelidir. | 1 | 2 3 4 5 |
| 5. Çocuğun çalışıp çalışmadığının anlaşılması için matematik defterinin aile tarafından denetimi yeterlidir. | 1 | 2 3 4 5 |
| 6. Çocuk bir soruyu çözemediğinde ona destek olunup kendisinin çözmesi beklenmelidir. | 1 | 2 3 4 5 |
| 7. Matematik dersi derste öğrenilebilir | 1 | 2 3 4 5 |
| 8. Ders zamanı, öğrenme amaçlı da olsa oyun oynanmamalıdır. | 1 | 2 3 4 5 |
| 9. Matematik oyun yoluyla da öğretilir. | 1 | 2 3 4 5 |
| 10. Aile çocuğu küçük alışverişler için çarşıya göndererek akıldan hesap yapmasını teşvik etmelidir. | 1 | 2 3 4 5 |
| 11. Aile oyun seçiminde çocuğun matematik bilgilerini kullanabileceği oyunları dikkate alabilir. | 1 | 2 3 4 5 |
| 12. Bir çocuğun matematikte başarılı olabilmesi için çok zeki olması gerekir. | 1 | 2 3 4 5 |
| 13. Yabancı dil bilmeyen aileler özel okullarda okuyan çocuklarına yardımcı olamazlar. | 1 | 2 3 4 5 |
| 14. Matematik başarıları ödüllendirilmelidir. | 1 | 2 3 4 5 |
| 15. Matematikten yüksek not almak, matematiğin iyi öğrenildiğini gösterir. | 1 | 2 3 4 5 |
| 16. Veliler, modern matematik bilmedikleri için çocuklarına matematikte yardımcı olamazlar. | 1 | 2 3 4 5 |
| 17. Veli çocuğu matematikten düşük not aldığına, nedenlerini çocukla birlikte bulmaya çalışmalıdır. | 1 | 2 3 4 5 |

	Hiç katılmıyorum.....				Tamamen katılıyorum
18. Çocuk matematik dersinde başarısız olduğunda cezalandırmak yararlı olur.	1	2	3	4	5
19. Kız çocukların matematikteki başarısızlığı erkeklerle oranla daha kabul edilebilir bir durumdur.	1	2	3	4	5
20. Matematik başarısı için yardımcı ders kitapları almak yeterlidir.		1	2	3	4 5
21. Bir çocuğun matematikte başarılı olabilmesi için iyi ve ileri model bir hesap makinesi olması gerekir.	1	2	3	4	5
22. Matematikte başarısız çocuğa ilk olarak özel ders aldirmek gerekir.	1	2	3	4	5
23. Matematik düşünmeyi öğretir.	1	2	3	4	5
24. Matematik bilmek teknolojiyi anlamayı sağlar.	1	2	3	4	5
25. Matematik çok zor bir derstir.	1	2	3	4	5
26. Velinin izleyici olarak çocuğunun matematik derslerine katılımı yararlı olabilir.	1	2	3	4	5
27. Veliler de matematik müfredat programındaki kitapların seçimi konusunda söz sahibi olabilirler.	1	2	3	4	5
28. Veliler için, onların girebileceği saatlerde ek matematik dersleri konup (e.g. akşam veya hafta sonu) çocukların matematik eğitimiyle daha içli dışlı olmaları sağlanabilir.	1	2	3	4	5
29. Matematik dersi müfredatını oluşturma aşamasında velilerin görüşünü almak çocukların eğitimi açısından hiçbir yarar sağlamaz.	1	2	3	4	5
30. Bir çocuğun matematik başarısı veya başarısızlığında ailenin etkisi yok denecek kadar azdır.	1	2	3	4	5
31. Bir çocuğun matematik dersinden başarısız olması kendi sorunudur.	1	2	3	4	5

PART III

* Lütfen izleyen cümleler hakkında kendinizi ne kadar yeterli algıladığınızı üç durum arasından (1-yeterli değilim, 2-biraz yeterliyim, 3-yeterliyim) seçim yaparak belirleyin.

	Yeterli değilim	Biraz yeterliyim	Yeterliyim
1. Çocuğumla birlikte çalışabilme konusunda	1	2	3
2. Çocuğumun matematik çalışmaktan zevk almasını konusunda	1	2	3
3. Çocuğumun matematikteki olası başarısızlığının ardında yatan gerçek nedenleri bulma konusunda	1	2	3

4. Genel anlamda çocuğumun matematik eğitimine olan ilgim düşünüldüğünde	1	2	3
5. Çocuğumun matematik eğitimi sırasında gereksinim duyabileceği bazı araç gereçleri (kitap, hesap makinesi, bilgisayar, v.b.) sağlayabilme konusunda	1	2	3
6. Çocuğumun matematik öğretmeniyle olan iletişimimin yeterliliği konusunda	1	2	3
7. Matematik dersine olan kendi tutumumun çocuğumun başarısını nasıl etkilediğini bilme konusunda	1	2	3

PART IV

* Çocuğunuzun matematik eğitiminde yardımcı olmanıza yönelik bir program hazırlansa, katılmak ister miydiniz?

- () Her koşulda katılmak isterim
- () Çocuğumun olası bir başarısızlığında katılmak isterim
- () Zamanı uyarsa katılmak isterim
- () Böyle bir programın gerekli olduğuna inanmıyorum
- () Hiç bir şekilde katılmak istemem

APPENDIX 3

MATEMATİK EĞİTİMİNDE ETKİLİ AİLE KATILIMINI SAĞLAMAYA YÖNELİK EĞİTİM PROGRAMLARI İÇİN GEREKSİNİMLERİ BELİRLEME ÇALIŞMASI 'ÖĞRENCİ ANKETİ'

Bu çalışma ile velilerin, siz çocuklarının matematik eğitimine etkin katılımlarını arttıracak eğitim programlarına olan gereksinim belirlemesi hedeflenmiştir. Lütfen her soruyu dikkatle okuyarak size en yakın gelen cevabı işaretleyin. Yardımlarınız için şimdiden teşekkür ederim.

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Fen Bilimleri Eğitimi Bölümü

PART I

1. Cinsiyetiniz () Kız () Erkek
 2. Bu dönem alacağınızı düşündüğünüz matematik karne notunuz
() 1 () 2 () 3 () 4 () 5
Diğer.....
 3. Öğrenimine devam eden kaç kardeşiniz var?
() Hiç yok () 1 () 2 () 3 () 4 ve daha fazla
 4. Veliniz sizin matematik öğretmeninizle ne zaman görüşüyor?
() Öğretmen çağırdığı zaman
() Gereksinim gördüğü zaman
() Yalnız veli toplantılarında
() Belirli aralıklarla
() Olası bir başarısızlığında
() Hiç görüşmez
Diğer.....
- Not: 4.soruda birden fazla şık işaretleyebilirsiniz.
5. Anne-babanızın matematik çalışmanıza yardım etme sıklığı:
() Her akşam () Yazılılardan önce
() Haftada bir kere () Hiç bir zaman
 6. Bu dönem matematikten özel ders aldınız mı?
() -hiç almadım () -bir iki defa, sınavlardan önce () -düzenli olarak aldım

PART II

* Lütfen izleyen sorulardaki cümlelere ne derecede katıldığınızı 5 ölçekten size en uygun geleni yuvarlak içine alarak belirtiniz. Beş ölçek 1-hiç katılmıyorum, 2- katılmıyorum, 3- emin değilim, 4-katılıyorum, 5-tamamen katılıyorum; seçeneklerinden oluşmaktadır.

- | | Hiç
katılmıyorum..... | Tamamen
katılıyorum |
|---|--------------------------|------------------------|
| 1. Veli ve öğretmen öğrencinin matematik dersindeki durumu hakkında devamlı ilişki içerisinde olmalıdır. | 1 2 3 4 5 | |
| 2. Bir çocuğun matematikte başarılı olabilmesi için veli-öğretmen iletişimi gereksizdir. | 1 2 3 4 5 | |
| 3. Velinin, çocuğun ödevlerinde çözemediği zor problemleri çözmesi, çocuğun öğrenmesi açısından faydalı olur. | 1 2 3 4 5 | |
| 4. Aile, çocuğun matematik çalışabileceği sakin, sessiz, ve iyi ışıklandırılmış bir ortam sağlayabilmelidir. | 1 2 3 4 5 | |
| 5. Çocuğun çalışıp çalışmadığının anlaşılması için matematik defterinin aile tarafından denetimi yeterlidir. | 1 2 3 4 5 | |

	Hiç katılmıyorum.....				Tamamen katılıyorum
6. Çocuk bir soruyu çözemediğinde ona destek olunup kendisinin çözmesi beklenmelidir.	1	2	3	4	5
7. Matematik dersi derste öğrenilebilir.	1	2	3	4	5
8. Ders zamanı, öğrenme amaçlı da olsa oyun oynanmamalıdır.	1	2	3	4	5
9. Matematik oyun yoluyla da öğretilir.	1	2	3	4	5
10. Aile çocuğu küçük alışverişler için çarşıya göndererek akıldan hesap yapmasını teşvik etmelidir.	1	2	3	4	5
11. Aile oyun seçiminde çocuğun matematik bilgilerini kullanabileceği oyunları dikkate alabilir.	1	2	3	4	5
12. Bir çocuğun matematikte başarılı olabilmesi için çok zeki olması gerekir.	1	2	3	4	5
13. Yabancı dil bilmeyen aileler özel okullarda okuyan çocuklarına yardımcı olamazlar.	1	2	3	4	5
14. Matematik başarısı ödüllendirilmelidir.	1	2	3	4	5
15. Matematikten yüksek not almak, matematiğin iyi öğrenildiğini gösterir.	1	2	3	4	5
16. Veliler, modern matematik bilmedikleri için çocuklarına matematikte yardımcı olamazlar.	1	2	3	4	5
17. Veli çocuğu matematikten düşük not aldığında, nedenlerini çocukla birlikte bulmaya çalışmalıdır.	1	2	3	4	5
18. Çocuk matematik dersinde başarısız olduğunda cezalandırmak yararlı olur.	1	2	3	4	5
19. Kız çocukların matematikteki başarısızlığı erkeklere oranla daha kabul edilebilir bir durumdur.	1	2	3	4	5
20. Matematik başarısı için yardımcı ders kitapları almak yeterlidir.	1	2	3	4	5
21. Bir çocuğun matematikte başarılı olabilmesi için iyi ve ileri model bir hesap makinesi olması gerekir.	1	2	3	4	5
22. Matematikte başarısız çocuğa ilk olarak özel ders aldirmek gerekir.	1	2	3	4	5
23. Matematik düşünmeyi öğretir.	1	2	3	4	5
24. Matematik bilmek teknolojiyi anlamayı sağlar.	1	2	3	4	5
25. Matematik çok zor bir derstir.	1	2	3	4	5
26. Velinin izleyici olarak çocuğunun matematik derslerine katılımı yararlı olabilir.	1	2	3	4	5

	Hiç katılmıyorum.....				Tamamen katılmıyorum
27. Veliler de matematik müfredat programındaki kitapların seçimi konusunda söz sahibi olabilirler.	1	2	3	4	5
28. Veliler için, onların girebileceği saatlerde ek matematik dersleri konup (e.g. akşam veya hafta sonu) çocukların matematik eğitimiyle daha içli dışlı olmaları sağlanabilir.	1	2	3	4	5
29. Matematik dersi müfredatını oluşturma aşamasında velilerin görüşünü almak çocukların eğitimi açısından hiçbir yarar sağlamaz.	1	2	3	4	5
30. Bir çocuğun matematik başarısı veya başarısızlığında ailenin etkisi yok denecek kadar azdır.	1	2	3	4	5
31. Bir çocuğun matematik dersinden başarısız olması kendi sorunudur.	1	2	3	4	5

PART III

* Lütfen izleyen cümleler hakkında anne-babanızı ne kadar yeterli bulduğunuzu üç durum arasından (1-yeterli değil, 2-biraz yeterli, 3-yeterli) seçim yaparak belirleyin.

	Yeterli değil	Biraz yeterli	Yeterli
1. Benimle birlikte çalışabilme konusunda	1	2	3
2. Matematik çalışmaktan zevk almamı sağlamak konusunda	1	2	3
3. Matematikteki olası başarısızlığımın ardında yatan gerçek nedenleri bulma konusunda	1	2	3
4. Genel anlamda benim matematik eğitimime olan ilgileri düşünüldüğünde	1	2	3
5. Matematik eğitimim sırasında gereksinim duyabileceğim bazı araç gereçleri (kitap, hesap makinesi, bilgisayar, v.b.) sağlayabilme konusunda	1	2	3
6. Matematik öğretmenimle olan iletişimlerinin yeterliliği konusunda	1	2	3
7. Matematik dersine olan genel tutumlarının benim başarıımı nasıl etkilediğini bilme konusunda	1	2	3

PART IV

*. Sizin matematik eğitiminize yardımcı olmalarına yönelik bir program hazırlansa, anne-babalarınızın katılmasını ister miydiniz?

- () Her koşulda katılmalarını isterim
- () Olası bir başarısızlığında katılmalarını isterim
- () Zamanları uyarsa katılmalarını isterim
- () Böyle bir programın gerekli olduğuna inanmıyorum
- () Hiç bir şekilde katılmalarını istemem

APPENDIX 4

MATEMATİK EĞİTİMİNDE ETKİLİ AİLE KATILIMINI SAĞLAMAYA YÖNELİK EĞİTİM PROGRAMLARI İÇİN GEREK SINIMLARI BELİRLEME ÇALIŞMASI 'ÖĞRETMEN ANKETİ'

Bu çalışma ile velilerin, çocuklarının matematik eğitimine etkin katılımlarını arttıracak eğitim programlarına olan gereksinim belirlemesi hedeflenmiştir. Lütfen her soruyu dikkatle okuyarak size en yakın gelen cevabı işaretleyin. Yardımlarınız için şimdiden teşekkür ederim.

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PART I

1. Şu an aşağıdaki okullardan hangisinde çalışıyorsunuz?
☐ İlköğretim Okulu
☐ Normal Lise
☐ İmam Hatip Lisesi
☐ Özel Lise
☐ Anadolu Lisesi
☐ Fen Lisesi
2. Kaç senedir matematik dersi öğretmenliği yapıyorsunuz?
☐ 1-2 senedir
☐ 3-6 senedir
☐ 7-10 senedir
☐ 10 sene üstü
3. Bu sene hangi sınıf öğrencilerini okutuyorsunuz?
☐ Orta 1 ☐ Orta 3 ☐ Lise 2
☐ Orta 2 ☐ Lise 1 ☐ Lise 3
4. Öğrencilerinizin velileriyle ne zaman görüşüyorsunuz?
☐ Gerekli gördüğüm zaman
☐ Onlar gerekli gördüklerinde
☐ Sadece veli toplantılarında
☐ Çocuklar başarısız olduklarında
☐ Genelde görüşmem
 Diğer.....

Not: Birden fazla şık işaretleyebilirsiniz.

PART II

* Lütfen izleyen sorulardaki cümlelere ne derecede katıldığınızı 5 ölçekten size en uygun geleni işaretleyerek belirtiniz. Beş ölçek 1-hiç katılmıyorum, 2- katılmıyorum, 3- emin değilim, 4-katılıyorum, 5-tamamen katılıyorum seçeneklerinden oluşmaktadır.

- | | Hiç
katılmıyorum..... | | | Tamamen
katılıyorum |
|---|--------------------------|---|---|------------------------|
| 1. Veli ve öğretmen öğrencinin matematik dersindeki durumu hakkında devamlı ilişki içerisinde olmalıdır. | 1 | 2 | 3 | 4 5 |
| 2. Bir çocuğun matematikte başarılı olabilmesi için veli-öğretmen iletişimi gereksizdir. | 1 | 2 | 3 | 4 5 |
| 3. Ebeveyn, çocuğun ödevlerinde çözemediği zor problemleri çözmesi, çocuğun öğrenmesi açısından faydalı olur. | 1 | 2 | 3 | 4 5 |

	Hiç katılmıyorum.....				Tamamen katılıyorum
4. Aile, çocuğun matematik çalışabileceği sakin, sessiz, ve iyi ışıklandırılmış bir ortam sağlayabilmelidir.	1	2	3	4	5
5. Çocuğun çalışıp çalışmadığının anlaşılması için matematik defterinin aile tarafından denetimi yeterlidir.	1	2	3	4	5
6. Çocuk bir soruyu çözemediğinde ona destek olunup kendisinin çözmesi beklenmelidir.	1	2	3	4	5
7. Matematik dersi derste öğrenilebilir.	1	2	3	4	5
8. Ders zamanı, öğrenme amaçlı da olsa oyun oynanmamalıdır.	1	2	3	4	5
9. Matematik oyun yoluyla da öğretilir.	1	2	3	4	5
10. Aile çocuğu küçük alışverişler için çarşıya göndererek akıldan hesap yapmasını teşvik etmelidir.	1	2	3	4	5
11. Aile oyun seçiminde çocuğun matematik bilgilerini kullanabileceği oyunları dikkate alabilir.	1	2	3	4	5
12. Bir çocuğun matematikte başarılı olabilmesi için çok zeki olması gerekir.	1	2	3	4	5
13. Yabancı dil bilmeyen aileler özel okullarda okuyan çocuklarına yardımcı olamazlar.	1	2	3	4	5
14. Matematik başarısı ödüllendirilmelidir.	1	2	3	4	5
15. Matematikten yüksek not almak, matematiğin iyi öğrenildiğini gösterir.	1	2	3	4	5
16. Veliler, modern matematik bilmedikleri için çocuklarına matematikte yardımcı olamazlar.	1	2	3	4	5
17. Veli çocuğu matematikten düşük not aldığında, nedenlerini çocukla birlikte bulmaya çalışmalıdır.	1	2	3	4	5
18. Çocuk matematik dersinde başarısız olduğunda cezalandırmak yararlı olur.	1	2	3	4	5
19. Kız çocukların matematikteki başarısızlığı erkeklere oranla daha kabul edilebilir bir durumdur.	1	2	3	4	5
20. Matematik başarısı için yardımcı ders kitapları almak yeterlidir.	1	2	3	4	5
21. Bir çocuğun matematikte başarılı olabilmesi için iyi ve ileri model bir hesap makinesi olması gerekir.	1	2	3	4	5
22. Matematikte başarısız çocuğa ilk olarak özel ders aldırarak gerekir.	1	2	3	4	5
23. Matematik düşünmeyi öğretir.	1	2	3	4	5

	Hiç katılmıyorum.....				Tamamen katılıyorum
24. Matematik bilmek teknolojiyi anlamayı sağlar.	1	2	3	4	5
25. Matematik zor bir derstir.	1	2	3	4	5
26. Velinin izleyici olarak çocuğunun matematik derslerine katılımı yararlı olabilir.	1	2	3	4	5
27. Veliler de matematik müfredat programındaki kitapların seçimi konusunda söz sahibi olabilirler.	1	2	3	4	5
28. Veliler için, onların girebileceği saatlerde ek matematik dersleri konup (e.g. akşam veya hafta sonu) çocukların matematik eğitimiyle daha içli dışlı olmaları sağlanabilir.	1	2	3	4	5
29. Matematik dersi müfredatını oluşturma aşamasında velilerin görüşünü almak çocukların eğitimi açısından hiçbir yarar sağlamaz.	1	2	3	4	5
30. Bir çocuğun matematik başarısı ve başarısızlığında ailenin etkisi yok denecek kadar azdır.	1	2	3	4	5
31. Bir çocuğun matematik dersinden başarısız olması kendi sorunudur.	1	2	3	4	5

PART III

* Lütfen izleyen cümleler hakkında genelde öğrenci velilerini ne kadar yeterli algıladığınızı üç durum arasından (1-yeterli değiller, 2-biraz yeterliler, 3-yeterliler) seçim yaparak belirleyin.

	Yeterli değiller	Biraz yeterliler	Yeterliler
1. Çocuklarıyla birlikte çalışabilme konusunda	1	2	3
2. Çocuklarının matematik çalışmaktan zevk almasını sağlamak konusunda	1	2	3
3. Çocuklarının matematikteki olası başarısızlığının ardında yatan gerçek nedenleri bulma konusunda	1	2	3
4. Genel anlamda çocuklarının matematik eğitimine olan ilgileri düşünüldüğünde	1	2	3
5. Çocuklarının matematik eğitimi sırasında gereksinim duyabileceği bazı araç gereçleri (kitap, hesap makinesi, bilgisayar, v.b.) sağlayabilme konusunda	1	2	3
6. Sizinle olan iletişimlerinin yeterliliği konusunda	1	2	3
7. Matematik dersine olan kendi tutumlarının çocuklarının başarısını nasıl etkilediğini bilme konusunda	1	2	3

PART IV

*. Velilere yönelik, çocuklarının matematik eğitimine yardımcı olmalarını sağlayacak bir program hazırlansa, katılmalarını gerekli görür müydünüz?

- () Her koşulda katılmalarını isterim
- () Çocuklarının olası bir başarısızlığında katılmalarını isterim
- () Zamanı uyarsa katılmalarını isterim
- () Böyle bir programın gerekli olduğuna inanmıyorum
- () Hiç bir şekilde katılmalarını istemem

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