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The Role of Family Engagement in Students' Science Learning in Qatari Schools

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Abstract: A survey of 312 parents of grades 7-12 school students from 24 schools with a focus group meeting of 24 parents from 8 schools was conducted to explore the type and level of parent's involvement and support for their children science learning. The results reveal that Qatari school parents show little interaction with schools and teachers despite the facilities and programs offered by MEHE and schools. This low involvement is featured by: Low participation of parents in schools' meeting and engagement in school activities that doesn't exceed 20% of students' population, weak communication link between parents and science teachers' strategies of science teachers, low level of concern about students' future high education and careers. From nearly 1200 from grades 7-12 surveyed students, about 45% of students say that the role of their parents is the most influential factor in their career aspiration compared to about 24% of the influence of teachers. Parents show medium level trust in science teachers, they indicate little help and support for children in their science learning, such as solving problems and assistance in assignments. The results also indicate few periodical talks and conversations about science subjects and activities between parents and children, low counselor guidance is offered by schools on future careers and science programs enrollment at higher education institutes. Very few parents (1%) use the e-learning portal offered by Ministry of education for follow up of their children schooling despite several messages and calls for training by schools' administrations and the Ministry. Parents play important role in the decision of their children future high education and careers but few advise them to be scientist or have a technical –based career.

Keywords: Science education, Parents' role, School visits, Careers

Introduction

Parent and family, involvement in education, in general, correlates with higher academic performance and school improvement. When schools, parents, families, and communities work together to support learning, students tend to earn higher grades, attend school more regularly, stay in school longer, and enroll in higher level programs (Henderson and Mapp, 2002, and Jeynes 2003).

Dick and Rallis (1991) found that parents and teachers were perceived by high school and university students to be the top influences on career choice, especially for students (both boys and girls) choosing careers in engineering and science.

Students' interest in taking more advanced science subjects or enrolling in future science programs and Consequently, a science-based career, is influenced by many factors; attitude towards science is just one factor, although it is a critical one. Archer et al. (2013) show that, despite positive views toward science, only a small proportion of 10-14 year olds in the UK aspire to become scientists. For example, they found that families exert a considerable influence on students' aspirations. They stated that: *"This influence operates in many ways, but a key factor affecting the likelihood of a student aspiring to a science-related career by the age of 14 is the amount of 'science capital' a family has. Science capital as they define it" refers to science-related*

qualifications, understanding, knowledge about science and 'how it works, interest and social contacts (e.g. knowing someone who works in a science-related job) (p.3).

Sun et al. (2012) found that parents' attitudes towards science is statistically significant factor for science achievement in Hong Kong. Ho Sui-Chu and Wilms (1996) identified four types of involvement of parents in their children achievements two are based at home, two at school: *Discussing school activities, monitoring out-of-school activities, contacts with school staff, and Volunteering and attending parent-teacher conferences and other school events.*

Lee and Miller (2001) found that involvement at home contributed to positive attitudes toward school, while involvement at school contributed to higher grades. In science learning parents can inculcate a scientific temper in growing children. The essence of scientific spirit is curiosity, and questioning of dogmas, superstitions and explanations given about cause and effect.

Responsible parents can impart this spirit to their children. Keith et al. (1998) stated that Parents involvement include providing necessary materials that include stimulating literacy materials such as general knowledge books on science topics for reading in spare time, encourage them to join extra lessons at school especially for those who are at risk of under achievement, creating a daily schedule and follow up with homework performance, asking questions about each subject, response to school concerns on attendance and misconduct issues and monitoring of television viewing.

Research clearly indicates that when students do their homework and get parent help, they perform better and their attitude and effort improve (Scales et al. 2000). The students tend to be more motivated, and would be more eager to make sure that their ongoing performance meets the expectations of parents. Often, supportive parents would also take all necessary measures within their means to ensure their children succeed academically. Thus the responsibility for children's' educational development is a collaborative enterprise among parents and school staff.

Another aspect of family interaction with school is the communication with school counselors regarding their children conduct, academic progress and advice on future careers. This kind of communication may include private meeting or through some orientation sessions for parents. For example, accurate knowledge about science, mathematics and technology professions and career prospects are key elements of orientation for parents, but are currently fraught with stereotypes and incomplete information. Science and Technology face increasing competition for good students from new, more fashionable subjects in higher education such as business, administration, and Information Technology. Improving school counseling and career service is among these measures. Schools in these countries require counselors to be academically specialized in a school counseling program and have licenses (Akos and Tier 2005).

A wide study by Williams (1998), using a large, long-term national database (NELS: 88), examined the effect of parent involvement on the achievement of about 14,000 middle-grade students. It found that parents' educational expectations and out-of-school activities are positively linked to all measures of their children's achievement. These effects occur in all pairings of parents with sons and daughters.

Williams concludes that parent involvement programs should be designed to increase the ways that fathers and mothers interact with their sons and daughters about academic achievement. *"Parents are an untapped resource and their parent-child interactions can be altered to enhance in-school performance"* (p. 10).

Perera et.al(2014) used data from Program for International Student Assessment (PISA) 2006 survey for 15 OECD and non-OECD countries and examined to what extent parents' attitudes towards science (how much they value science and the importance they place on it) can influence their children's science achievement. Their findings indicate that parents' attitudes towards science have a positive and statistically significant effect on science achievement, after controlling for other important student and school-level variables. Moreover, students from poor backgrounds appear to benefit from more positive parental science attitudes as much as students from high socioeconomic status, such that equality of student achievement is not affected.

Qatari Students' Interest and Attitude toward Science

In a previous study Said et al. (2016) found that Qatari Students' interest and attitude toward Science are highly influenced by home environment and family education background. Surveying about 3200 students, the study

found that characteristics of the students' home environment indicating their family values education, such as their parents' educational background and involvement, can lead to more-positive attitudes toward science. Students with a parent who had received post-secondary education, such as a vocational or college degree, were less negative about science (ES = 0.1). If both parents had received post-secondary education, then their child was even less negative about science (ES = 0.2). Additionally, students who talk with someone in their family about what they learn in school at least once a week expressed more-positive attitudes toward science than students who talk with their families less often (ES = 0.4 corresponds to 1.5 times higher).

All the above aspects associated with the role of families and their impact on students' science learning and attitudes toward science in Qatari schools are the subjects of the current study

Method

A 5-point Likert scale survey was conducted at 24 preparatory (grades 7-9) and secondary schools (grades 10-12). The survey consists of 21 items with a total of 38 sub-items. The main items will be presented in the result section. The survey consists of 22 statements and was validated by internal pilot with 8 parents from 4 schools representing the two genders at two levels (preparatory and secondary level) The students of these schools participated in a survey on assessing the science interest, attitude, and self-efficacy (Said et al. 2018). It was then distributed to 24 schools from different areas who participated in the current project. We received 320 responses only (27% only) out of about 1200 parents contacted (312 valid responses analyzed). We, also, managed to have a focus group meeting that was attended by 24 parents (all males). In this report we present the main results from the survey and focus group meetings. Statistical comparison of the responses of males with female parent are presented on confidence of parents in their children schools and science teachers, their regular interactions and communication with schools in addition to their role in their future high education and future careers. Parents of 320 students responded to the survey, 312 were valid (166 males and 146 females). Results were analyzed using SPSS program. In addition, a focus group meeting of 24 parents from 8 schools was arranged.

Results and Discussion

The results from both survey and focus group meeting, combined, are presented in five sections as below.

Parental Support

The survey results indicate that about 50% of parents do not talk frequently or regularly with their children about their science learning (figure1). This part is attributed, in part, to the educational background of parents (surveyed) or they are not familiar with science content of the curriculum.

"I can't understand any science topic; how can I help? My son never told me he has a problem in science, he is fine in science subjects" [Non-Qatari, grade 11 male's parent].

But did you try to ask him about teachers, or if he has any problem in learning science?

He said:

" here girls talk to their mothers more than boys talk, unless the boy wants something, such as talking to his teacher to excuse him from a test or he was punished, he will never complain or discuss his problems"

A Qatari parent said

" I talk sometimes with my son; he takes my advice on how can he understand some difficult topics. I frequently ask him about his marks in subjects or if he has any problem in any topic especially in science and math".

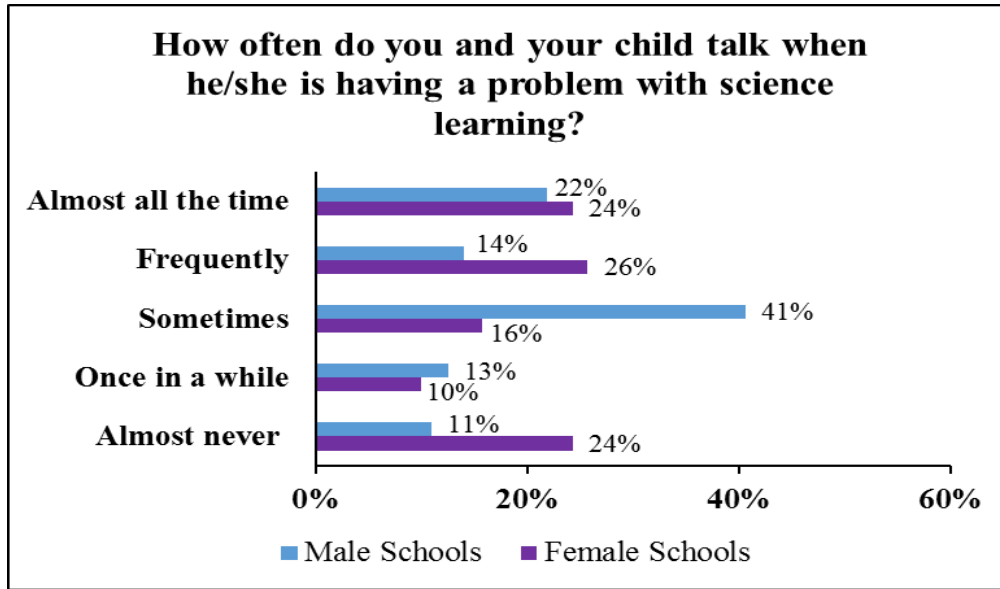


Figure 1. Parents' involvement in their children's science learning

Another Qatari parent said:

"I hired a private science teacher who teaches my son and my two daughters, he solves their problems".

Asked if he thinks a private tutor help them understand the content, few parents agreed but one parent explained: *'Not always, I hired a female physics teacher last year for my grade 11 daughter, she was happy with her, the teacher left at the end of last year, we hired another teacher this year, she didn't obtain high mark in the first term, she said I understand better without her, so we asked the tutor to give lessons only during the revision time before the exams'*

These opinions were also heard from few students during the interviews.

Private tutoring is highly prevailed in Qatar. It is common that families hire private tutors for their children in most subjects, especially in mathematics, science and English subjects. A released report (Alemadi et al., 2012) on Qatar education by the Social and Economic Survey Research Institute (SESRI) indicated that 31% of the 1848 surveyed preparatory and secondary school students use private tutoring (34% among secondary independent schools and 25% among preparatory schools).

Parent Engagement and Involvement with Schools and Teachers

The survey results indicate that there is a serious lack of parents' participation and involvement in their children's schools (figures 2 and 3). This was also expressed by all administrators and teachers who put the parents' participation in school meetings, in general, between 12-18%.

Table1. Frequent Parents talk with their children

Frequent talk of parents with children when they have problems in science learning.	Males			Females			Effect size d_{Cohen}	Level of difference Between the two genders
	n*	M	SD _m	n*	M	SD _f		
Almost all the time + frequent talks	36	1.87	1.4	50	2.37	1.02	0.41	Significant (females more)

n* represents the total number of respondents who indicated very often and frequent talks (Total respondents to the survey 312).

Parents of male students show more engagement (although still low) in their children schools and communication with science teachers as shown in table-2 and figures 2 and 3. This less engagement of female parents (mainly mothers) with teachers compared with males' parents (mainly fathers) is related to social and educational backgrounds of the parents. Girls usually perform better than boys, they have less problems that require direct contacts with teachers. Table -2 show the statistical significance of this difference.

Table 2. Statistical comparison of males' and females' parents' in communication with schools and science teachers

	Males			Females			Effect size d_{Cohen}	Level of difference Between the two genders' parents
	n*	M	SD _m	n*	M	SD _f		
Contacts with school	164	3.24	1.11	144	2.8	1.01	0.416	Significant (males more)
Contact with teachers	164	2.26	1.05	142	1.9	0.98	0.35	Low to Medium significance(males more)

In the focus group meeting, parents were asked about the reasons for low participation; the majority attributed this to lack of time, few said the traffic, some said they do not find meetings important. Few also mentioned the bad timings of the meetings. For this latter issue “the bad timing” two vice principals in a separate meetings said they changed the timing several times in their schools but the % attendance of parents did not change.

One parent said:

“Schools always contact us when there are behavior problems in which our children are involved, but no one listen to us when we have a complaint against a teacher or other students' behavior”. He meant bullying against their children by others.

Asked what about meetings with teachers? *We rarely have a call from teachers only when they complain about our children behavior but not about academic issue*” one parent said with signs of agreement from most of the parents

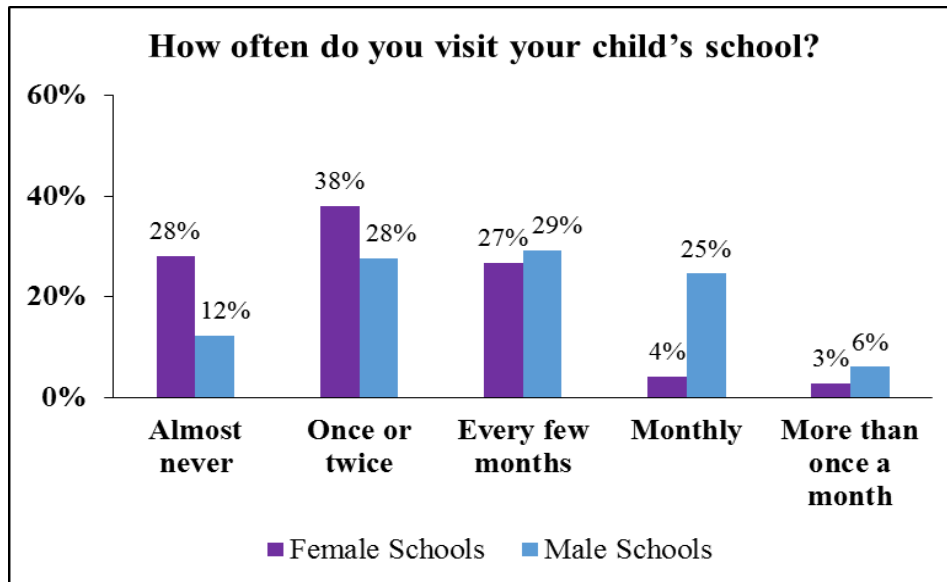


Figure 2. Communication of parents with their children's schools

Another parent said:

“This depends on the teacher and the circumstances; for example the physics' teacher one time called me saying that my son needs to have extra lessons in mathematics, he understands physics very well but he must improve his math skill”

Many parents agreed and also raised the mathematics issue. This issue was also a concern expressed by many science teachers and administrators during their interviews. Parents were asked during the meeting, if anyone has communicated with his child school or teachers through the E-learning portal at the MEHE site? No one said he does except one.

Parents' Confidence in Their Children's Schools and Science Teachers

Table – 3 and figure-4, show that between 30-35% of parents expressed some non-confidence in their children's schools' science teachers (*Note that somewhat confident in the figure is more or less not a straightforward statement*). Table-4 shows that female students' parents have significantly, more confidence in their children's school teachers than male students' parent have (effect size 0.43 and 0.51 respectively)

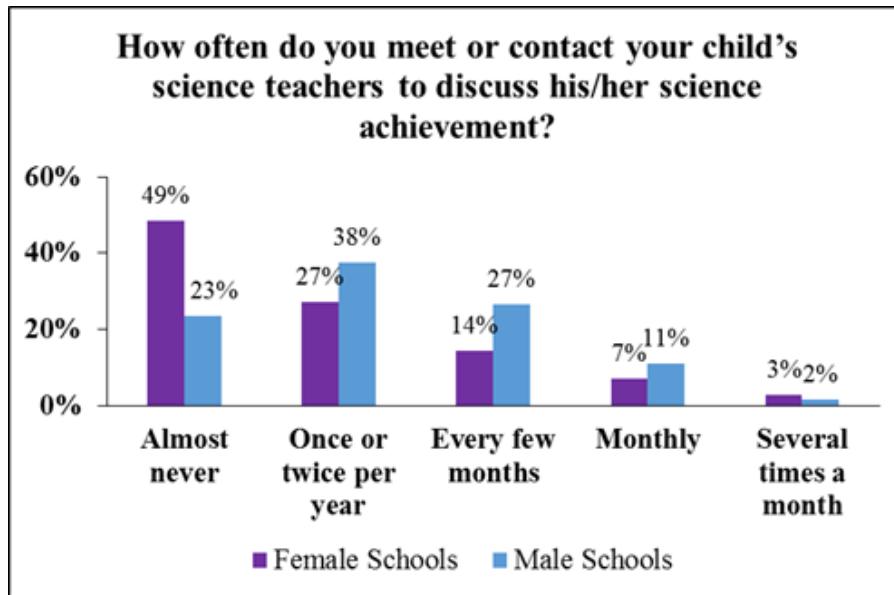


Figure 3. Communication of parents with their children's teachers

Table 3. Parents' confidence in their children's school science teachers (N=312)

	Males	%*	Females	%
Highly confident	20	11.8	34	23.8
Confident and quite confident	85	51.5	62	42.4
Slightly and not confident	59	35.3	46	31.5
No answer	2	1.5	4	2.7
Total	166		146	

* Rounded figures

Table 4. Statistical comparison of confidence of males' and females' parents' inschools and science teachers

	Males			Females			Effect size d_{Cohen}	Level of difference Between the two genders
	n	M	SD	n	M	SD		
Confident and highly confident in school	8	3.0	1.5	9	3.6	1.0	0.43	Significant (Females more)
	6	7	6	3	8	8		
Confident and highly confident in science teachers	6	3.0	1.2	6	3.5	1.0	0.51	Highly significant (Females more)
	0	0	3	8	8	6		

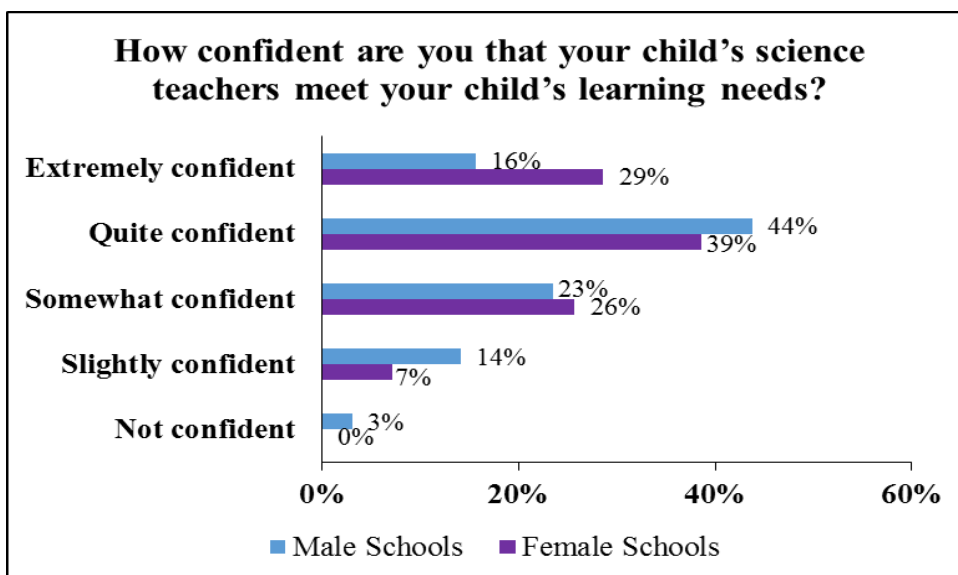


Figure 4. Parents' confidence in their children's schools and science teachers

The reasons that parents of female students are more confident in schools and science teachers, in the authors belief, are: first Complaints of female students against schools and teachers are less than male students, similarly complaints from schools and teachers are also less against females, therefore parents feel that the schools and teachers are relatively better; second Qatari female students, in general, perform better than male students as evidenced from international test results (PISA 2015); which also make parent more confidence in science teachers and school support.

During the parents' focus group meeting a parent of grade 12 male student said:

"My son complained that his teacher is only worried that he may not be able to finish the

syllabus, so he sometimes gives them too much topics in a single period "several grade 12 students' parent echoed the same statement.

One parent, who is an engineer, said that he has a grade 11 son and a grade 12 daughter

"The daughter complained also about the same issue but the grade 11 boy complained about how their physics teacher explains physics content to them".

He gave one example:

"At one time he asked the teacher a question about the mathematical expression of heat transfer when ice is added to water, what if I forgot to remember the expression in the exam, how can I derive the equation? The teacher told him it is better to remember it because it is long".

A similar case was told by a grade 11 female father, who is a biology teacher, about a chemistry teacher in a girl secondary school:

" She told the class there is no way you will understand the rules of balancing oxidation reduction equations only if you memorize balancing these equations"

These cases reflect part of how some teachers are still encouraging learning by the traditional rote learning style.

One parent told the meeting:

"When my son was in grade 8 and 9, he used to tell us about the fun they used to have in the science lab, and demonstrate to his younger brother and sister the balloon experiment and playing with soap and many more, once he moved to secondary school he complained that they only go few times to the lab"

Many parents agreed that at secondary schools, the lab activities are rarely carried out, teachers and science coordinators attributed this lack to the very extensive curricula of science subjects and teachers struggle to complete their contents.

At present, MEHE is engaged with extensive revisions to reduce these contents.

It is surprising that most schools' administrators believe that their science school teachers are not skilled enough to deliver the curriculum effectively especially the practical activities, although they have the qualifications and professional licenses (Said et al. 2018).

Parents' Role in their Children's Future Education and Careers

How do parents view their role and school role in different aspects of their children's further education and careers?

About 51% of parents believe that the child is more influenced by parents than by teacher (13-18%) and friends (about 10%) in choosing his future career as shown in figure 5. While about (54-58%) said that the child decides his further education in consultation with parents (figure 6).

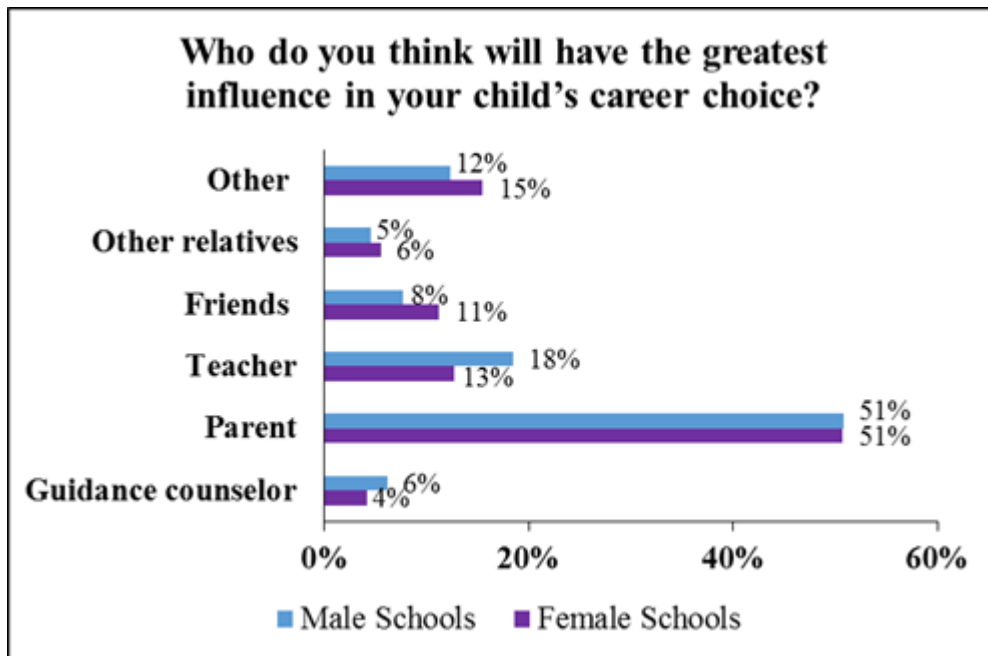


Figure 5. Parents' view on influence on their children's future careers

As can be seen from the two figures only little difference exists between the views of male and female parents. Few parents mentioned the role of school counselors in guiding students on their future careers.

"Counselor calls only when there is a behavior issue, my son never mentioned him" [one parent said with overwhelming agreement from other parents].

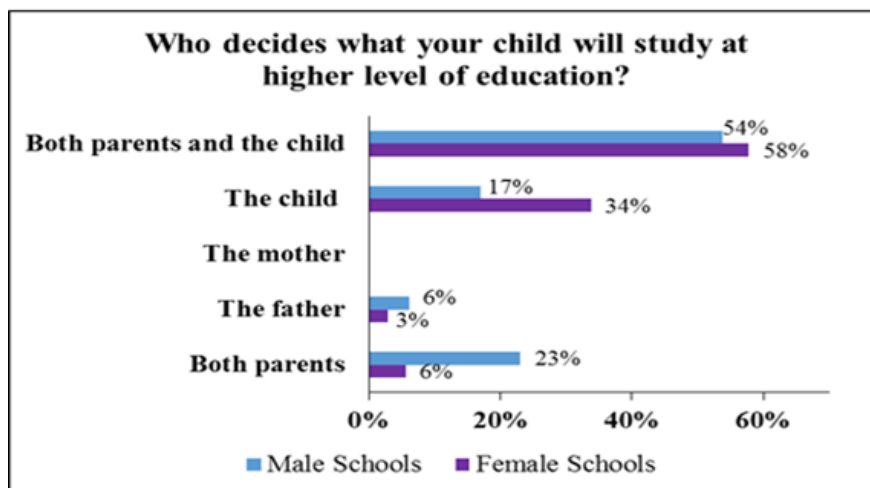


Figure 6. Parents' view on influence on their children's future higher education

In a recent meeting on education attended by the authors, one senior MEHE said that the Ministry has directed schools and provided some workshops and booklets on career guidance services that schools should provide. The Education and Supervision Department has launched a program called “Advance” and it provides advice on career guidance to schools.

A school vice principal told the LPI that his school already started the program of advising students especially after the creation of another science track from next year to encourage students to take more science subjects.

Three parents in the meeting indicated that they encourage their children to participate in Qatar Science Club, watch scientific TV programs such as Discovery Satellite Channel and also buy books on scientists and inventions. One parent said that his son participated in several competitions at Qatar University and Texas A&M University-Qatar.

One parent said: “My son likes Astronomy, he watches all films and related programs. Whenever I find an article in a magazine or newspaper I cut it for him to read”.

Parents’ Encouragement of their Children Engagements in “Out of School Activities”

Figure 7 from the survey results, shows a modest support of parents for their children in this aspect of engagement. As expected, male students are more encouraged although they still at low level (38% compared with 21% of female students).

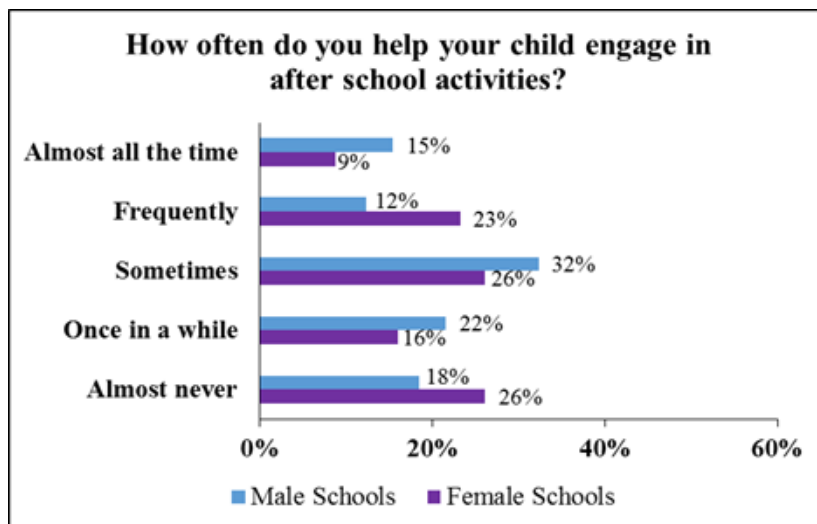


Figure 7. Parents’ view on influence on their children’s engagement in after-school activities

Conclusions

Qatari school parents show little interaction with schools and teachers despite the facilities and programs offered by MEHE and schools. This low involvement is featured by:

- Very low participation of parents in schools’ meeting and engagement in school activities that doesn’t exceed 15-18% of students’ population,
- Weak communication link between parents and science teachers’
- Very low level of concern about students’ future high education and careers
- Medium level trust of parents in science teachers,
- Little help and support for children in their science learning, such as solving problems and assistance in assignments, some of them hire tutors instead.
- Few periodical talks and conversations about science subjects and activities between parents and children
- Low counselor guidance is offered by schools on future careers and science programs enrollment at higher education institutes,

- Very few parents (1%) use the e-learning portal offered by MEHE for follow up of their children schooling despite several messages and calls for training by schools' administrations and the Ministry.

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