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# SERVANT LEADERSHIP AND PERCEIVED CHALLENGES IN STEM CLASSES: THE REINFORCING ROLE OF PROBLEMS AND MANAGEMENT TECHNIQUES

**Rima Charbaji El-Kassem**
Qatar University - Social and Economic Survey Research Institute (SESRI)
rima.charbaji@qu.edu.qa

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***Abstract***

**Purpose:** This study investigates how high school principals' leadership can directly and indirectly affect perceived challenges (obstacles) in STEM classes, with specific reference to teachers in Qatar.

**Design/methodology/approach:** A large convenience sample of 424 high school STEM teachers in Qatar was surveyed. Using SPSS and two suitability tests—the Kaisers-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartless test of sphericity—the researcher established the construct validity of the instrument. The 11 extracted dimensions were found to be reliable and valid.

**Main Findings:** Findings from a regression analysis show that only 3 out of 11 independent variables are significant in predicting perceived challenges (obstacles) in STEM classes with specific reference to teachers in Qatar. In addition, results of the path causal model reveal that the direct effect of each explanatory variable is strengthened via the effect of the other independent variables.

**Practical implications:** Findings of this investigation provide strategic insights and practical thinking that have important implications for understanding and overcoming challenges (obstacles) in STEM classes as perceived by teachers in Qatar. Moreover, this paper contributes to the limited knowledge about the direct and indirect effects of leadership on such challenges via strategic variables such as classroom problems and classroom management techniques.

**Originality:** Empirically, this article bridges the gap between three fields: leadership, classroom management, and STEM education.

***Keywords****: STEM Teacher; STEM School; Leadership Style; Classroom Management; Classroom Problems.*

## INTRODUCTION

In June 2017, Saudi Arabia, the United Arab Emirates, Bahrain, and Egypt broke off diplomatic and transportation links with Qatar. One year later, Qatar "scores highest of the Arab states on a global index compiled by the IFC, World Bank and the World Economic Forum"(Saleh, 2018). Moreover, the Peninsula reports that "Qatar has ranked first in the Arab world and seventh globally out of 128 countries at the Global Finance Safety Index for 2019" ("Qatar tops region," 2019). Moreover, any student at a Qatari secondary school (independent and international) is eligible to participate in the non-traditional educational project called "Al-Bairaq." This program was developed by UNESCO and the Qatar National Commission for Education, Culture, and Science. Dr. Noora Jabor Al-Thani, project representative of Al-Bairaq, said: "Our program has adopted innovative techniques to attract young people to Science, Technology, Engineering, and Math, and to show them the beauty and excitement of the world of science"(Al Bawaba, 2015). Any secondary student, regardless of their gender, nationality, socioeconomic status, or special needs is eligible to participate in this project.

Al-Sada and his colleagues argue that the education sector in Qatar is experiencing fast growth due to significant government expenditure. Moreover, they observed a significant positive relationship between "participative-supportive leadership and job satisfaction" (Al-Sada et al., 2016, p. 163). Nowadays, schools in Qatar increasingly utilize a servant management leadership style by investing more time in building relationships in a constructive manner and sharing control. It can therefore be argued that the servant leadership style plays a fundamental role in providing a supportive environment for STEM teachers and their students in Qatar. The servant leadership style allows STEM teachers, parents, and students to interact seamlessly. It creates opportunity and helps others grow (Luthans & Avolio, 2003). The close relationship between a servant leadership style and successful schools has been recognized in earlier scholarship (Bush & Heystek, 2006). Based on previous research, it can be argued that principals and teachers together build the engine of growth and determine the quality of education (Hallinger&Heck,1996). Cansoy and Parlar (2018) believe that "[s]chool principals can implement practices to enhance teachers' competence, to make them feel more effective and competent as a group" (p. 550). Having said that, it becomes imperative to mention that in today's school life, STEM teachers often encounter challenges and problems on their way to success. These can often make it difficult for them to achieve their goals. Most STEM teachers perceive obstacles and problems to be synonymous, as both create challenges for them. The Macmillan Dictionary defines obstacle as a "difficulty or

 

a problem that prevents you from achieving something." To avoid any misconceptions, this study will differentiate between problem and obstacle. Problem is operationally defined as any difficulty that STEM teachers encounter, while an obstacle is a challenge that stands in the way of STEM teachers' road to success and growth. The researcher believes that by approaching an obstacle as a challenge rather than as a problem, servant leaders retain the power to act on and influence the obstacle.

## NEED FOR THE STUDY

STEM school teachers are often faced with challenges (obstacles) and problems; however, the intensity of the challenges (obstacles) varies with situational variables such as the use of social media and class management techniques. Instead of dreaming about the ideal STEM classroom for Qatar, this investigation focuses on existing STEM classes and on how to overcome the challenges STEM teachers face in these classes on a daily basis. These include the bad state of school buildings, lack of facilities, seating arrangements, students' behavior when working together in smaller groups, a large class of students talking simultaneously and producing too much noise, and large classes, which lead to each student having less time to make individual contributions. STEM teachers react to these variables with varying degrees of intensity, depending on the principal's leadership style. In Qatari schools, the leadership style could be a major factor that explains the variation in challenges (obstacles) facing STEM teachers. Cemaloğlu (2011) argues that "[t]here is a positive relationship between transformational leadership acts of principals and organizational health" (p. 495). Moreover, Barnett and McCormick reported that "[t]he main conclusion of the study is that leadership in schools is mainly characterized by relationships with individuals, and it is through these relationships that a leader is able to establish her/his leadership and encourage teachers to apply their expertise, abilities, and efforts towards shared purposes" (Barnett &McCormick, 2003, p .55). School principals motivate and push STEM teachers to do their best. The job description of STEM teachers, on the other hand, requires them to establish control over STEM classes that in turn helps them bring out their best. It involves asking "how?" and "when?" to ensure that plans are properly executed. From this perspective, it follows that the school administration should treat teachers very well, show them respect, and work with them as a group.

Moreover, another factor that explains the variation in obstacles (challenges) facing STEM teachers in Qatar may be how classrooms are formed and managed. Freiberg et al. (2013) believe that "[a] person-centered learning environment balances the needs of both the teacher and the learner, utilizing shared responsibility, cooperative leadership and caring" (p. 203). Teachers should have an open line of communication with their students, call them, and send them emails when they are struggling in their STEM classes. Moreover, they should be ready and willing to share their ideas with students' parents. To deepen the dilemmas, variation in problems such as student apathy, tardiness, and absenteeism could significantly explain the variation in challenges facing teachers in the classroom. To date, very little research has tried to investigate the direct and indirect relationships between these variables in Qatar.

This study seeks to fill this research gap by empirically analyzing how a perceived leadership style influences teachers' perceived challenges (obstacles) in STEM classes in Qatar. A study like the one suggested here is recommended by experts in this field. Fadlelmula and Koc (2016) argue that "[a]fter one and half decade of reform, the results indicate that Qatar is still far from meeting its national curriculum standards and has a long way to go for providing quality education, especially in mathematics and science education"(p. vii). Nowadays, all public schools have been transformed into Independent Schools. Moreover, "there is consensus now that students are doing work, they are learner-centered in student-centered classrooms within improved facilities and teachers are better prepared and better trained to guide them in accordance with internationally benchmarked standards"(Nasser, 2017).

## STATEMENT OF THE RESEARCH PROBLEM

Today's challenges (obstacles) facing teachers in STEM classes require new leaders who can confront problems and foster management techniques that lead their schools toward a sustainable, competitive future. The current research answers the basic question: What are the direct and indirect effects of the explanatory variables preceding perceived challenges (obstacles) in STEM classes with specific reference to teachers in Qatar?

## STATEMENT OF THE RESEARCH HYPOTHESES

The research hypotheses are depicted as algebraic signs on Figure 1, which presents the causal model proposed to include both direct effects from servant leadership and indirect effects mediated by the other strategic explanatory variables preceding perceived challenges (obstacles) in STEM classes with specific reference to teachers in Qatar. The research hypotheses are summarized into the following interrogative statement:

There is a significant impact ($\alpha \leq 0.05$) of the independent variables on challenges (obstacles) as perceived by high school STEM teachers in Qatar.

 

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**STATEMENT OF THE STATISTICAL HYPOTHESES**

$H_o$: $R^2 = 0$

$H_1$: $R^2 <> 0$

**SURVEY DESIGN AND METHODOLOGY**

*Population and Sample Selection:*

The sampling frame was established by the Social and Economic Survey Research Institute (SESRI) and grounded in a comprehensive list provided by the Supreme Council of Education that provided the researcher with all the public and private schools in Qatar.

After receiving information about school size, school system, gender, and grade, the sampling frame was divided into several subpopulations (i.e., stratum). Within each stratum, teachers were randomly selected, using a two-stage sampling procedure. In the first stage, the school was chosen according to its size. In the second stage, to facilitate the fieldwork, the researcher randomly selected one class for each grade in the school and teachers of that class were included in the survey. Teachers of grades 11 and 12 in the secondary schools and teachers of grades 8 and 9 in the preparatory schools were chosen.

The sample size of this survey is 42 schools. However, 8 schools refused the researcher survey requests. For the remaining 34 surveyed schools, 424 teachers were interviewed.

*Instrumentation (Questionnaire Construction):*

Based on a literature review (Sithole *et al*., 2017; McInnis, 2000; Bates & Poole, 2003; Velasco *et al*., 2012; Herschbach, 2011; Benders, 2011 and Meyers *et al*., 2006) the researcher and a team at SESRI constructed an instrument (questionnaire) consisting of three parts. The first part provided an introduction and general instructions to help the STEM teacher complete the questionnaire and obtain a general understanding of the purpose of this investigation. The second part was the body, which consisted of 5-point Likert scale. The third part consisted of personal (demographics) questions that were developed and placed at the end of the questionnaire.

The questionnaire was designed in English and then translated into Arabic by skilled translators. After the translation, the Arabic version was carefully checked by researchers at SESRI, who are bilingual (English and Arabic). The instrument was subsequently tested in a pretest at four randomly selected schools. After the pretest, the question wording, interviewer instructions, and skip logics were refined. Based on this information, the final version of the instrument was created and then programmed for data entry purposes.

Every interviewer attended a training program covering fundamentals of the education survey, interviewing methods, and standards procedures for managing survey questionnaires. All interviewers were very well trained before going to the schools.

*Factor Analysis and Construct Validation:*

Only items having the 5-point Likert scale were used in factor and path analysis. The survey comprised 424 usable questionnaires that were returned and analyzed. Factor analysis was carried out as a data reduction technique and to test the construct validity of the questionnaire (instrument). Two statistical tests were conducted in order to determine the suitability of the factor analysis. First, the score of the Kaisers-Meyer-Olkin (KMO) measure of sampling adequacy was 0.831, which is well above the recommended level of 0.50. Second, the Bartless test of sphericity was significant (Chi Square = 9650.765, P= 0.00), indicating that there are adequate inter-correlations between the 38 valid items, which allows the use of factor analysis. Principal axis factoring was used as an extraction method and oblique rotation was used as a rotation method. Eleven factors were extracted, using Eigenvalue greater than one criterion. The eleven-factor solution accounted for 75.631% of the total variance. The eleven factors were easy to label. Refer Table 1 here.

*Assessing Reliability of the Instrument Using Cronbach's Alpha:*

The first factor (Challenges to Effective Teaching in STEM Subject (Obstacles); Cronbach alpha = 0.919) accounts for 21.362% of the total variance and is defined by eight items with factor loadings greater than 0.73. The second factor (Using Media to Enhance Teaching and Learning; Cronbach alpha = 0.928) accounts for 12.484% of the total variance and is defined by nine items with factor loadings greater than 0.72. The third factor (Leadership Style; Cronbach alpha = 0.862) accounts for 8.122% of the total variance and is defined by three items with factor loadings greater than 0.84. The fourth factor (Teacher Seeking Advice; Cronbach alpha = 0.622) accounts for 5.98% of the total variance and is defined by two items with factor loadings greater than 0.80. The fifth factor (Problems Facing Teachers in STEM Classes; Cronbach alpha = 0.89) accounts for 5.025% of the total variance and is defined by items with factor loadings greater than 0.79. The sixth factor (Teacher Substitute; Cronbach alpha = 0.893) accounts for 4.822% of the total variance and is defined by two items with factor loadings

 

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greater than 0.88. The seventh factor (Eating Healthy; Cronbach alpha = 0.917) accounts for 4.235 % of the total variance and is defined by two items with factor loadings greater than 0.95. The eighth factor (Classroom Management Techniques; Cronbach alpha = 0.687) accounts for 3.726% of the total variance and is defined by two items with factor loadings greater than 0.81. The ninth factor (Working Hours; Cronbach alpha = 0.709) accounts for 3.638% of the total variance and is defined by two items with factor loadings greater than 0.86. The tenth factor (Perceived Percentage of Students Interested in STEM; Cronbach alpha = 0.88) accounts for 3.354% of the total variance and is defined by two items with factor loadings greater than 0.93. The eleventh factor (Authority of Education Support; Cronbach alpha = 0.688) accounts for 2.882% of the total variance and is defined by two items with factor loadings greater than 0.80.

**Predicting Challenges (Obstacles) as Perceived by High School STEM Teachers in Qatar**

Table 2 shows the results of Multiple Linear Regression. In regressing the dependent variable "Challenges (Obstacles) as Perceived by High School STEM Teachers in Qatar" on the other ten explanatory variables that were determined by factor analysis, it was found that the regression equation is highly significant (F = 20.325, p = 0.000) and the R2 is 0.337, as shown in Table 2. Three out of ten independent variables are significant: 1–Problems Facing Teachers in STEM Classes is the most significant variable; 2–Leadership Style is the second most significant variable; and 3–Classroom Management Techniques is the third significant variable in predicting challenges (obstacles) as perceived by high school STEM teachers in Qatar. The significant relations between the three independent variables and challenges were further analyzed using path analysis. Refer Table 2 here.

**Path Analysis**

This study utilized the path causal analysis approach, which seeks to explain the variation in challenges (obstacles) as perceived by high school STEM teachers in Qatar and measure the direct and indirect Leadership Style, Classroom Management Techniques, and Problems Facing Teachers in STEM Classes. To put it another way, this investigation aims to clarify conceptually and methodologically the way in which leadership directly and indirectly affects challenges (obstacles) as perceived by high school STEM teachers in Qatar. It proposes breaking down the process into its sequential stages and examining what happens in each stage separately, while at the same time supposing that each stage affects the following. The use of causal path analysis was a must in this investigation because it prevented the included intermediate relations from being confused with spurious relations, whereby two variables have no causal relation. Figure 1 shows the results of a path analysis of the structural causal model. The direct effect (path coefficient) is less than the total effect (simple correlation coefficient), implying that the direct effect of each of the three independent variables on challenges (obstacles) as perceived by high school STEM teachers in Qatar is strengthened via the effect of the other intermediating variables. The algebraic signs of the direct effects of path analysis in this study support the stated hypotheses and are consistent with previous research.

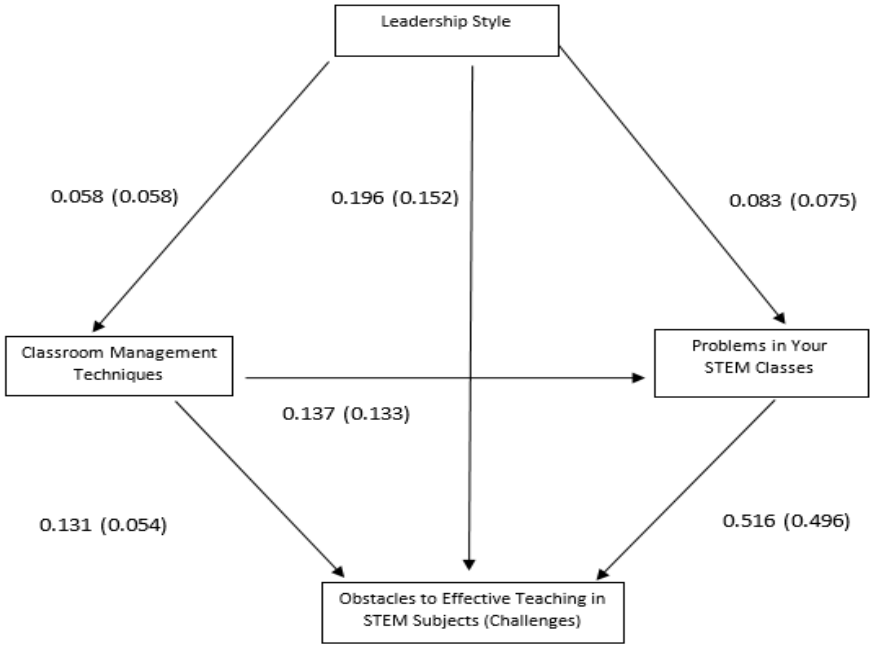


**Figure 1: Framework of Research Design**

## CONCLUSION AND RECOMMENDATIONS

Servant leadership is a trending field of research for leadership academics (Van Dierendonck, 2011), as it is becoming a very popular concept in recent years. That said, it is worth mentioning that a transformational leadership style focuses its efforts on the school and the school's objectives, while a servant leadership style directs its efforts toward the students. The extent to which the school principal is able to shift the primary focus of leadership from the school to the students is the distinguishing factor in classifying the leadership style as either a transformational or a servant leadership style.

The findings of this study confirm findings from previous research, which show that both a servant leader and STEM teachers can help create a loving, collaborative environment by showing empathy for their students. Today's STEM teachers and principals cannot help being role models for their students. Kouzes and Posner (2002) argue that servant leaders "recognize and honor the legitimacy of others' interest in an effort to promote their own welfare"(p. 256). Moreover, Jennings and Stahl-Wert (2003) believe that servant leadership addresses weaknesses and builds on strength. Servant leaders and STEM teachers should provide more professional commitment and need to develop partnerships with their students' parents. When teachers within a collaborative environment are using up-to-date management techniques, are involved in proper student counseling, and work on building trust, the can find solutions to school problems and become more prepared to face schools' STEM challenges (obstacles).

Findings of this study also recommend that principals of STEM schools should treat their school teachers very well, show them respect, and keep working with them as a group. This in turn will make STEM teacher more willing and ready to share ideas with students and parents and to establish an open line of communication between teachers, students, and their parents. All of these strategic tools will help teachers to better deal with their students' apathy, tardiness, and absenteeism. All of these will also lead to more student and parent engagement and will improve students' learning process through a better collaborative environment.

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**Table 1 Structure Matrix**

| | Component | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| QOBS to what extent do you think number of students in class presents an obstacle to good education? | .796 | -.190 | .016 | .130 | .498 | .156 | .198 | -.076 | -.046 | .144 | -.094 |
| QOBS to what extent do you think curriculum standards present an obstacle to good education? | .794 | -.230 | .045 | .049 | .416 | .244 | .132 | -.101 | .005 | .099 | -.138 |
| QOBS to what extent do you think teachers' workload presents an obstacle to good education? | .770 | -.030 | .007 | .104 | .416 | -.109 | .209 | -.170 | -.122 | .152 | .191 |
| QOBS to what extent do you think school buildings & facilities present an obstacle to good education? | .770 | -.337 | .156 | .030 | .213 | .280 | -.001 | -.249 | .136 | -.036 | -.213 |
| QOBS to what extent do you think parents' involvement presents an obstacle to good education? | .769 | -.221 | .358 | -.004 | .263 | .171 | .069 | -.130 | .094 | .104 | -.215 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| QOBS to what extent do you think assessment and testing presents an obstacle to good education? | .766 | -.116 | .081 | -.073 | .298 | .034 | .065 | -.225 | .033 | .146 | .075 |
| QOBS to what extent do you think students' behavior presents an obstacle to good education? | .762 | -.068 | .023 | .085 | .576 | -.063 | .204 | -.131 | -.094 | .190 | .108 |
| QOBS to what extent do you think school administration presents an obstacle to good education? | .736 | -.086 | .365 | .150 | .199 | -.056 | .002 | -.203 | .125 | .119 | .072 |
| QDISCUSTECH4 in a typical semester, how often do you discuss the use of multimedia technology with Vice Principal for admin. Affairs? | .213 | -.863 | .120 | -.041 | .237 | .183 | -.103 | -.229 | .160 | .145 | -.119 |
| QDISCUSTECH3 in a typical semester, how often do you discuss the use of multimedia technology with Vice Principal for academic affairs? | .213 | -.847 | .070 | .047 | .243 | .137 | .020 | -.179 | .084 | .163 | -.083 |
| QDISCUSTECH2 in a typical semester, how often do you discuss the use of multimedia technology with School Principal? | .163 | -.839 | .126 | .024 | .145 | .149 | -.108 | -.279 | .108 | .060 | -.170 |
| QDISCUSTECH6 in a typical semester, how often do you discuss the use of multimedia technology with Counselor/Social Advisor? | .137 | -.806 | .069 | -.082 | .133 | .167 | -.024 | -.219 | .144 | .024 | -.167 |
| QDISCUSTECH5 in a typical semester, how often do you discuss the use of multimedia technology with Academic Advisor? | .107 | -.801 | .061 | -.100 | .089 | .181 | -.120 | -.186 | .149 | .039 | -.176 |
| QDISCUSTECH8 in a typical semester, how often do you discuss the use of multimedia technology with Supervisor? | .212 | -.795 | .023 | -.072 | .200 | .099 | .082 | -.130 | .021 | .106 | -.085 |
| QDISCUSTECH9 in a typical semester, how often do you discuss the use of multimedia technology with Students' parents? | .226 | -.763 | .101 | .009 | .108 | .181 | -.026 | -.309 | .061 | -.040 | -.204 |
| QDISCUSTECH7 in a typical semester, how often do you discuss the use of multimedia technology with Subject Coordinator? | .080 | -.737 | -.088 | .087 | .001 | .196 | .008 | .221 | -.061 | .034 | -.112 |
| QDISCUSTECH1 in a typical semester, how often do you discuss the use of multimedia technology with Fellow Teachers at your school? | .087 | -.720 | .020 | .261 | -.040 | .256 | .063 | .177 | -.078 | .041 | -.135 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| QLEAD teachers and the administration work together as a group at the school? | .137 | -.114 | .922 | .149 | -.019 | .198 | .040 | .027 | .028 | -.044 | -.236 |
| QLEAD the school administration shows respect to teachers? | .210 | -.051 | .899 | .113 | .148 | -.034 | .026 | -.289 | .071 | -.030 | -.040 |
| QLEAD teachers are treated well by the school administration? | .113 | -.063 | .848 | .131 | -.024 | .194 | .027 | .062 | .018 | -.057 | -.335 |
| QSEEKCOLLEAGUEADVICE in a typical semester, how often do you consult or seek advice on teaching matters? | -.028 | .068 | -.065 | -.857 | .002 | -.037 | -.097 | .029 | .074 | .012 | -.116 |
| QSEEKADMINADVICE in a typical semester, how often do you consult or seek advice on teaching matters? | -.069 | -.072 | -.176 | -.802 | .102 | -.054 | -.126 | .039 | .036 | .027 | .002 |
| QABESTEEISM to what extent is Absenteeism is a problem in your classes? | .285 | -.068 | -.011 | -.149 | .902 | -.122 | .118 | -.150 | -.058 | .201 | .089 |
| QSTUDLACKQUALITY to what extent is Quality of students a problem in your classes? | .383 | -.068 | .049 | .037 | .872 | -.122 | .147 | -.155 | -.064 | .268 | .143 |
| QTARDINESS to what extent is Tardiness is a problem in your STEM classes? | .402 | -.286 | .039 | -.052 | .848 | .246 | .072 | -.117 | -.037 | .239 | -.140 |
| QAPATH to what extent is student apathy a problem in your classes? | .477 | -.218 | .136 | .020 | .798 | .118 | .181 | -.057 | -.066 | .340 | -.120 |
| QSUBSTSAMEAREA in a typical semester, how often do you act as a substitute teacher for other teachers in your subject area? | .097 | -.171 | .114 | .100 | .025 | .895 | .042 | .016 | .062 | .062 | -.155 |
| QSUBSTDIFFERAREA in a typical semester, how often do you act as a substitute teacher for other subject areas? | .133 | -.166 | .112 | .037 | .007 | .883 | .007 | -.058 | .086 | .055 | -.121 |
| QFOODQUALITY how would you rate the quality of food provided by the cafeteria? | .094 | .014 | .020 | .093 | .107 | .029 | .955 | .023 | -.069 | .123 | -.038 |
| QFOODPRICE how would you rate the price of food at the cafeteria? | .114 | .025 | .045 | .163 | .123 | .017 | .955 | -.008 | -.098 | .174 | .005 |
| QMANAGE9 in a typical semester, how often do you discuss classroom management with Individual students? | .211 | -.209 | .043 | .042 | .167 | .035 | .072 | -.822 | .053 | -.010 | -.049 |
| QMANAGE8 in a typical semester, how often do you discuss classroom management with Students' parents? | .212 | -.195 | .116 | .048 | .103 | .067 | -.065 | -.815 | .068 | -.068 | -.147 |
| QWHUORS2 excluding teaching, how many hours per week do you spend on activities related to your work such as | -.001 | -.113 | -.009 | -.071 | -.066 | .177 | -.108 | -.069 | .875 | -.077 | -.109 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| lesson preparation, homework checks, office activities, school activities, and exam grading, etc. outside the school (home)? | | | | | | | | | | |
| QWHUORS1 excluding teaching, how many hours per week do you spend on activities related to work such as lesson preparation, homework checks, office activities, school activities, and exam grading, etc. inside the school | .044 | -.037 | .061 | -.049 | -.055 | -.014 | -.054 | -.025 | .868 | -.110 | -.045 |
| PMATHabout what percentage of the students in your class are very interested in math? | .089 | -.073 | -.070 | .018 | .236 | .046 | .155 | .045 | -.110 | .937 | .059 |
| PSCIENCE about what percentage of the students in your class are very interested in science? | .108 | -.086 | -.060 | -.045 | .244 | .070 | .153 | .068 | -.109 | .936 | .043 |
| QMINISTRYSATISFY performance of the ministry of education and higher education | -.077 | -.084 | .081 | -.114 | -.071 | .197 | -.063 | .001 | .111 | -.121 | -.878 |
| QMINSTRYSUPPORT level of support you receive from the ministry of education and higher education | .128 | -.163 | .301 | -.025 | .049 | .023 | .074 | -.188 | .063 | .010 | -.808 |
| Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. | | | | | | | | | | | |

**Table 2: Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .976 | .218 | | 4.476 | .000 |
| | 9–Working Hours | .005 | .005 | .040 | .953 | .341 |
| | 4–Seeking Advice | -.083 | .066 | -.054 | -1.264 | .207 |
| | 10–Perceived Percentage of Students Interested in STEM | .000 | .001 | -.005 | -.125 | .901 |
| | 2–Using Media to Enhance Teaching and Learning | .063 | .036 | .077 | 1.744 | .082 |
| | 3–Leadership Style | .115 | .043 | .118 | 2.691 | .007 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 5–Problems in your STEM classes | .462 | .045 | .460 | 10.276 | .000 |
| | 6–Teacher Substitute | .062 | .039 | .068 | 1.593 | .112 |
| | 8–Eating Healthy | .018 | .014 | .055 | 1.313 | .190 |
| | 7–Classroom Management Techniques | .153 | .045 | .147 | 3.388 | .001 |
| | 11–Authority of Education Support | -.017 | .033 | -.022 | -.510 | .611 |
| a. Dependent Variable: 1–Obstacles to Effective Teaching in STEM Subject | | | | | | |