Conditions for Student-Centered Teaching and Learning: Relationship Between Classroom Processes and School Achievement of Curriculum Standards

Atmane Ikhlef, Qatar University; Stephanie L. Knight, Penn State University

Abstract

Qatari educational curriculum standards emphasize student-centered classrooms where students actively engage in inquiry and problem solving. Classrooms characterized by these elements should emerge as more successful on Qatari standards-based assessments, but little research has been done to examine the relationship between these characteristics and standards attainment or even to determine whether these elements exist. The purpose of this study was to develop profiles of Qatar schools and to examine the relationships among classroom processes, teacher and student perceptions, and student achievement in math and science classrooms in higher and lower achieving elementary schools. Data were collected in October, 2008, in 17 schools randomly selected from 46 schools that had implemented the standards for at least 3 years. Descriptive data for school profiles were generated and compared qualitatively. Findings indicate that the percentage of standards met by schools is very low (.9% to 12.1%) and the incidence of classroom behaviors associated with student-centered classrooms is also very low across schools (0% to 9.53%). However, teachers report high levels of efficacy on a 6 point scale for teaching in reform-oriented schools (4.11 to 5.41) and perceive that they are implementing high levels of standards-based practices (5.02 to 5.73). Reports of inquiry practices were lower (4.2 to 5.76) but still high compared to observation of these practices. While schools making more progress meeting standards tended to exhibit higher levels of student-centered behaviors (albeit still low), no patterns existed for teacher perceptions. They tended to be high despite achievement level or level of observed implementation. Students' perceptions of classroom environment and problem solving also were high, but variations by achievement level were noted with higher performing schools reporting greater student-centeredness and problem-solving activities. The mismatch between participant perceptions and both observed behaviors and achievement has implications for the implementation of reform in general and professional development in particular.

Theoretical Framework

In 2002, Qatar established key elements of educational reform in schools including national curriculum standards; emphasis on critical thinking through student-centered teaching; establishment of charter (independent) schools; standards-based assessment; English as the language of instruction in math and science, and extensive teacher professional development. In the classroom, the reform provides "an emphasis on encouraging a spirit of inquiry and hands-on learning" (www.education.gov.qa) often referred to as student-centered teaching because students are actively involved in activities and discussions that promote deep conceptual learning, knowledge construction, and autonomy. This emphasis requires a change in student and teacher interactions). The reform focus on student inquiry, critical thinking and problem solving requires that students participate actively in classroom activities designed to foster these

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outcomes and that they engage in self-regulation of motivation and strategy use to emerge as independent, life-long learners. The movement away from rote memorization places tremendous pressure on students, who must assume responsibility for motivational and cognitive processes that underlie learning, and on teachers, who must provide the kinds of instructional strategies and assessment practices within a learning environment that fosters development of student self-regulation and participation (see e.g., Blumenfeld, Kempler, & Krajcik, 2006; Bransford, Brown, & Cocking, 1999, 2000; Donovan, Bransford, & Pellegrino, 2000).

Qatari educational curriculum standards emphasize student-centered classrooms where students actively engage in inquiry and problem solving. This focus suggests that certain models of learning (Bransford et al, 1999, 2000); pedagogical approaches (Grossman, 2005); and professional development (Darling-Hammond, 2000; Hawley & Valli, 1999; Loucks-Horsley et al, 1998; Putnam & Borko, 2000) form the framework of the goals of Qatari reform. These constructivist-based models emphasize the importance of engaging initial understanding before conceptual change is possible; the importance of a deep foundational knowledge that allows meaningful conceptual frameworks to develop; the need to define, implement, and monitor learning goals and strategies; effective use of technology; development of dispositions that encourage critical thinking and reflection; and the need for professional development based on sound principles of teacher learning (Brown et al., 2000; Putnam & Borko, 2000). Classrooms characterized by these elements should emerge as more successful on Qatari standards-based assessments, but little research has been done to examine the relationship between these characteristics and standards attainment or even to determine whether these elements exist. Therefore, the purpose of this study was to develop profiles of Qatar schools and to examine the relationships among classroom processes, teacher and student perceptions, and student achievement in math and science classrooms in higher and lower achieving elementary schools. More specifically, the following research questions were addressed.

1)What classroom instructional strategies are implemented in math and science classes in independent elementary schools?
2) To what extent are students in Qatari Independent elementary schools engaged in productive classroom participation during math and science classroom activities?
3) To what extent do students exhibit self-regulated learning (motivation and strategy use) during math and science classroom activities?
4) How effective do teachers perceive themselves to be when providing instruction in math and science classrooms?
5) How do the teaching and learning profiles of higher- and lower- performing elementary schools differ?

Methods

This study employed a descriptive design using systematic classroom observation and teacher and student surveys with a stratified random sample of math and science classrooms in independent schools.

Participants

Participants for the first phase of research included teachers and students from a sample of randomly selected math and science classes in randomly selected independent elementary schools. Elementary schools were targeted since recognition of the need to use strategies for self-regulation of motivation and problem solving begins between the ages of 5-10 years and reflection on students' own learning continues to develop throughout their elementary school years (Donovan, Bransford, & Pellegrino, 2000). We have little information on students' cognitive development for complex learning during this age period (Duschl et al., 2007) and study of this age group will add to the knowledge base. The study was confined to math and science classes since productive participation is rooted in specific disciplines. Data were collected in the Fall of 2008 in 17 schools randomly selected from 46 schools that had implemented the Qatar standards for at least 3 years. Three to five third and fourth grade math and science classrooms were randomly selected from these schools for participation. The sample included 67 teachers and approximately 1150 students.

Procedures

The extent to which interactions and activities in the classroom were student-centered was determined through observations using two instruments (SOS; Stallings, 1975; Teacher Attributes Observation Protocol, Fouts, Brown, & Thieman, 2002). The Snapshot documents the materials, activities, grouping arrangements, instructional strategies, and interaction patterns among teachers and students, and establishes student engagement rate (Stallings & Giesen, 1977). The TAOP is a combined qualitative and quantitative measure (qualitative scripting followed by a set of summative likert-type items which are completed based on the qualitative data) designed to capture contructivist approaches to teaching. The summative set of likert-type items represent seven components (conceptual understanding, reflection, student active participation; real world applications, consideration of diversity, challenging curriculum, and assessment) consisting of 27 indicators. Interrater reliability for the Snapshot was .85 and .79 for the TAOP. Internal consistency reliability for the TAOP was .93. Teachers were asked to conduct a 'typical' class on the observation day and were observed for the duration of the math or science lesson. While the observations do not provide an exhaustive profile of classroom interactions, they provide a snapshot of what is occurring on a given day in Qatari elementary math and science classrooms (n=56).

In addition to observations, during their free period math and science elementary teachers (n=67) were administered a modified version of the Teacher Efficacy Scale (TES) developed by Gibson and Dembo (1984). The TES consists of 16 items in two scales: Personal Teaching Efficacy, which represents a teacher's perceptions of her ability to affect student learning, and General Teaching Efficacy which represents teachers' beliefs about the general relationship between teaching and learning. Teachers also completed the Inventory for Teaching and Learning (ITAL; Ellet & Monsaas, 2007) to determine their perceptions of instructional practice and the extent to which they

engaged in practices consistent with Traditional, Standards-based, and Inquiry teaching. Reliability for the TES is .98 and .95 for the ITAL. To investigate the teachers' perceived English language proficiency, surveys from Butler (2004), and Chacon (2005) were used to develop an additional questionnaire administered to a subset of 29 teachers. Based on the two instruments a 13 item survey was developed (Eslami, 2008). The items were on a 5 point Likert-type scale ranging from 'strongly disagree' (1) to 'strongly agree' (5). The instrument has items covering both productive and receptive language skills.
On a day separate from the classroom observations, students completed the Individualized Classroom Environment Questionnaire (ICEQ; Fraser & Fisher, 1991; Spinner & Fraser,2002) and the How Do You Solve Problems inventory (HDYSP; Howard et al, 2000) to determine perceptions of classroom environment and problem-solving. The ICEQ contains five scales: Personalization, Participation, Independence, Investigation, and Differentiation and exhibits internal consistency reliability of .79. The HDYSP consists of 25 items in five scales (Problem Representation, Objectivity, Evaluation, Knowledge, and Monitoring Subtasks) measuring students' problem solving and self-regulation perceptions. Internal consistency reliability for the HDYSP is .79. Each survey required approximately 30 minutes to complete and was administered by a native Arabic speaker who provided assistance or translations as needed.

Results from the Qatar Comprehensive Educational Tests (QCET) were obtained for each school in math/science from reports of the Qatar Evaluation Institute (2009). Three classification lists were issued which, when considered together, give a picture of overall performance of schools in three areas: extent to which schools meet standards; level of academic achievement, and academic progress from 2007-2008. Each list was divided into three levels of schools depending on performance. For purpose of this analysis, sample schools in the top tier of the three lists were used to define higher-performing schools in comparison with schools in the remaining tiers which were considered lower-performing. The results yielded 6 schools in the top tier for Meets Standards, two of which were included in our sample; 18 schools in the top level of Academic Achievement, five of which were included in our sample; and 10 schools in the Overall Change Academic Outcomes 2007-2008; four of which were included in our sample. Since some schools in our sample were represented in the top of more than one level, the total number of higher-performing schools was 8 schools. From the lower-performing tiers of the three lists, 9 schools were included in our sample. However, some data are missing from schools in both groups. Descriptive data for school profiles were analyzed qualitatively

Results and Discussion

To address the five research questions, descriptive statistics were generated in four categories matched to the research questions: Instructional Strategies, Productive Classroom Participation, Self-Regulated Learning, and Teacher Efficacy (Tables 1-4). For the fifth research question, school profiles were developed to compare higher- and lower-performing schools (Tables 5-7).

Instructional Strategies

The *Snapshot* yielded information about classroom grouping, activities, and materials. An aggregate variable including activities and materials characteristic of student-centered instruction (amount of discussion, project-based instruction, student use of manipulatives, technology integration, and cooperative learning) was compiled from the data. Classrooms emerged as teacher-centered with over 70% of instruction occurring in teacher-directed large groups and about 25% involvement with small group/individual configurations. Student-centeredness, as defined by the aggregate variable, was observed less than 20%. However, there was a great deal of variation by school as determined by the large standard deviations (Table 1). Student-centeredness ranged from a low 0% to a high of almost 70% across schools, but Discussion and Projects, key elements of student-centered instruction, were observed infrequently in all schools.

Table 1: Stallings Observation System Snapshot - Means and Standard Deviations *(n=56)*

GROUPING	**Mean %**	**SD**
1 student	8.89	17.52
Small	17.38	18.53
Large	48.04	29.64
All	24.10	24.28
STUDENT INVOLVEMENT	**Mean %**	**SD**
*Discussion	4.82	10.99
Practice/drill	4.91	10.01
Kinesthetics	2.89	6.42
*Projects	.62	4.92
Classroom Management	3.40	7.64
Receiving Assignments	9.16	16.22
Computers/Calculators	.63	3.53
*Manipulatives	4.44	10.44
*Multimedia	6.15	14.09
Visual Aids	24.58	20.11
*Cooperative learning	3.04	8.22
No Materials	41.83	21.23
Total Student Off Task	29.66	19.34
TEACHER INVOLVEMENT	**Mean %**	**SD**
Monitoring Seatwork	10.56	17.60
Interactive Instruction	67.25	24.88
Organizing/Managing	20.29	22.47
Working Alone	1.59	5.45

*Indicates a student-centered activity

While the Snapshot documented activities and materials, the *Teacher Attributes Observation Protocol* investigated the nature of the content of classroom instruction, including depth of conceptual understanding elicited and the degree to which the curriculum challenged students (Table 2). Overall results were low, with the key elements of student-centered instruction (Real World Applications, Active Student Participation, and Differentiation in Strategies and Curriculum) observed rarely. Teaching for Conceptual Understanding and Challenging Curriculum were observed more often than other variables, but were still low. Again, there was considerable variation across schools.

Table 2. Teaching Attributes Observation Protocol - Means and Standard Deviations *(n=56)*

Attributes	**Mean**	**SD**

Conceptual Understanding	.86	.31
Reflection	.63	.30
Real World Applications	.23	.26
Active Student Participation	.37	.33
Differentiation	.51	.39
Challenging Curriculum	.84	.03
Assessment	.48	.01

Note: Scales range from 0 (Not Observed) to 4 (Observed Very Often)

The results depict an emerging set of instructional strategies consistent with the direction of educational reform in Qatar, but not yet fully implemented. While teacher-centered instruction prevailed, student-centered instruction occupied a fifth of the time observed. Superficial structures such as grouping and discussion were more prevalent than evidence of depth of content or active student participation which underlie productive classroom participation. During one observation, field notes indicated that a particular teacher would turn to the observer frequently and give the 'label' for the instruction she was providing (e.g., this is tying the content to student lives). However, the observer noted that the examples were either incorrect or at a low level and that students were not involved actively in instruction.

Productive Classroom Participation

Productive classroom participation refers to student engagement in discipline-based activities in ways that lead to self-regulation and motivation. This construct was measured by comparing the amount of off-task behavior and kinds of activities observed. (see Table 1). Results indicated that students overall were off-task and not productively engaged about a third of class time. This is disturbing since it reflects reduced opportunity for student learning of any type. This finding may be related to the type of school. Classroom management in boys' schools is perceived as more difficult than in girls' schools (Personal Communication with Qatar University professor) and higher off-task rates in boys' schools, which comprised 7 of 17 schools included in the analysis, could have affected off-task level. Comparison of off-task rates revealed about 10% more in boys' schools, and the range for off-task was much greater compared to girls'. The off-task level for both girls' and boys' schools may be related to difficulties in teacher management of higher-level learning activities noted in previous research (Brophy & Good, 2000; Doyle, 1986).

Examination of the aggregate variable representing elements of classrooms characterized by student-centered inquiry reveals some use of Discussion, Manipulatives, and Multimedia, but little evidence of Projects or Cooperative Learning that are key characteristics of inquiry-based classrooms (Duschl et al., 2009). The small groups noted in the previous section do not appear to be cooperative groups, but more superficial structures. While there was considerable variation as noted by the standard deviations (see Table 1), percentages were generally low across classrooms for discipline-based activities that underlie Productive Classroom Participation.

Contrary to the results of the observations, teachers perceived they emphasized more elements associated with student-centered inquiry than traditional teacher-centered instruction (see Table 5 below). The mismatch between teacher perceptions and observed behaviors needs to be considered by those implementing the reform as well as those providing professional development for teachers. Perhaps teacher use of structures such as small group learning, although not necessarily accompanied by inquiry activities or conceptually challenging content, gave them the illusion of student-centered inquiry. Conversely, this mismatch between actual strategy use and teacher perceptions of strategy use may represent an initial stage in moving from teacher-centered to student-centered instruction. In fact, although observations revealed low levels of conceptual understanding and challenging curriculum, these variables were higher than other elements of student-centered inquiry instruction and may be emerging in the classroom.

Self-Regulated Learning

Self-regulation refers to students' dispositions and strategies (motivation, persistence, and strategy use) that enable them to achieve learning goals related to inquiry and problem solving (Schunk & Zimmerman, 2008). Students reported high levels of problem-solving (problem representation) and self-regulation (objectivity, evaluation, and subtask monitoring) with the exception of one area (see Table 3). Students reported less knowledge available for problem solving. This finding may be related to observation data described previously that reported low levels of conceptual understanding and challenging curriculum – the knowledge base was not provided.

Students' perceptions of classroom environment that facilitates development of self-regulation were more mixed. Students reported high degrees of Personalization and Participation and to a lesser extent, Involvement. However, students' perceptions of Independence and teachers' Differentiation of student work/activities were considerably lower. While results of the *Inventory for Teaching and Learning* (see Table 4) indicated that teachers perceived they gave students opportunities for autonomy and individualized assignments/ activities according to Qatari standards, students did not perceive these elements to the same extent. Students felt that teachers gave them personal attention, cared for them, and gave them opportunities for participation and involvement in class activities. However, without autonomy and differentiation, student-centeredness could not be fully achieved.

Table 3. Students' Surveys: Means and Standard Deviations

I. Individualized Classroom Environment Questionnaire* *(n=1151)*		
	Mean	**SD**
Personalization	4.11	1.30
Participation	3.66	1.41
Independence	2.15	1.41
Involvement	3.42	1.44
Differentiation	2.82	1.60
II. How Do You Solve Problems* *(n=1151)*		
Problem Representation	4.06	1.22
Objectivity	4.03	1.25
Evaluation	4.15	1.18
Knowledge	3.76	1.42

Subtask Monitoring	4.01	1.19

*Scales range from 1 (Strongly Disagree) to 5 (Strongly Agree)

Teacher Efficacy

Teachers with high teaching efficacy typically impact students more positively than low-efficacy teachers. In this study teachers reported high levels of Personal Teaching Efficacy and somewhat lower levels of General Teaching Efficacy (see Table 4). In other words, they had less confidence that other teachers teach in ways consistent with development of problem solving and self-regulation, but they perceived they personally could impact student performance in these areas. This is consistent with findings of other research (Tschannon-Moran & Hoy, 2000). However, the high efficacy did not appear to generate positive findings for this study.

When investigating efficacy for teaching in English, the results showed that overall efficacy for the subset of teachers was high and similar to the larger set of teachers for General Teaching Efficacy and Personal Teaching Efficacy (see Table 4, Ia & Ib). Self-reported English proficiency was also high. Listening was lower than the skills of Speaking, Reading, and Writing, but all were high (Table 4, II). Since teachers were recruited to teach math and science in Independent Schools partially based on their English ability, this finding is not surprising. However, while confidence in English ability is desirable, confidence alone may not be enough to implement reform. Results of observations indicated that teachers were doing most of the talking in English. Students were doing very little talking in English. The lack of English proficiency among students may have contributed to the observation findings of a lack of student-centeredness. Students' confidence in their English proficiency and their opportunity to participate in linguistically appropriate tasks are key elements since students would benefit most from an active role in classroom discussion. The findings indicate that teachers' ability to facilitate this confidence and proficiency and scaffold classroom discussion needs to be further investigated.

Table 4. Teacher Surveys: Means and Standard Deviations

	Mean	**SD**
Ia. Teacher Efficacy* TOTAL SAMPLE *(n=67)*		
General Teaching Efficacy	4.11	1.68
Personal Teaching Efficacy	5.41	.89
Ib.Teacher Efficacy* SUBSET (n=29)		
General Teaching Efficacy	4.28	1.09
Personal Teaching Efficacy	5.47	.23
II. Teacher Perceptions of English Proficiency** *(n=29)*		
Overall Proficency	4.01	.87
Listening	3.86	.92

Speaking	4.10	.87
Writing	4.04	.94
III. Inventory for Teaching and Learning* ** *(n=67)*		
Standards	5.31	.55
Traditional	3.78	.57
Inquiry	5.11	.26

*Scales range from 1 (Strongly Disagree) to 6 (Strongly Agree)
**Scales range from 1 (No Proficiency) to 5 (Very Proficient)
***Scales range from 1 (No Emphasis) to 6 (Very Strong Emphasis)

Profiles of Higher- and Lower-Performing Schools

Tables 5-7 provide results of the comparison of higher- performing schools (HPS) and lower- performing schools (LPS). Findings indicated few differences by performance level, perhaps because both achievement and behaviors related to standards were quite low. The top tier of Meeting Standards only achieved 10-20% of standards (Qatar Evaluation Institute Report, 2009). The *Teacher Attributes Observation Protocol*, which focused on instruction from a constructivist perspective consistent with the standards, provided support for more use of student-centered instruction by Lower-performing schools than Higher-performing schools, but also showed very low use overall by both groups (see Table 5). For observed behaviors using the *Snapshot*, three composite variables related to student-centeredness were considered: Teacher interactions with individuals and small groups, Student-centered activities, and Student off-task behavior. Higher-performing schools were characterized by more teacher interactions with individual students and small groups and less student off-task behavior than Lower-performing schools, although both groups had high off-task behavior. LPS, surprisingly, exhibited almost twice as much student-centered activity, although both groups were extremely low in this area (see Table 5).

Table 5. Classroom Observations by Higher- and Lower-Performing Schools: Means and Standard Deviations

I. Teaching Attributes Observation Protocol*	**Mean**		**SD**	
High-Performing *(n=6)*	.44		.23	
Low-Performing *(n=9)*	.60		.33	
II. Stallings Observation System Snapshot				
Variables	High Performing *(n=6)*		Low Performing *(n=9)*	
	Mean%	**SD**	**Mean%**	**SD**
1 Student or small group	14.19	13.19	13.46	13.9
Student-Centered activities	2.25	3.73	4.19	5.74
Student Off-Task Behaviors	30.59	20.92	40.8	13.35

*Scales range from 0 (Not Observed) to 4 (Observed Very Often)

Results from teacher (see Table 6) and student (see Table 7) surveys show some differences by school performance. Teachers in both HPS and LPS reported similar high levels of efficacy for teaching in reform-oriented schools. However, differences across groups consistent with the findings from the classroom observations emerged when teachers were asked about the type of instruction they provided in classrooms. Although both groups indicated they implement high levels of standards-based and inquiry

practices and lower levels of traditional instruction, teachers in LPS reported higher levels of standards-based and inquiry instruction than teachers in HPS (see Table 6). Students' perceptions of classroom environment (ICEQ instrument) and problem-solving (HDYSP instrument) were high and similar across groups (see Table 7). In general, observations of inquiry practices were much lower compared to teacher and student reports of these practices.

Table 6: Teacher Surveys by Higher- and Lower-Performing Schools: Means and Standard Deviations

	High-Performing *(n=7)*		**Low-Performing** *(n=8)*	
I. Teacher Efficacy*	**Mean**	**SD**	**Mean**	**SD**
GTE	4.20	1.69	4.25	1.55
PTE	5.42	.79	5.43	.67
Total	4.82	1.24	4.84	1.11
II. Inventory for Teaching and Learning** *(n=69)*				
Standards	5.25	.81	5.40	.89
Traditional	3.91	1.30	3.78	1.46
Inquiry	5.09	.81	5.22	.82

*Scales range from 1 (Strongly Disagree) to 6 (Strongly Agree)
**Scales range from 1 (No Emphasis) to 6 (Very Strong Emphasis)

Table 7. Student Surveys by Higher- and Lower-Performing Schools: Means and Standard Deviations

	Mean	**SD**
I. Individualized Classroom Environment Questionnaire*		
High-Performing *(n=8)*	3.29	.91
Low-Performing *(n=9)*	3.27	.77
II. How Do You Solve Problems*		
High-Performing *(n=8)*	4.05	1.18
Low-Performing *(n=9)*	4.02	1.19

*Scales range from 1 (Strongly Disagree) to 5 (Strongly Agree)

In summary, some variations by achievement level were noted, with LPS *exhibiting* and teachers in LPS *reporting* greater student-centeredness. Several explanations might address this unexpected finding. Since schools were randomly drawn from eligible schools, the possibility of bias should be mitigated. Nevertheless, due to teacher absenteeism, many substitutions had to be made, raising the possibility that teachers who were absent were somehow different than their colleagues who were present. In addition, some schools were unable to be observed due to scheduling problems. Scheduling observations was a major challenge due to scheduling uncertainties and last-minute changes that appear to be common in Qatari schools. In addition, the length of the observation may not have captured classroom teaching and learning to the extent needed, even if there were no problems with the schedule. However, since both LPS and HPS had similar problems with absenteeism and were observed for the same amount of time, these are probably not factors in the differences that emerged. Overall, the fact that multiple data sources support similar findings suggests that the limitations presented above probably were not responsible for the unexpected findings.

Another possibility, and one common in the U.S., is that the assessments may not be consistent with the standards. Teaching to the test, particularly if the test is more oriented to basic skills, often works against student-centered approaches. Traditional direct instruction has been successful in raising standardized test scores (Good & Brophy,

2000). Teachers in HPS report more traditional instruction than teachers in LPS, an indication that this may be a possible factor in the results.

Another explanation is that student and teacher behaviors related to student-centeredness are emerging and have not yet been implemented to the extent that we can see a relationship between achievement and instruction. Previous evaluation of the processes, activities, and outcomes of Qatari reform highlighted challenges, including the ambitious scope of the reform, the short time period for implementation, and the limited capacity for implementation (Brewer et al., 2007, p. 24). The important factor of the language of instruction was not noted, but it may be a significant barrier. Overall, both observations and student outcomes indicate low levels of standards implementation. Additional investigation of barriers confronted in classrooms that might contribute to low levels of implementation, including possibility of linguistic and cultural difficulties, needs to be conducted.

The dispositions for student-centered instruction, or at least awareness of the goals, are prevalent as indicated by teacher and student survey responses. However, teachers and students may not yet have acquired the skills needed to implement student-centered instruction and impact achievement. Change in performance may lag behind changes in teacher and student perceptions and dispositions due to the pressures this approach places on participants (see e.g., Boekarts, 1999; Schunk & Zimmerman, 2008). The high student off-task rate signals problems in general with management of the new and often unfamiliar behaviors related to student-centeredness. That the classes in LPS have higher off-task rates and more evidence of student-centered activities, but with lower achievement, supports the hypothesis of increased pressures due to the approach.

Conclusions

Previous research and evaluation on the processes, activities, and outcomes of the initial Qatari "Education for a New Era" reform efforts highlighted issues and challenges associated with the program that included the ambitious scope of the reform, the short time period for implementation, and the limited capacity for implementation (Brewer et al., p.24). Despite these challenges to the reform effort, results of surveys from the current study of independent school math and science classrooms indicate that teachers and students perceive progress in key components of the reform related to implementation of student-centered learning environments. Teachers perceive that they can impact student outcomes related to reform positively and students recognize skills in problem solving and self-regulation, although students perceive they have less independence and individualization than reported by teachers. In fact, observation of the classroom processes necessary for actualization of student-centered teaching and learning and results from the QCET administered to students provide little evidence that the reform has been successfully implemented at this point. Actual change in performance may lag behind changes in teacher and student perceptions and dispositions due to the pressures that this approach places on students and teachers (See e.g., Boekarts, 1999; Schunk & Zimmerman, 2008). In addition, some evidence exists that the level of the content is not as challenging as it may need to be to achieve goals set through the standards. The differences in schools and the mismatch between participant perceptions, observed behaviors and achievement in schools has implications for implementation of

reform in general and professional development in particular. Next steps might include examination of the measures used to gauge progress to insure a match between standards and assessment of the standards; identification and case studies of schools that are making progress with the goal of providing models that can assist teachers and administrators in implementation of the standards; and targeted professional development that goes beyond general awareness of appropriate instructional strategies and includes intensive practice and coaching with feedback. (See e.g., Hawley & Valli, 1999).

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