

Environmental sustainability in Qatar's Education City: Strategies, initiatives and education

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ABSTRACT

This paper presents a summary of the results of a one-year student-faculty research project on environmental sustainability in Qatar's prime knowledge economy vehicle, the Qatar Foundation (QF), and its home, Education City (EC), in Doha. The project's main objective was to produce new information on the emergence of environmental sustainability policy and practice on the QF's agenda from a number of angles. The research team adopted a multi-level, multi-method approach to the topic, analyzing developments on three hierarchically interlinked levels: (i) strategic priorities of the State of Qatar and QF; (ii) initiatives and projects in EC; and (iii) individual attitudes and self-reported behavior of EC undergraduate students. A variety of research methods were employed, including document-based analysis, semi-structured interviews and survey research. The survey, administered in November 2012-February 2013, yielded a sample of 114 responses. Highlights of the survey analysis are presented in this summary paper.

The study is believed to have been the first comprehensive look at the evolution of QF's ambitious agenda to investigate, implement and promote environmental sustainability in EC. In addition to understanding the rationale underpinning the QF's commitment, the study also explored how the QF's goals are implemented by QF divisions and university administrations. Also, how EC's different sustainability programs are understood and received by its core constituency, the students. QF's commitment to environmental sustainability is both a key contributor to Qatar's national development and a significant component of its global brand. Therefore, understanding the achievements and challenges in translating ideals of environmental sustainability into practice in EC not only provides a useful basis upon which programs and initiatives may be strengthened and expanded, but also offers important lessons for other institutions in the country and the region. The paper concludes with a number of recommendations, based on the results of the research, relating to improving the effectiveness of sustainability policy in Education City.

The project was funded through the Qatar National Research Fund's Undergraduate Research Experience Program.

Keywords: Qatar, Education City, sustainable development, knowledge economy, environment, environmental education, Gulf studies

<http://dx.doi.org/10.5339/connect.2013.41>

Submitted: 31 August 2013
Accepted: 14 September 2013
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OBJECTIVES AND METHODOLOGY

This research paper presents, in summary form, the results of a one-year research project that examined the emergence of environmental sustainability policy and practice in Qatar through a pioneering institution in the area, Qatar Foundation for Education, Science and Community Development (QF), from a number of angles. Given QF's pioneering policies and initiatives in this area, on the one hand, and its relative isolation from many institutions and spheres of society, on the other, the study conceptualized its geographic home, Education City, both as a "green beacon" and a "green island." This way, it managed to track the drivers of QF's successes in strategy alignment, innovation and quick implementation and, perhaps more importantly, the key challenges that remain in the areas of coordination and alignment of policies and actions amongst the Foundation's different constituting parts.

In order to achieve a multifaceted picture of the situation, the research team chose a multi-level approach to the topic and analyzed developments at three hierarchically interlinked levels: (i) the strategic priorities of the State of Qatar and its prime knowledge-building vehicle, Qatar Foundation; (ii) initiatives and projects in the Foundation's geographical home, Education City; and (iii) individual attitudes and self-reported behavior of undergraduate level university students of Education City, most of whom are being exposed to these early sustainability developments through studying and living in the area. This paper presents a number of conclusions obtained from this analysis and provides some tentative recommendations for environmental sustainability policy and further research on the topic.

The main question the team set out to answer was: are Qatar Foundation's and Qatar's environmental strategies, Education City's environmental education initiatives, and its students' attitudes and behaviors in some form aligned or related? The study built on three interlinked research questions, which organically divided it into three complementary parts: (i) What are the strategic intersections of the Qatar National Vision and Qatar Foundation? (ii) How is Education City advancing in environmental sustainability, in particular with regard to educating its university students? (iii) What kind of environmental attitudes and behavioral patterns do undergraduate students of Education City's universities exhibit?

Different methodological tools were employed for data collection and analysis in each part: Part I analyzed the strategic level through a qualitative textual analysis; Part II explored the implementation level, in other words, initiatives and projects, through qualitative, semi-structured interviews and on-site observation; and Part III measured attitudes and behavior at the individual level, through an online questionnaire targeting undergraduate students. Part III sought to find overall patterns and correlations in these areas, such as the influence of exposure to environmental education, at the university or Education City residence halls, on environmentally sustainable behavior. A more detailed explanation of the survey methodology is provided in the section "Survey in focus".¹

The research team comprised two undergraduate students and two faculty members of Georgetown University's School of Foreign Service in Qatar. Given that the project was part of the Qatar National Research Fund's Undergraduate Research Experience Program, its objectives were both exploratory and didactic: it sought to provide new information in this under-studied area, but also to provide the student researchers with a research experience. The student survey (n = 114) measuring both awareness and behavior in relation to environmental sustainability among students therefore played a central role in the study.

The resulting final report, on which this summary article is based, finds its theoretical grounding in the academic discipline of Gulf Area Studies, and is conceptually anchored in contemporary global debates on sustainable development and environmental sustainability policy. Two key concepts applied are knowledge-based economy² and Hertog's islands of efficiency³, as explained below.

BACKGROUND

Environmental sustainability⁴ as a policy theme rose on the Qatari government's agenda as a result of rapid, fossil-fuel intensive growth of the 2000s, the devastating impacts on the local environment of

¹Georgetown University SFS-Q IRB#Q012-009.

²OECD, *The Knowledge-Based Economy*, OCDE/GD(96)102 (Paris: OECD, 1996), 7.

³S. Hertog, *Princes, Brokers, and Bureaucrats: Oil and the State in Saudi Arabia* (Ithaca: Cornell University Press, 2011), passim.

⁴Defined as the "preservation of natural environmental systems and processes". Susan Baker, *Sustainable Development* (New York: Routledge, 2006), 26.

which became too important to ignore.⁵ Its place as a core policy focus was consolidated in 2008, with the publication of the long-term planning document Qatar National Vision 2030 (QNV), which is based on a four-pillar understanding of sustainable development, consisting of human, economic, social and environmental development.⁶ Another core goal of the QNV and key objective of Qatari government's economic diversification efforts is the transition from a hydrocarbons-based economy into a knowledge-based one. This latter concept has been the principal driver of the activities of the Qatar Foundation, which was created in 1995 as Qatar's leading knowledge-economy building vehicle.⁷

Qatar Foundation's ambitious vision, efficient management, excellence in performance, private status, and the location of Education City at the outskirts of Doha invite a further conceptual approach: Hertog's concept of "island of efficiency" posits that, at times of fiscal surplus, under certain conditions (such as government autonomy), the government's institutional experimentation can enable enclaves of administrative efficiency to emerge. While these "islands" are operated by technocrats and often durable in time, they remain separate from the rest of the bureaucracy.⁸ QF's Education City fits this definition well: it attracts talented students and houses top universities and rising research institutes, but its physical separation from Doha and institutionally autonomous status from government mean that its best practices, including in the area of environment, may take a long time to be implemented in other semi-government and government institutions. The island metaphor is also useful for characterizing the dynamism of the different university campuses in Education City, and their interactions with each other and with Qatar Foundation, as will be demonstrated below.

KEY FINDINGS

The study examined environmental sustainability policy and practice in Qatar Foundation's Education City in the following areas: (i) the strategic intersections of QF and the QNV; (ii) student-related activities in EC; and (iii) the environmental attitudes and self-reported behavior of EC's undergraduate students. By examining alignment along and between these different levels, the study sought to determine whether, from these perspectives, Education City can be considered a "green beacon" that provides inspiration for the entire country, and/or whether it perhaps resembles a series of "green islands," where institutions operate in silos, with little connection and coordination.

The study's overall conclusions are relatively clear: at the strategic level, in particular with regard to its own research activities, Qatar Foundation is well aligned with the National Vision and, despite its primary focus on knowledge-economy building, shows consistent leadership in the area of environmental sustainability. At the level of student-related activities in Education City, a slightly more mixed picture emerges: a number of projects and programs are the first of their kind in Qatar. However, through a careful look at the variability in sustainability programs and practices across campuses within Education City, and shortcomings in impact monitoring and coordination of activities, a configuration more reminiscent of an "archipelago" emerges. The attitudes and behavior of Education City's students collected through the survey point towards a similar assessment: while the majority of students report positive attitudes towards environmental sustainability and conservation, the data suggests substantial variability in behavior patterns within universities and from one university to another. What follows is a set of broader conclusions from each part of the study.

PART I: STRATEGY

Since its publication in 2008, the QNV has become widely adopted and cited by public and private sector organizations alike. Qatar Foundation, too, sees its own function as central to the realization of the human development pillar of the Vision. Despite QF's private character, given its direction by the country's top leadership, its role is inevitably entangled with government goals and policies. For

⁵According to the latest Environmental Performance Index, published annually by the universities of Yale and Columbia, Qatar ranks as 100th out of 132 countries and, according to the World Bank, has the world's highest per capita rate of carbon dioxide emissions. Yale University, "Environmental Performance Index 2012" [<http://epi.yale.edu/epi2012/rankings>], accessed in June 2013; The World Bank. "Data: CO2 emissions (metric tons per capita)" [<http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>], accessed in June 2013.

⁶General Secretariat for Development Planning (GSDP), *Qatar National Vision 2030* (Doha: GSDP, July 2008).

⁷"Knowledge-based society" has been common in Qatar Foundation's rhetoric. See e.g. Qatar Foundation, *Annual Report July '07- June '08: Building a Knowledge-Based Society* (Doha: QF, undated).

⁸The Project on Middle East Political Science, "Princes, Brokers, and Bureaucrats: Oil and the State in Saudi Arabia — A Conversation with Steffen Hertog," 29 March 2011 [<http://pomeps.org/event/princes-brokers-and-bureaucrats-oil-and-the-state-in-saudi-arabia-a-conversation-with-steffen-hertog/#sthash.cTdeHdQu.dpuf>], accessed in June 2013.

example, the QNV document speaks about the importance of building a knowledge-economy to enable the country to compete internationally, and sets the goal of becoming the region's knowledge hub—both goals in which QF undoubtedly is providing leadership. In addition to these human and economic development-related goals, QF's vision and mission has in the past years broadened to include goals in the two other areas of sustainable development.⁹

Thanks to QF's institutional independence and consistent policies, supported by long-term key technocrats, QF has been able to move fast and implement a number of ambitious projects, including those relating to environmental sustainability. The environment became one of the core foci of QF's Research Division around 2007–2008, and was consolidated in the Qatar National Research Strategy launched in 2013.¹⁰ Over the past six to seven years, a number of institutions have been established and strategically streamlined according to these focal areas. QF's building and infrastructure projects have also started consistently applying sustainable construction methods over this time. However, with regard to the individual universities of Education City, an examination of available QF annual reports indicates little top-level strategic emphasis in the area of environmental sustainability.¹¹

The emergence of environmental sustainability as a theme on QF's agenda coinciding with the launch of the QNV is not a coincidence as these two are deeply linked: the strategy-level analysis by the team suggests that QF's focus on knowledge society was a key influence of the QNV, whilst the QNV has provided alignment to a number of QF's strategies and initiatives since its announcement, including on the environment.

PART II: INITIATIVES

Since its establishment the mid-1990s, Education City has developed into a vibrant “multiversity”¹² and a melting pot of cultures. It currently hosts most of QF's over 80 member organizations, including six top US universities that offer undergraduate degrees to qualified Qatari and foreign nationals. Whereas QF as an organization can be characterized as an island of efficiency, its geographic home, Education City, requires a more nuanced description: on a macro level, Education City's physical separation from Doha gives it a feel of an island, or oasis; on a micro level, its member universities operate individually, in “academic silos”, with only loose coordination by QF¹³. The university campuses are also located relatively far from each other, which in Qatar's harsh climate decreases mobility and exchange between the different buildings. In other words, Education City is an island of efficiency in Doha, but from within, it resembles more an archipelago. This has important implications for environmental sustainability activities, as shown by the team's analysis.

Despite the recent inclusion of environmental themes on QF's agenda, Education City has already managed to emerge as a national pioneer in environmental research, research and development and in implementing environmental sustainability projects. These include the establishment of a solar panel test facility, a number of groundbreaking sustainable and LEED-certified buildings, environmental education events and programs, and recycling pilot projects. Table 1 illustrates a number of examples collected by the team from Internet sources, official press releases and stakeholder interviews, and arranged into categories based on their initiator.

Apart from the EC universities themselves, a few Education City-wide QF services that relate to students were explored by the team, including the Sustainability Education Coordination (SEC) of the Education Division, and the Capital Projects Division. Initiatives by the SEC since 2010 have included: recycling and related awareness events in the student dorms; on-campus student jobs promoting sustainability; and environmental education events and annual fairs on campus. Among other infrastructure projects, QF's Capital Projects Division has led the development of new residence halls, reported to be the world's largest concentration of platinum LEED certified buildings. The division is

⁹Qatar Foundation, “About Qatar Foundation” [<http://www.qf.org.qa/about>], accessed in May 2013. The environmental focus is evident on the agendas of QF's Research and Capital Projects Divisions, amongst others.

¹⁰Qatar Foundation, *Exhibition Book 2011, Qatar Foundation Annual Research Forum* (Doha: QF, 2011), 21; Qatar Foundation, *Qatar National Research Strategy. Executive Summary* (Doha: QF, 2013), 4.

¹¹Nb. Annual reports were only available on the QF website for: 2007–08; 2008–09; 2009–10; and 2010–11.

¹²S. Caton and N. Ardan, *New Arab Urbanism: The Challenge to Sustainability and Culture in the Gulf*. Final Report (Cambridge: Harvard Kennedy School Middle East Initiative, 2010), 38–9, 103.

¹³*Ibid.*, 93; Job advertisement: “Assistant Vice President for Faculty and Student Services at Qatar Foundation in Qatar,” 10 July 2007. Announced by: Director for Academic Affairs, Education Division, Qatar Foundation.

Table 1. Examples of environmental sustainability initiatives in Education City, as of January 2013.*

Area/institution	Type of activity	Description
(i) RESEARCH, R&D, TECHNOLOGY DEVELOPMENT (Research Division)		
Qatar Environment and Energy Research Institute	RESEARCH PROJECTS	Solar desalination and air quality management; Broad focus on the water-energy-food nexus.
Qatar Science and Technology Park	RESEARCH PROJECTS	Production of biofuel from aquatic photosynthetic microorganisms for transport industry (QSTP, Qatar Airways and TAMU-Q); low-carbon concrete development (QSTP, Gulf Organisation for Research and Development and others).
	EVENT	TECHtalks events series, with focus on sustainability (2013).
	EVENT	Shell Eco-Marathon, Shell-sponsored energy efficiency competition in Malaysia (July 2012), with student participants TAMU-Q.
	INVESTMENT	£250 m venture capital fund for renewable energy projects, joint investment by Qatar Investment Authority and UK govt. (2008).
	JVs ('innovation centers')	ConocoPhillips Global Water Sustainability Centre; Qatar Center for Coastal Research (ExxonMobil, 2010); Chevron Center for Sustainable Energy Efficiency.
	PROJECT TV SERIES	GreenGulf solar testing facility (inaugurated in 2012). Khayal Production: Stars of Science TV Show for young people
(ii) QF EDUCATION DIVISION		
QF Student Services/ Sustainability Education	EVENTS	Qatar Environmental Education Fair (annual); Campus Conversations: The Impact of Climate Change on Food Security (November 2011); Climate change film series (2012).
QF Student Services/ Sustainability Education	PROGRAMS	Sustainable Living Ambassador program for students; Sustainability internships for students.
(iii) QF INFRASTRUCTURE, BUILDINGS AND DEVELOPMENT PROJECTS (Capital Projects Division)		
(Various)	BUILDINGS	Energy efficient buildings in Education City, incl. LEED-certified National Convention Center (gold) & student residences (platinum).
(Siemens)	TRANSPORT	Energy efficient tram system for EC: 11.5 km & 25 stations (2015).
	PROGRAM, PRACTICES	Recycling program in EC: bins in various areas for cans, plastic and paper, including at the Student Center and residence halls.
(iv) EDUCATION CITY UNIVERSITIES ("Haman bin Khalifa University", Education Division)		
Carnegie Mellon University in Qatar	PROJECT	Youth initiative aimed at mapping of Qatar's Mangroves (jointly with Qatar Foundation International and Conservation Intl.).
Georgetown University School of Foreign Service in Qatar	PRACTICES, PROGRAMS	Paper products: "Reduce Reuse Recycle" (result: 25% reduction); energy management: (result: 32% reduction); water conservation and reducing the use of bottle water; pilot composting program.
	COURSE, LECTURES	Ethics course on Environmental Politics for students (2012–13); Climate Change Lecture Series for the general public (2012).
Texas A&M University in Qatar	EVENT STUDENT CLUB COURSES INITIATIVE	Car-Free Day (2011) Help Out Planet Earth (HOPE) environmental club Green building workshops Qatar Sustainable Water and Energy Utilization Initiative

also working on a sustainable transport system for the area, which includes an eco-efficient light rail system and hybrid bicycles running on a combination of electricity and manual power.

By using material obtained from on-site observation and interviews with stakeholders at QF and Georgetown University's School of Foreign Service in Qatar, and students of the six American universities that offer undergraduate degrees,¹⁴ the research team produced a tentative analysis of

¹⁴It is these universities in which students spend, on average, at least four years and therefore become thoroughly acquainted with the area, through everyday classes and study and, in many cases, on-campus living, and hence were of interest for the study's third part.

Table 1 – continued

Area/institution	Type of activity	Description
(v) OTHER QF EDUCATIONAL INSTITUTIONS (Education Division)		
Academic Bridge Program	EVENT	Beach cleanup to raise awareness of the environment (2012)
Qatar Academy Senior School	COURSE	Environmental Systems and Societies, IB course for the 11th grade
	CLUB	Roots and Shoots Environmental Club
	EVENTS PROGRAM	Week without Walls; Earth Day celebrations Recycling program
(vi) OTHER QF INITIATIVES (including non-Education City)		
Qatar Foundation Intl.	PROGRAM	Youth ambassadors program, e.g. Road to Doha (2012)
Msheireb Properties	PROJECT	31 ha Doha downtown reconstruction, aiming at LEED Gold rating

* Year of the activity is listed if included in the source information. Sources consulted (autumn 2012-January 2013): Qatar Tribune; The Peninsula; QFI website, GU-Q website; Qatar Academy Annual Report 2011–12; QF website; QEERI website; QSTP and QSTP members' press releases (2006–2013); Siemens press release (2012); Msheireb website.

student-oriented environmental sustainability activities in Education City.¹⁵ The focus was on the six universities and two QF divisions, and the activities were divided according to type into: courses, research projects, awareness campaigns, clubs, lecture series and recycling programs. Based on the interview responses obtained, the team examined the (i) sustainability (durability over time), (ii) environmental sustainability impacts, and (iii) coordination of the documented environmental activities by the universities and QF.

On sustainability, environmental initiatives, in particular courses and student clubs, tend to be short-lived owing to a dependence on individuals who often spend only a few years in Education City. Environmental activities do not seem to be integrated in the strategies of the individual universities, and a number of events and programs on the QF side are initiated by a single-person unit (QF sustainability education coordination). On impacts, monitoring systems are largely lacking, but a few positive examples were registered, including utilities consumption monitoring at one university. However, no Education City-wide systems for monitoring environmental sustainability impacts (of electricity and water use or recycling, for example) were registered. On coordination, the results were mixed. Horizontal coordination exists at departmental level, for example in the area of facilities management. However, in most cases, universities implement independent environmental sustainability programs, such as recycling, and the aggregating role of QF remains relatively weak. A consistent sustainability strategy on part of the QF division in charge for buildings and infrastructure exists, but with regard to courses, events and campaigns, a silo-approach prevails, leading to a loss of important synergy potential.

Based on the responses and observation, the team also drafted a matrix on the different environmental sustainability activities in the six universities, presented in Table 2. The results, which should be regarded as indicative only, suggest that there is great variation amongst the universities in the types of activities studied.

SURVEY IN FOCUS: KEY FINDINGS AND SELECTED TABLES

From an individual's perspective environmental sustainability is generally understood as making environmentally conscious choices in everyday life, such as consuming less energy and water, producing less waste, and helping to protect the ecosystem from pollution and damage. In order to learn more about attitudes and behaviors related to environmental sustainability among undergraduate students in Education City, the research team developed an online survey, consisting of 38 questions, which was administered in November 2012-February 2013. A total of 114 responses,

¹⁵The information was collected in the spring of 2013 through qualitative, semi-structured, interviews and correspondence with student peers and a few faculty and staff members of the EC universities. The team encountered unexpected difficulties in reaching out to key informants in the universities: despite repeated attempts via different channels, only five stakeholders out of 16 directly contacted replied. The team sought additional information through on-site observation and interviews with informed students in other EC universities. The resulting inventory and analysis are therefore to be considered as indicative and non-exhaustive.

Table 2. Environmental sustainability education activities in EC universities, spring 2013.*

	Carnegie Mellon University in Qatar	Georgetown University in Qatar	Northwestern University in Qatar	Texas A&M University at Qatar	Virginia Commonwealth University in Qatar	Weill Cornell Medical College in Qatar
Courses	?	1	?	1	?	?
Awareness and other programs	?	1	?	1	1	?
Student clubs	1	1	?	1	1	1
Recycling: paper	1	1	1	1	1	0
Recycling: plastic	0	1	1	0	0	0
Recycling: cans	0	1	1	0	0	0
Total	2	6	3	4	3	1

Key: 1 = type of activity registered; 0 = no activities reported; ? = activities may exist/have existed but available information indicated none.
 *NB. This matrix, as noted in the text, is not comprehensive and should therefore be treated as a preliminary assessment. Importantly, it examines environmental sustainability activities from a student perspective only. Sources: On-site observation by research team; faculty and students at SFSQ; students at CMU-Q, NU-Q, TAMU-Q, VCU-Q and WCMC-Q, April-May 2013.

equaling to 6.4% of all students, were obtained. Given the resource limitations set by the nature of the research program, the survey responses were obtained through a convenience sample, which limited the generalizability of the results.¹⁶ Also, given the survey distribution methods, some groups were overrepresented in the sample, including: students from team's home university, Georgetown University in Qatar (GU-Q); male respondents; and on-campus students. Thus, the results of the survey are rough indicators of trends rather than reliable population estimates. The summary below presents a selection of tables, out of a total of 21 that were produced as part of the survey analysis.¹⁷

Regarding attitudes towards the environment, close to two-thirds identified themselves as having a strong sensitivity to environmental issues, as shown in Table 3. Variation between campuses in the proportions was, however, high, but possibly attributable to the small sample sizes. Nearly all respondents agreed with statements associated with environmentally sensitive attitudes and two-thirds welcomed more sustainability initiatives at Education City (see: Table 4).

Survey respondents expressed the most concern for environmental challenges that touch their everyday lives, with food wastage, high consumption of electricity and water, and insufficient public transport as the top concerns (see: Table 5). Similar patterns were observable in awareness on existing and planned Education City-wide sustainability programs, including shuttle buses, sustainable buildings and bicycle lanes. The students expressed most preference for learning about sustainability through social media and on-campus signs.

Regarding self-reported behavior, the survey results were more mixed. Four areas of behavior with environmental impacts were measured: transport, water use, electricity use and recycling. Given Qatar's climate, Education City's location and the low availability of public transport, over a third of students surveyed travel to university by car or taxi. The rest either take a shuttle bus (available within Education City) or walk. Only a fourth of students surveyed own a car and car ownership increases with seniority. At least some form of water conservation is reportedly practiced by close to 80% of students and only a third of car owners had washed their car more than twice in the past month. However, despite the fact that using tap water (produced through desalination, a highly energy intensive process) for washing cars has been criminalized in Qatar, only two respondents reported using a waterless service.¹⁸ Of respondents, 66% and 80% reported turning air conditioning and lights off when exiting a room, respectively. On-campus students appear to be less likely to turn off lights and A/C. Most students, over 80%, recycle at least one item. The items most recycled (printed paper, bottles and cans) are those for which recycling bins exist in many of the campuses and residences. However, students residing

¹⁶Recruitment of subjects was conducted via e-mail appeals and face-to-face recruitment on the campus of GU-Q and at the Hamad bin Khalifa University Student Center, a QF-operated, popular gathering point for students of all EC campuses. All respondents were undergraduate students enrolled at a university in EC and 18 years old or older.

¹⁷Questions in the survey were partly adapted from earlier environmental sustainability surveys by: Environment Agency – Abu Dhabi (UAE), Macalester College (US), University of Connecticut (US), and Red River College (Canada).

¹⁸It should be noted that the team could not verify the share of car wash services in Qatar that use non-potable water or have water recycling systems in place.

Table 3. Student sensitivity to environmental issues by branch campus.

	Carnegie Mellon University in Qatar	Georgetown University in Qatar	Northwestern University in Qatar	Texas A&M University at Qatar	Virginia Commonwealth University in Qatar	Weill Cornell Medical College in Qatar	Total
Strong	79.3% (23)	58.3% (28)	100.0% (5)	37.5% (6)	87.5% (7)	62.5% (5)	64.9% (74)
Low	20.7% (6)	41.7% (20)	0.0% (0)	62.5% (10)	12.5% (1)	37.5% (3)	35.1% (40)
Total (n=)	29	48	5	16	8	8	114

Question: Considering your stay in Education City or your University thus far, what would you say is your sensitivity to environmental issues?

Table 4. Attitudes about responsibility for the environment and sustainability in EC.

Statement	Carnegie Mellon University in Qatar	Georgetown University in Qatar	Northwestern University in Qatar	Texas A&M University at Qatar	Virginia Commonwealth University in Qatar	Weill Cornell Medical College in Qatar	Total
Feel responsible for future	96.4% (27)	93.7% (45)	100% (5)	93.8% (15)	100% (8)	100% (8)	108
Consider changing lifestyle	96.4% (27)	95.9% (46)	100% (5)	100% (16)	100% (8)	100% (8)	110
Want more sustainable campus	100% (28)	97.9% (47)	100% (5)	93.8% (15)	100% (8)	100% (8)	111
Enough EC sustainability initiatives	75% (21)	72.2% (35)	60% (3)	43.8% (7)	57.2% (4)	75% (6)	76
Total (n=)	28	48	5	16	8	8	114

Question: Please indicate your level of agreement with the following statements: strongly agree, somewhat agree, somewhat disagree, strongly disagree. For the purposes of this table, "strongly agree" and "somewhat agree" have been combined.

on-campus seem to recycle substantially less (68%) at their universities than off-campus students (84%), as shown by Table 6. This finding merits a further inquiry as for the reason.

Many in Education City express doubt whether materials dropped in recycling receptacles are actually recycled and reprocessed.¹⁹ According to the sample, 45% of respondents expressed some amount of confidence in the recycling program, while a striking 50% expressed little or no confidence (the rest were not sure). Perhaps somewhat unexpectedly, results indicate that confidence about the destiny of items dropped in recycling bins does not have a significant impact on an individual's choice to recycle, as observable in Table 7. However, a number of respondents called for more, better and more clearly labeled recycling bins in all student-related areas.

The correlation between attitudes and reported behavior is a more complex question.²⁰ At the root of the question about the connection between attitudes and behaviors is the question of whether pro-sustainability policies, activities or awareness campaigns at an institution have an impact on pro-sustainability attitudes and behavior: If policies can change behavior, will attitudes follow? At a university, if education can change attitudes will behavior follow?

On the one hand, the survey results showed a nearly complete consensus among students about the importance of their concern for the environment (see: Table 4). With only a handful of exceptions, students said they felt responsible for the future of the environment, would consider changing their behavior to improve the environment, and wanted to see more support for sustainability on campus.

¹⁹In addition to open-ended survey responses, a discussion at the end of the team's presentation of its preliminary results at GU-Q on 28 January 2013 heard a number of interventions on this topic.

²⁰There is much debate in the social sciences about whether attitudes precede or follow behavior. See e.g.: I. Ajzen and M. Fishbein, "The Influence of Attitudes on Behavior," in D. Albarracín, B. T. Johnson, and M. P. Zanna (eds.), *The Handbook of Attitudes* (Mahwah, NJ: Erlbaum, 2005). Our research design can only observe correlation, not causality, and thus we make no judgment about whether one factor is more influential than the other.

Table 5. Student perception of the most important environmental challenges.

Environmental challenge	% (n = 113)
Food wastage	52.6% (60)
High per capita consumption of electricity and water	50% (57)
Insufficient public transport networks and options	43.8% (50)
Lack of environmental education/literacy	31.6% (36)
Lack of recycling	30.7% (35)
Water security	29.8% (34)
Air pollution	28.1% (32)
Climate change	22.8% (26)
Trash/littering	19.3% (22)
High greenhouse gas emissions per capita	19.3% (22)
Hazardous waste	11.4% (13)
Food insecurity	8.8% (10)

Question: Of the following environmental challenges, what are you most concerned about living in Qatar? Please select the three most important ones for you.

Table 6. Comparison of on and off-campus students' reported recycling behavior.

Items recycled	Recycle at residence halls	Recycle at university	Recycle at university
	<i>On-Campus students</i> (n = 76), % (number) (a)	<i>On-Campus students</i> (n = 75), % (number) (b)	<i>Off-campus students</i> (n = 38), % (number) (c)
Newspapers	19.7% (15)	17.3% (13)	31.6% (12)
Bottles/cans	67.1% (51)	41.3% (31)	52.6% (20)
Printed paper	50% (38)	54.7% (41)	73.7% (28)
Cardboard	17.1% (13)	13.3% (10)	18.4% (7)
Clothes	19.7% (15)	2.7% (2)	2.6% (1)
I do not recycle	17.1% (13)	32% (24)	15.8% (6)

Table 7. Recycling behavior and confidence in recycling programs.

Confidence level	Does not recycle any items	Recycles one or more item
More confident	51.9% (14)	46.2% (37)
Less confident	48.1% (13)	53.8% (43)
Total*	27	80

Question: How confident are you that items placed in recycling bins at Education City are actually being recycled and reprocessed?

* "Not Sure" and missing data (n = 7) excluded.

This partly reflects a global trend in public opinion in favor of the environment;²¹ a strong relationship between youth and pro-sustainability attitudes, consistently demonstrated in public opinion polls;²² and presumably, in part the students' exposure to EC initiatives and education. Also over 60% of respondents felt that their attitudes vis-à-vis the environment had changed as a result of their EC experience, as illustrated by Table 8.

On the other hand, the results for specific questions about pro-sustainability behavior (see for example Table 6) consistently show much smaller percentages of students who actually adopt sustainable practices (even though the base rate of pro-sustainability behavior is reasonably high). Clearly, behavior does not fully match up with the high-consensus high-value sentiments ascribed by students to environmental issues. The source of this discrepancy between attitudes and behavior is not easily identified by this study. However, it is reasonable to expect that variation in the accessibility of recycling programs, other sustainability programs, as well as the extreme climate conditions in Doha, are amongst the likely contributors.

A comparison of students' attitudes about the environment with their own assessment of Education City's impact on these attitudes indicated that those students who feel that there has been an impact

²¹Pew Research Global Attitudes Project, "Chapter 8: Environmental Issues," in, *Muslim Disappointment: Obama More Popular Abroad Than at Home, Global Image of U.S. Continues to Benefit* (Washington, DC: Pew Research Center, 2010).

²²J. Boeve-de Pauw and P. Van Petegem, "A Cross-National Perspective on Youth Environmental Attitudes," *Environmentalist* 30 (2010), 133–44.

Table 8. Education City's influence on student attitudes about the environment.

Statement	% (n=)
My attitudes about environmental issues have been strongly affected by my university experience in Qatar.	16.7% (9)
My attitudes about environmental issues have been somewhat affected by my university experience in Qatar.	52.6% (60)
My attitudes about environmental issues have not been affected by my university experience in Qatar.	30.7% (35)
Total	114

Question: Overall, considering your experience at your university thus far, which of the following statements best applies to you?

are three times more likely to characterize themselves as having strong sensitivity to environmental issues than low sensitivity. A comparison of recyclers and non-recyclers with self-assessment of Education City's impact yielded similar results. Overall, the survey responses suggest that having effective programs to support environmental sustainability in Education City results in positive changes toward pro-sustainability attitudes and behavior.

CONCLUSION

The recommendations of this study focus on how to improve the effectiveness of Education City's environmental sustainability projects and their outcomes. Suggestions for further research on the topic are also made. Recommendations arising from research findings in Part II relate to better alignment of environmental sustainability activities, which should take place both amongst the universities and through coordination and active encouragement. Support by the QF would bring important efficiency gains for all parts: through shared courses, environmental campaigns and events, the sustenance of the theme of environmental sustainability at the universities, and Education City more broadly, would become more institutionalized and no longer depend on individuals. Consistent and sustained monitoring of the results of environmental initiatives would not only help in planning, but data collected can also be used for awareness-raising purposes. Finally, effective and regular coordination networks that link QF to its branch campuses and the campuses to each other would enable information-sharing (including on lessons learned), and most likely decrease duplication and increase cooperation and, hence, the effectiveness of all forms of activities.

The results of the survey analysis (Part III) bear a number of lessons for policy-making and planning in Education City: first, difficulties faced by the team in obtaining information on activities from the different universities seems to confirm the findings in Part II, that environmental sustainability is not an institutionalized goal in the universities and that these operate largely in silos in this respect. Secondly, based on this survey, the undergraduate students of Education City welcome more environmental sustainability activities, and their message may best be delivered through themes and issues that are part of the student's everyday lives, given that these are the ones to which students attach the most importance. Students are, in general, aware of the existence of recycling programs, and these could be easily be incorporated Education City-wide, given the previous experience at two universities that already work with three types of recyclables. Thirdly, there is considerable variation in student behavior in relation to environmentally friendly lifestyles. This—together with the study's finding that effective environmental education programs are associated with increased environmentally friendly behavior among students—indicates that a more consistent, Education City-wide approach to environmental sustainability in action could result in a more consistent set of behaviors.

The survey conducted by the research team was perhaps the first Education City-wide attempt at collecting data on environmental attitudes and behavior among students. Given the small sample size and the use of a convenience sample, the findings from the survey were largely preliminary. Some important themes, however, were revealed that are supported by findings in other parts of the study. Some recommendations are clear and can be implemented immediately, whereas a more nuanced understanding of the dynamics of environmental education in Education City will require new surveys. One possibility would be to incorporate questions from this survey in future surveys in order to start creating a time series. Other tasks for further research projects include more in-depth questions on behavior (or using a fixed indicator, such as the environmental footprint) and a true probability sample.

Broad dissemination of the results of this and future surveys on the topic will also help both in the planning of future policies and programs and in drawing attention to this topic.

Competing interests: The authors have declared that no competing interests exist.

Funding sources: Qatar National Research Fund, Undergraduate Research Experience Program.

Authors' contributions: All authors contributed substantially to this study and have read and given their approval for the final manuscript.

Acknowledgements

This study was made possible by an Undergraduate Research Experience Program award from the Qatar National Research Fund, a member of The Qatar Foundation. The statements made herein are solely the responsibility of the authors.