Johns Hopkins University

BRINGING ARTS, HUMANITIES, AND STEMM TOGETHER: A PROFILE SYSTEM FOR FACILITATING INTERDISCIPLINARY COLLABORATION WITHIN EDUCATION CITY, QATAR

by
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Abstract

As part of its effort to enhance its Higher Education Strategy, the Qatar Foundation (QF) has explored approaches to increase interdisciplinary and cross-disciplinary experiences for undergraduate and graduate students within its partner universities based in Education City, in Doha, the capital of Qatar. These approaches are built around sharing best practices and effective policies that encourage interdisciplinary curricula and programs as well as research collaborations between different academic entities within Education City.

Solving complex problems may require expertise originating from multiple disciplines, hence the need for multidisciplinary research projects.[1] However, a key challenge that may slow or even impede interdisciplinary and cross-disciplinary research efforts within QF is the difficulty of locating internal collaborators because of the decentralized nature of the university branch campuses.

While research collaboration and partnerships are increasingly gaining importance at both intra- and inter-institutional levels,[2] the ability to find research experts and collaborators remains a real challenge facing many institutions.[3] Currently, the information and profiles of researchers and faculty members based at QF are hosted in their respective college websites. Therefore, a researcher interested in establishing a collaboration with a fellow researcher in a particular area or discipline would need to navigate several websites to find a potential collaborator.

As there is a continuous push for more interdisciplinary collaborations in the areas of research and teaching, there is a need to find ways of encouraging this endeavor. Indeed, it is

[1] National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, *Facilitating Interdisciplinary Research* (Washington, DC: The National Academies Press, 2005), https://www.nap.edu/catalog/11153/facilitating-interdisciplinary-research.

[2] Kyle W Demes, Gail C Murphy, and Helen M Burt, "Catalyzing Clusters of Research Excellence: An Institutional Case Study" (n.d.): 15.

[3] Marlee Givens, Lisa A. Macklin, and Paolo Mangiafico, "Faculty Profile Systems: New Services and Roles for Libraries," *portal: Libraries and the Academy* 17, no. 2 (2017): 235–255, accessed March 1, 2021, https://muse.jhu.edu/article/653202.

possible that during the next decade interdisciplinary research and education will be sought after both researchers and by funding agencies.[4] Having the profiles and research interests of researchers and faculty members hosted under one online platform has the potential to facilitate communication among researchers and thus promote the chances for interdisciplinary collaborations. The author of this Capstone Project has designed a single platform that will house all the profiles of faculty and researchers who are based in Education City. In order to assess current needs and identify the gaps and barriers that hamper interdisciplinary research collaboration (IRC), this Capstone Project utilized a survey to explore the views and opinions of faculty and researchers regarding research collaboration. To attain this goal, questionnaires were emailed to 200 faculty, researchers, and academic and research deans working at EC's seven branch campuses and three research centers.

[4] Ibid.

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Glossary

SPARC	Supporting Practice in the Arts, Research and Curriculum project was funded by the Mellon foundation for a study in 2012-2015, to study about institutions' and its respective members' perspective on arts-integrative and interdisciplinary collaborations.[5]
NASEM	The National Academies of Sciences, Engineering, and Medicine provide the nation with independent, objective analysis. They advise and conduct activities to solve complex problems and inform decisions in public policy. They also encourage research and education and ensure that public understanding increase in matters of science, engineering, and medicine.[6]

[5] Veronica Dittman Stanich and Gabriel Harp, *Insights: Interdisciplinary Collaboration in the University* (The Alliance for the Arts in Research Universities, 2018), https://www.a2ru.org/wp-content/uploads/2020/11/Insights-Summary-Collaboration4_copyright.pdf.

[6] "About Us | National Academies," accessed December 23, 2020, https://www.nationalacademies.org/about.

Abbreviations

a^2ru	The Alliance for the Arts in Research Universities
EC	Education City
GU-Q	Georgetown University in Qatar
HBKU	Hamad Bin Khalifa University
IRC	Interdisciplinary Research Collaboration
NUQ	Northwestern University in Qatar
QF	Qatar Foundation
QNRF	Qatar National Research Fund
STEAM	Science, Technology, Engineering, Arts, Math
TAMUQ	Texas A&M University at Qatar
VCUarts Qatar	Virginia Commonwealth University School of the Arts in Qatar
WCM-Q	Weill Cornell Medicine-Qatar

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Chapter 1. Introduction

1.1. Background.

As part of Qatar Foundation's vision to bring top, renowned international branch campuses to Qatar in an effort to provide world class quality education, the country's leadership spearheaded the development of Education City, a 12-square meters campus, which houses multiple branch campuses of leading universities with reputable international standing. Students that graduate from these branch campuses receive the same degree as their peers in the main home campus. Education City is a member of the Qatar Foundation for Education, Science and Community Development (QF), a semi-private chartered, non-profit organization established in Qatar. Since its creation in 1995, QF has invested heavily to create an education hub and a unique ecosystem to facilitate collaboration.

As part of its effort to define its Higher Education Strategy,[1] QF has been encouraging research collaborations and partnerships between and among researchers, faculty and students. QF has also focused on exploring approaches to increase interdisciplinary and cross-disciplinary experiences for undergraduate and graduate students within its partner universities, built around sharing best practices and effective policies that encourage the development of interdisciplinary curricula and programs. At the heart of its new Higher Education Strategy is the concept of 'Multiversity', which is an innovative model whereby program units come together to offer a multidisciplinary program that integrates arts and humanities with the sciences.

As QF is pushing for a more interdisciplinary approach within EC, it is also looking at ways of enhancing this collaboration. Under Her Highness Sheikha Moza Bint Nasser's leadership, the vision of Qatar Foundations highlights the need to bring the strengths of different campuses

[1] Hend I. Zainal, e-mail message to author, March 21, 2019

together to bring a new global opportunity. In her last interview with Bloomberg, Her Excellency Sheikha Hind, stated: "Research and Development is indeed central to QF's overarching mission, as it allows for the possibility of delivering tangible results from our investment in education … we are working to create greater synergies among our member organizations and through international partnerships."[2]

However, these ambitious endeavors continue to encounter challenges. For example, Education City faces the challenge of locating collaborators in a decentralized university environment. Because complex problems require expertise from multiple perspectives, and to overcome problems associated with the dearth of collaborative research, QF has in recent years consulted with NASEM to review the EC ecosystem and to find ways to address existing challenges and to increase multiversity and interdisciplinary research.

Research is a critical part of modern educational systems, especially as they help in addressing the many problems facing the modern era. Research that examines such problems effectively has the potential of providing feasible and suitable solutions.[3] These problems are diverse and mainly comprise issues related to engineering, health and medicine, and the environment. Prominent skills that may assist in finding solutions to many of the world's ills can be developed within key fields of study such as the different science disciplines grouped under the acronym STEMM (i.e., science, technology, engineering, mathematics, and manufacturing). STEMM, a broad term that brings together these disciplines, is a term that is widely used when looking at

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[2] "Sheikha Hind Bint Hamad Al Thani, Vice-Chairperson and CEO, Qatar Foundation (QF): Interview," *Oxford Business Group*, last modified July 31, 2016, accessed January 2, 2021, https://oxfordbusinessgroup.com/interview/culture-excellence-obg-talks-sheikha-hind-bint-hamad-al-thani-vice-chairperson-and-ceo-qatar.

[3] Laura Petri, "Concept Analysis of Interdisciplinary Collaboration," *Nursing Forum 45*, no. 2 (June 2010): 73–82.,accessed November 30, 2020, https://doi.org/10.1111/j.1744-6198.2010.00167.x.

the issues in educational policies[4] and when trying to improve the research quality of teaching these disciplines. Different disciplines have some research gaps that require an effective research plan and research methodology to be put in place.[5] In addition to this, encompassing concepts from other fields can also be helpful in addressing these gaps.[6] A number of countries have tried to create collaborative platforms that may remove or at least reduce communication barriers between experts within a particular field.

This shared platform will assist in facilitating collaboration among researchers with shared or mutual interests, such as experts in the domain of mechanical engineering, who can collaborate with researchers who can assess the profile of other mechanical engineering experts.[7] This solution has already been implemented in different universities around the globe and the results have proved fruitful. The central disciplinary model of the University of Michigan, USA illustrates improvements in research methodology for the researchers.[8]

Qatar is one such country that is in need of a common online platform to bolster research between individuals in order to raise the quality of research in the country by aiding researchers to get assistance from experts in their respective fields. Interdisciplinary researcher collaboration can result in the free flow of ideas across disciplines, permitting a larger set of knowledge to be

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[4] "Science, Technology, Engineering, and Mathematics," *Wikipedia*, March 1, 2021, accessed March 1, 2021, https://en.wikipedia.org/w/index.php?title=Science,_technology,_engineering,_and_mathematics&oldid=1009635283.

[5] Sally W Aboelela et al., "Defining Interdisciplinary Research: Conclusions from a Critical Review of the Literature," *Health services research* 42, no. 1 Pt 1 (February 2007): 329–346, https://pubmed.ncbi.nlm.nih.gov/17355595.

[6] Ibid.

[7] Daniel de Vise, "University of Michigan Creates Model for Instant Research Funding," *Washington Post*, May 9, 2012, accessed December 22, 2020, https://www.washingtonpost.com/blogs/college-inc/post/university-of-michigan-creates-model-for-instant-research-funding/2012/05/09/gIQAn7uuCU_blog.html.

[8] Ibid.

made available to groups of researchers.[9] Furthermore, collaboration between and among researchers can also make it possible to approach a particular problem from different perspectives, which may lead to team-based solutions that may not otherwise be reached through individual efforts.

1.2. Statement of the Problem.

Collaborative research can improve outcomes because researchers, both as individuals and as groups, have a pool of expertise that they can share and exploit to address existing research gaps. Many higher education institutions are increasingly promoting interdisciplinary research to improve the quality of education they offer across different disciplines. For example, many American universities have been actively engaged in implementing interdisciplinary research programs since World War I to promote research and innovation in different fields, including engineering, medicine, life sciences and political sciences.[10] The State of Qatar has brought different international universities, mainly American, university branch campuses to the Education City and located the branch campuses next to each other to enhance the quality of education and promote collaboration between different universities.

However, based on the author's knowledge and insight within the QF research ecosystem, Qatar Foundation has no formal structure to oversee or facilitate such a collaboration. The lack of a centralized system makes it difficult for researchers to find fellow researchers who may be interested in collaborating and/or who have prior expertise in a similar or related field. A centralized system, such as an online platform, can also help in collecting relevant information

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[9] Kyle W. Demes, Gail C. Murphy, and Helen M. Burt, "Catalyzing Clusters of Research Excellence: An Institutional Case Study.," *Undefined*, last modified 2019, accessed November 19, 2020, /paper/Catalyzing-Clusters-of-Research-Excellence%3A-An-Case-Demes-Murphy/62d5631c22f19e8fdf024150d11051a28d32d651.

[10] Glenn R. Allen, "Mechatronics Engineering: A Critical Need for This Interdisciplinary Approach to Engineering Education.," in *The 2006 IJME*, 2006, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.545.7944&rep=rep1&type=pdf.

related to researchers from different domains, using university websites or by directly contacting researchers. There is also a need to examine the current state of IRC within EC and identify the factors that hinder IRC. To that end, this capstone project will provide a platform that has the potential of filling this gap and recommendations to facilitate IRC.

1.3. Project Question.

This Capstone Project will explore if a centralized online web platform is a viable option for providing accessibility and support to enhance interdisciplinary research productivity within Education City and identify other challenges hindering greater interdisciplinary collaborations across EC campuses.

1.4. Project Objectives.

As was stated previously (Section 1.1), the Qatar Foundation plays a major role in bolstering interdisciplinary research that is key to solving complex problems. Many modern-day problems require insights from more than just one particular discipline; adequate solutions often need to be informed by ideas gleaned from different disciplines and this is where interdisciplinary research is important. However, many researchers in EC find it difficult to apply an interdisciplinary approach in most of the work they conduct because this requires connecting with peers from other fields at different campuses.

QF seeks to promote a culture of interdisciplinary research within EC. To respond to the need for an interdisciplinary platform, this project is focused on implementing an interdisciplinary approach to collaborative research in Qatar. In so doing, it examined the key factors that hinder interdisciplinary research undertaking in EC. As such, the project seeks to provide suggestions for alleviating salient barriers associated with the implementation process. Insights for the current

research were gleaned from a study titled *Faculty profile systems: New services and roles for libraries*[11] and the SPARC report.[12]

Thus, the project objectives are as follows:

1) To identify the barriers that hinder interdisciplinary collaboration at Education City and provide suggestions for alleviating these barriers.

2) To examine how interdisciplinary collaboration may be improved and what should be expected from an interdisciplinary system.

3) To confirm the value of an online web platform for facilitating interdisciplinary collaboration.

1.5. Significance of the Project.

At present, different researchers have their profile stored in their own university databases. There is evidence that suggests that

> Universities implement faculty profile systems to fill these and other needs. Profile systems make it easier for faculty to highlight and make accessible their work to a global audience, for students to learn more about their professors and advisers, for university administrators to track and understand the impact of scholarly outputs from programs and grants, and for the media, industry, and the general public to find university experts, among other things."[13]

Currently QF does not have such central database at where the profiles of EC researchers are housed. It is difficult for new researchers to find fellow researchers to collaborate with, and subsequently would need to work with experts from other fields to conduct interdisciplinary research. Herein lies the importance of the present project.

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[11] Givens, Macklin, and Mangiafico, "Faculty Profile Systems."

[12] Stanich and Harp, *Insights: Interdisciplinary Collaboration in the University*.

[13] Marlee Given, Lisa A. Macklin, and Paolo Mangiafico, "Faculty profile systems: New services and roles for libraries," *Portal: Libraries and the Academy*, 17, no.2 (April 2017): 235-255 accessed September 30, 2020, https://doi.org/10.1353/pla.2017.0014.

The significance of interdisciplinary research cannot be overstated mainly because it has become a key, multi-faceted tool for solving complex problems in the modern era. For example, a complex problem in art may not only involve the major concepts of art but may also need some expertise from the field of engineering. Thus, studying a complex art problem from a multidisciplinary point of view may bring up a more feasible and suitable solution as compared to an approach based on a single discipline.

Moreover, the centralized system of researcher and faculty member profiles would aid in facilitating collaboration and networking in Education City.[14] The significance of the online platform is to allow a researcher to log in to the central portal and view the profiles and expertise of different faculty members and researchers working in different institutes in Qatar. This would aid researchers in reaching out to collaborate in interdisciplinary research. However, this is only one solution to facilitate IRC, there are other factors that can hinder IRC that need to be examined. Hence the author engaged the stakeholders of the EC ecosystem to contribute to the discussion on how to improve the IRC at EC and to spur their ideas for improvements.

1.6. Exclusions and Limitations.

This website platform is limited to QF but could benefit other research institutions in Qatar as well as the broader Arab and MENA region. Hence, the project excludes researchers and medical doctors at other well-established universities and research centers.[15] The present project excludes these stakeholders at this point as it requires a longer timeline. The platform will serve as a model that can be later applied and extended to include the wider research community.

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[14] Sciences, National Academies of. "The Integration of the Humanities and Arts with Sciences, Engineering, and Medicine in Higher Education: Branches from the Same Tree." Branches from the Same Tree | The National Academies Press, May 7, 2018. https://www.nap.edu/catalog/24988/the-integration-of-the-humanities-and-arts-with-sciences-engineering-and-medicine-in-higher-education.

[15] Hamad Medical Corporation and Qatar University's faculty and researchers.

Chapter 2. Literature Review

2.1. Overview of IRC.

Interdisciplinary collaborative study is aimed at diversifying the perspective and viewpoint to advance a particular idea, view, or argument by bringing together experts from different fields. Over the past few decades benefits of such collaborative research has become evident.[16] Research shows that the merits of team-based, collaborative, and interdisciplinary research include increased productivity among researchers, greater citation impact, and increased multi-sector and community engagement.[17,18,19]

However, while some fields of study allow for collaborative research that invites researchers from different disciplines, researchers find it difficult to forge collaborations with their counterparts in other fields of interest. Nonetheless, this doesn't mean that the latter do not allow for interdisciplinary work.[20] Topics that cannot be truly explored using a single perspective may also be studied using a multidisciplinary approach.[21] There is a common argument that there is a lack of synthesis in multidisciplinary work because researchers are unaware of the standards followed in different fields.[22] For example, lack of guidance can lead to a conclusion that lacks cohesion and that may not be explained from a single-point of view.

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[16] Stefan Wuchty, Benjamin F. Jones, and Brian Uzzi, "The Increasing Dominance of Teams in Production of Knowledge," *Science* 316, no. 5827 (May 18, 2007): 1036–1039, accessed January 3, 2021, http://science.sciencemag.org/content/316/5827/1036.

[17] Sooho Lee and Barry Bozeman, "The Impact of Research Collaboration on Scientific Productivity," *Social Studies of Science* 35, no. 5 (2005): 673–702, accessed December 20, 2020, http://www.jstor.org.proxy.library.vcu.edu/stable/25046667.

[18] Benjamin F. Jones, Stefan Wuchty, and Brian Uzzi, "Multi-University Research Teams: Shifting Impact, Geography, and Stratification in Science," *Science* 322, no. 5905 (November 21, 2008): 1259–1262, accessed March 3, 2021, http://science.sciencemag.org/content/322/5905/1259.

[19] Stephanie E. Hampton and John N. Parker, "Collaboration and Productivity in Scientific Synthesis," *BioScience* 61, no. 11 (November 1, 2011): 900–910, accessed March 3, 2021, https://doi.org/10.1525/bio.2011.61.11.9.

[20] Givens, Macklin, and Mangiafico, "Faculty Profile Systems."

[21] Givens, Macklin, and Mangiafico, "Faculty Profile Systems."

[22] Veronica Dittman Stanich and Gabriel Harp, Insights: Interdisciplinary Collaboration in the University (Michigan: Arts Engine, 2019).

2.2. Importance and Challenges.

As was indicated above, studying a subject from an interdisciplinary perspective is a feasible research method that can provide a holistic view of the subject from multiple points of view. Both the importance and challenges of an interdisciplinary approach are discussed below, with specific emphasis on the area of research collaboration, which is the focus of the present study.

2.2.1. Importance of IRC.

The importance of and need for an interdisciplinary approach is particularly salient when dealing with complex problems. In the 21st century humanity is constantly faced with complex problems that exist in almost every field; these problems can be examined from a multidisciplinary perspective. An interdisciplinary approach may apply two or more theories from different disciplines to explain a certain point of view[23] and different theories may also be used to explain a complex issue that is otherwise difficult to comprehend. An added advantage of such an approach lies in that it draws upon insights of researchers and scholars who are specialized in their fields of expertise.

A recent interdisciplinary collaborative project across EC institutes illustrates not only these advantages but also commitment of EC institutes to such collaborative research. For the project, a Ph.D. student in computer science and engineering at QF member Hamad Bin Khalifa University (HBKU) is applying engineering tools to understand the educational needs of a child with autism. The researcher is working with teachers, experts in the fields of Mechanical Engineering and Information and Computing Technology.[24]

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[23] Ibid., 15.

[24] "When Cross-Campus Collaborations Offer Real-World Answers," accessed March 4, 2021, https://www.qf.org.qa/stories/when-cross-campus-collaborations-offer-real-world-answers.

In addition, adopting an interdisciplinary approach has the added advantage of deploying the best elements of two or more disciplines that can help to explain and comprehend an issue effectively. Equally important, using an interdisciplinary mode of study allows researchers to access their preferred expert from a specific field in order to be able to solve complex problems. Unsurprisingly, experienced interdisciplinary scholars are more receptive to novel ideas and conduct a detailed risk-analysis to avoid possible risks associated with their proposed solutions.

Furthermore, existing research has shown that interdisciplinary researchers are more productive, have a higher impact than single disciplinary research[25] and funding agencies realize the importance of interdisciplinary research, thus giving more attention to this type of research. For instance, the National Science Foundation and Horizon 2020 (European Union Research Framework) place a high priority and promote interdisciplinary research proposal submissions.[26]

These benefits can also be viewed as benefits to institutions. Additional institutional-level benefits include: increased external funding sources, increased partnerships and community engagement, high return on investment for internal resources, expanded networking opportunities for trainees in clusters, increased communication and outreach, and early evidence of significant impact on research.[27]

2.2.2. Challenges to IRC.

While the advantages of interdisciplinary approaches cannot be stressed enough, there are certain challenges associated with these approaches. As already mentioned, collaborations and interdisciplinarity are commonly a central theme in research strategies at universities and

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[25] Jean-Marie Bruzzese et al., "Professional Development Outcomes Associated with Interdisciplinary Research: An Integrative Review," *Nursing Outlook* 68, no. 4 (July 1, 2020): 449–458, accessed December 24, 2020, http://www.sciencedirect.com/science/article/pii/S002965541930750X.

[26] Ibid.

[27] W. Demes, C. Murphy, and M. Burt, "Catalyzing Clusters of Research Excellence."

funding agencies. However, few resources are available to the researchers, administrators and leadership of these institutions to implement these strategies.[28]

Other notable examples of these challenges include the collection of resources, developing a shared point of view, and other complexities related to the concepts used. Similarly, other problems such as these can be studied from an interdisciplinary standpoint, using several tools developed by previous research teams. One example of this type of tool is the Team Science Toolkit, "an online knowledge management system that collects and integrates TS knowledge and resources and makes them readily accessible to the public." This tool enables people to work collaboratively in a more efficient way by providing access to resources such as access to relevant publications and templates for collaboration plans.[29]

An additional problem is associated with the collection of data from different sources. Researchers often find it cumbersome to visit different university websites to study the research interests of other researchers. There is a lack of a centralized platform where researchers could find experts and their published work in specific fields.[30] Thus, different countries have established a centralized portal with the details of their faculty members of major universities.[31] This is convenient for interested individuals as they can simply log in to a single portal and type the query or researchers' names to learn about their profile. Similarly, assessing as a single central database can be relatively easy and less time-consuming as compared to checking the

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[28] Demes, Murphy, and Burt, "Catalyzing Clusters of Research Excellence: An Institutional Case Study."

[29] Amanda L. Vogel et al., "The Team Science Toolkit: Enhancing Research Collaboration Through Online Knowledge Sharing," *American Journal of Preventive Medicine* 45, no. 6 (December 1, 2013): 787–789, accessed March 29, 2021, https://www.ajpmonline.org/article/S0749-3797(13)00491-1/abstract.

[30] Givens, Macklin, and Mangiafico, "Faculty Profile Systems."

[31] Tania Leimbach and Keith Armstrong, "Improving Transdisciplinary Arts-Science Partnerships," *Integration and Implementation Insights*, last modified April 1, 2019, accessed March 2, 2021, https://i2insights.org/2019/04/02/arts-science-partnerships/.

database of every university to find out an appropriate expert (researcher) to provide an insight into the kind of research they are involved in.

Another challenge often encountered in interdisciplinary research is the silo effect, which occurs owing to the lack of a system that can facilitate communication, isolated buildings and laboratories, and the absence of a flow of information between two or more organizations or individuals. As a consequence, the silo effect prevents research from being carried out effectively. The silo effect can be prevented by understanding each other's discipline and remediating infrastructural barriers.[32]

2.3. Applicability of the Literature Review.

As illustrated in 2.2.2, the silo effect and the challenges surrounding collecting information from scattered sources are some of the key challenges that researchers face when engaging in interdisciplinary research. The literature review provides good insights into an interdisciplinary system that can be used to establish and promote interdisciplinary research within the EC.

An interdisciplinary system should comprise the profiles of faculty members/researchers and their area of expertise. This would give future researchers useful information as they could log in to a single portal and learn about other faculty members/researchers. their research affiliations, important work, and research interests.

Thus, this will be beneficial for QF as it will make its scholars and researchers more visible and their research affiliation and interdisciplinary interests exposed to others around the globe. Additionally, the proposed platform will not only facilitate communication and multi-disciplinary

[32] W. Demes, C. Murphy, and M. Burt, "Catalyzing Clusters of Research Excellence."

research, but will be a nexus for strategic partnerships with government entities, industries and businesses.

Chapter 3. Needs Assessment

3.1. Needs Assessment.

A needs assessment is conducted to analyze the gaps between the current situation of interdisciplinary research and the perceived ideal conditions. As the name indicates, this analysis was carried out to identify gaps and barriers that are related to IRC, particularly within QF. As will be seen from the results provided in chapter six below, the survey results identified the gaps, confirmed the need for an online platform and highlighted problems that researchers are facing. Since research activity at EC is growing, there is increasing demand for a centralized system where researchers will have access to the profiles of researchers and be able to contact the appropriate person(s) in order to undertake interdisciplinary research.

This centralized system will help connect interdisciplinary experts from different institutions around the country and aid researchers in finding appropriate counterparts with whom to collaborate. This will not only limit or remove the communication barrier but also save time for researchers who do not have access to the database of the relevant institution to examine the profile of expert researchers in a particular field.

3.2. The Need for a Centralized Interdisciplinary Platform.

Qatar is focusing on improving the quality of its research and education system, for this purpose, QF is continuously encouraging collaboration among the educational institutions and sharing resources. At this present time an interdisciplinary platform has not yet been established in EC in the same manner as it is established in other countries around the globe.[33] This lack of a platform for collaboration can be seen as a barrier to the research progress in Qatar.

[33] "Scholars@Duke," Duke University, accessed on November 20, 2020, https://scholars.duke.edu/.

The Qatar Foundation had invested in software tools such as Pure from Elsevier to facilitate collaboration among researchers. However, this has not been efficient as it should be as it does not address the needs of the entire community, as it's based on Scopus, which focuses on journals, which are not the main medium for humanities and arts scholarship. This has resulted in the data of scholarly products and the keywords for searching humanities and art researchers, not always representing how the researchers would describe their work.

In a homegrown web application system, interdisciplinary research gives individuals the flexibility to describe their own research. In the author's opinion, a homegrown system is much better as QF can manage, update and customize according to researchers needs. Currently, researchers looking at the EC in Qatar, have to go through the databases of different universities to learn about fellow experts in their field. As an example, if a researcher has to contact an expert in the field of electrical engineering, he or she has to go through the databases of TAMUQ, which offers programs such as electrical and mechanical engineering. The researcher furthermore has to go through additional searches in other EC institutions' databases before connecting with his or her profile match. In summation, by building this central online platform, it would be easy for a researcher to access comprehensive information that would highlight all experts in a particular field and would make it easy for the researcher to shortlist or filter to find experts according to his or her research preference and needs. This will not only increase the pace of conducting research but also attract more researchers towards EC.

3.3. Metrics and Sources.

In designing the survey instrument required for assessing the need of a centralized website, the author drew on the model utilized in the SPARC report.[34] Furthermore, the author consulted a

[34] Stanich and Harp, *Insights: Interdisciplinary Collaboration in the University*.

panel of survey research experts at the Social and Economic Survey Research Institute at Qatar University and VCU library. Insights from the panelists were very useful in the design and development of this project's survey questions. Questionnaire metrics were used to measure respondents' views and get different perspectives on research collaboration within and between EC universities.

3.4. Committees

While there were no dedicated committees to establish the need for this project, QF has been taken steps towards institutionalizing the importance of interdisciplinary research through QNRF cross sectoral clusters and by introducing multiversity courses at EC campuses. Further, the author in the role of assistant director of research at one of the EC universities, often discussed informally with counterparts during periodic coordination meetings the wish for a more structured mechanism. It is hoped that this project will pave the way for further discussion on the possibilities that lie ahead.

Chapter 4. Project Description

4.1. Description of the Project.

This capstone project proposes an online website including a mobile friendly version that is designed to foster interdisciplinary collaboration among EC faculty members and researchers. The author's idea was reinforced by an open-ended response received from the questionnaire as follows:

> If there was some kind of platform where people could share their projects and what they're looking for - so, for example, if I have a project in the arts and I want to do some kind of installation that requires some engineering work, I currently have no idea how or who to even approach from branch campuses that could help me. But if there was a platform or a way, I know who's who and what they do (kind of like a social networking app maybe? but for research and projects?) then I would know who to reach and how?[35]

The next section (4.2) will briefly describe the project elements and discuss the project design. At this stage, the first version of the website is completed and is currently tested at VCUarts Qatar. Recommendations and suggestions for QF addressing the barriers that IRC is encountering will be presented in Chapter 7.

4.2. Project Elements.

This project seeks to use an approach similar to Scholars@Duke and Mcubed initiative.[36,37] Currently, the EC's branch campuses have their own websites that follow certain format, some not easily accessible. Hence, the author proposed a centralized website including a mobile friendly version for Education City's (EC) researchers and faculty to connect, network, build interdisciplinary teams and propose projects.

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[35] Fikria El Kaouakibi, Survey results associated with Appendix 3.

[36] "Scholars@Duke | Scholars@Duke," accessed November 22, 2020, https://scholars.duke.edu/.

[3] "Mcubed | U-M Research," accessed March 23, 2021, https://research.umich.edu/mcubed.

The website will house all EC's faculty and researchers' bios and profiles, with their disciplinary affiliations and identified research interests with keywords to facilitate searches and filtering.

The online platform aims first and foremost to connect the faculty and researchers from the different branch campuses. The university's current logistic structure does not help in fostering connection and network. As faculty have quoted in the survey study on what barriers they found for research collaboration: "*On the connection side, often people just do not know each other - their teaching, their research, their interests, and skills*" and "*Getting to know people from other institutions.*"[38] Therefore, the project focuses on centralizing faculty profiles and house them under one organization such as QF.

[38] Fikria El Kaouakibi, Survey Study Results, Appendix 3.

Chapter 5. Methodology

5.1. Methodology Overview.

This chapter provides a description of the methods employed in this project, including the platform that was designed for the capstone project's purposes. It also offers a discussion of the questionnaire intended to elicit respondents' views, focusing on the importance and usefulness of IRC, the barriers facing such collaboration, as well as some proposed measures for improving IRC. The next section looks at the platform, followed by a section that explores questionnaire instrument.

5.2. Project Design and Discussion.

5.2.1. Online Platform.

The author adopted a collaborative approach in the design of an interdisciplinary research platform at QF. Given the author's lack of technical/IT background and the need to generate a substantial website, the author approached the Chief Technology Officer (CTO) at Virginia Commonwealth University's Technology Services department. The author pitched their idea, and the CTO responded positively as the initiative aligned with their strategic research goals. From that point onward, the author and CTO formed a project team and made plans to facilitate the design and management of the online platform.

The project team has developed and designed the layout for the website including a mobile friendly web application. In an initial phase, the project team has gathered a list of ideas that VCUarts Qatar faculty would like to find or see in a website that invites them to collaborate. The team came up with a list of ideas which includes features such as filter function to search for areas of project and ideas, research interests, what kind of collaboration is being sought, ability to post ideas and projects and to invite others to collaborate. The website must be user friendly and easy to navigate and does not require a lot of data entry from the researchers and faculty,

minimizing the administrative burden as much as possible. The team took all the above into consideration and developed templates that address these functionalities (Appendix 1).

5.2.2. Online Platform Design and Discussion.

With the help of the financial support of VCUarts Qatar, the author hired a web designer, a former VCUarts Qatar alumni, who provided the project team three design templates and designed a wireframe from the selected design templates. A web designer was hired to work on the website and mobile application. The scope of work was based on the selected wireframe produced by the graphic designer. The main color would be the QF colors (green and white) and the secondary color scheme would be the colors from all the institutes. The design is simple so that it is easily understandable. The homepage has a small introduction and an option to sign up for the faculty and researchers. The functioning of the website and application is solely dependent on the registered users. The profile page is a personal page where users can give detailed information about themselves so that others can see their profession to collaborate with and choose them as their project partner and vice versa. The proposal menu will give access to all the users to make a new proposal and see proposal details. The platform will help users to invite collaborator to participate in their projects and submit proposals. Similar to the Mcubed initiative from the University of Michigan,[39] an incentive-based system in the form of a capped seed funding, can be allotted to encourage proposals with interdisciplinary collaborative nature. The structure of the designed website is shown in Figure 1. The Designed Website Structure.

[39] Mcubed. (2020, October 20). Retrieved October 22, 2020, from https://research.umich.edu/mcubed

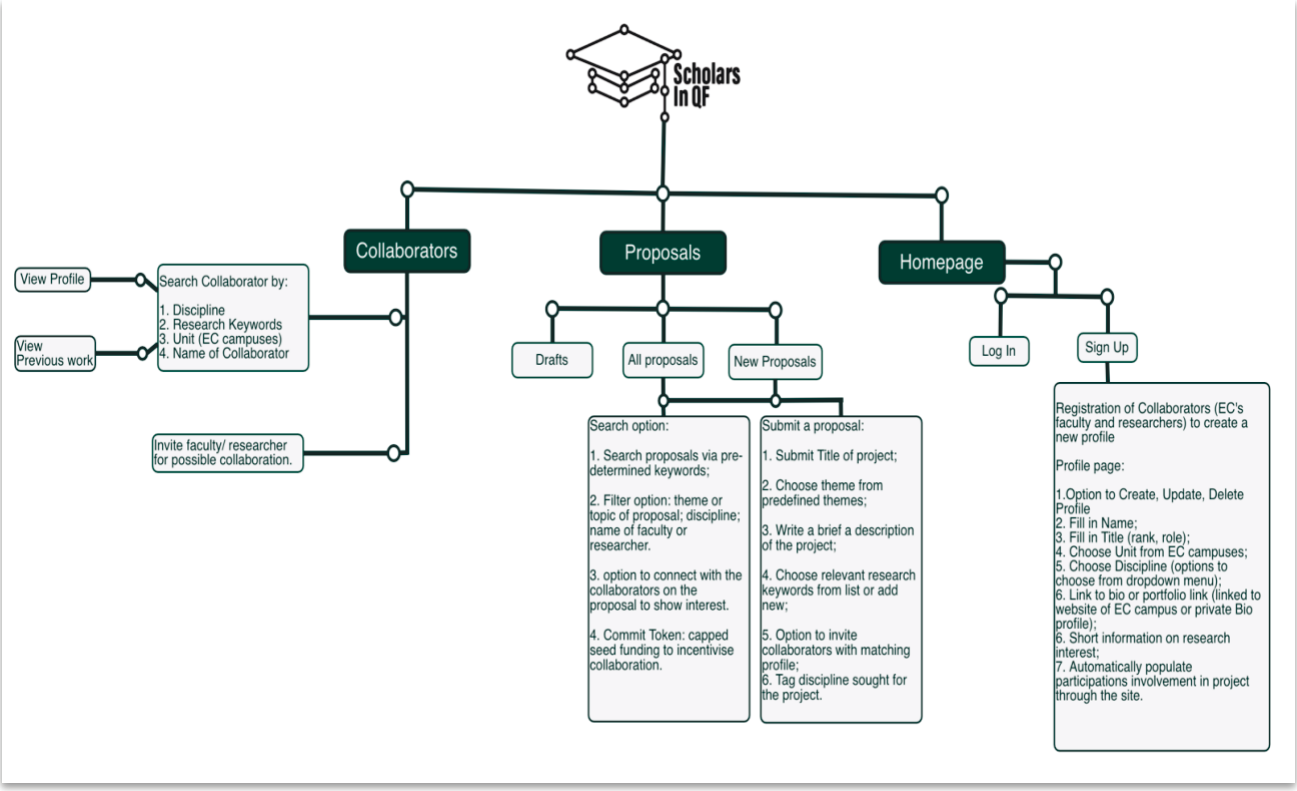

Figure 1. The Designed Website Structure.[40]

Under the proposal page, the users are able to search for proposals using keyword and discipline tags and submit proposals. In addition, the system has the option to send calls out for proposals where users will be able to request to become a collaborator on a proposal or submit an abstract for an interdisciplinary research project. The functionality will enable the proposal owner, whether or not, to accept a request of a collaborator to join the project and search for matching or specific registered profiles via keyword, unit or discipline specific search as shown in Figure 2. Search and Filter Option for Keywords.

[40] Fikria El Kaouakibi, Illustration created by the author using design tool from https://cacoo.com, January 2021

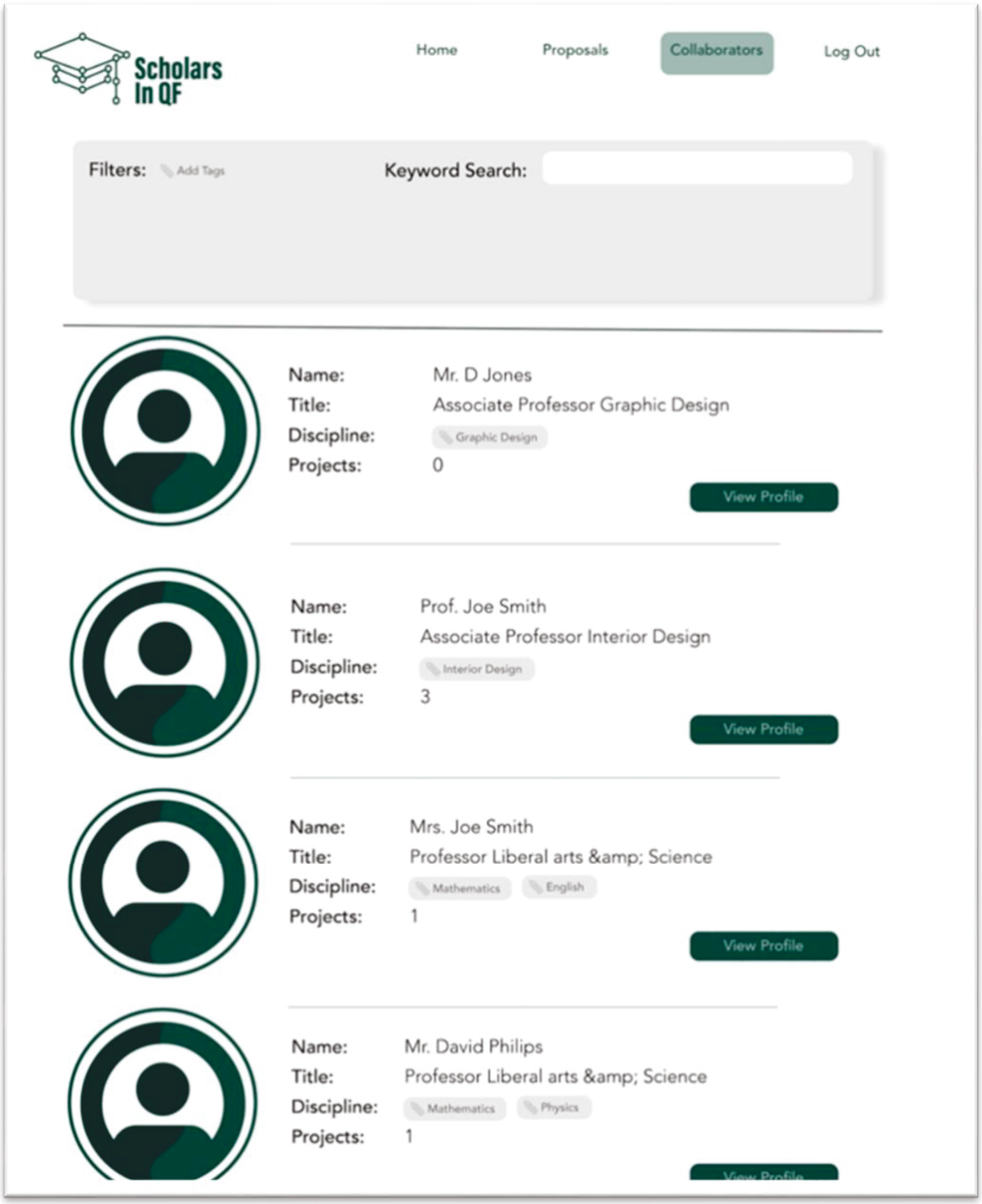

Figure 2. Search and Filter Option for Keywords.[41]

In the Collaborator Management Profile tab in Figure 3. Registering Profile, the user can create, update and delete his profile. The function allows the users to link their profile with existing biography at their respective institutions to avoid administrative burden on the faculty.

[41] Image courtesy of VCUarts Qatar - Office of Research.

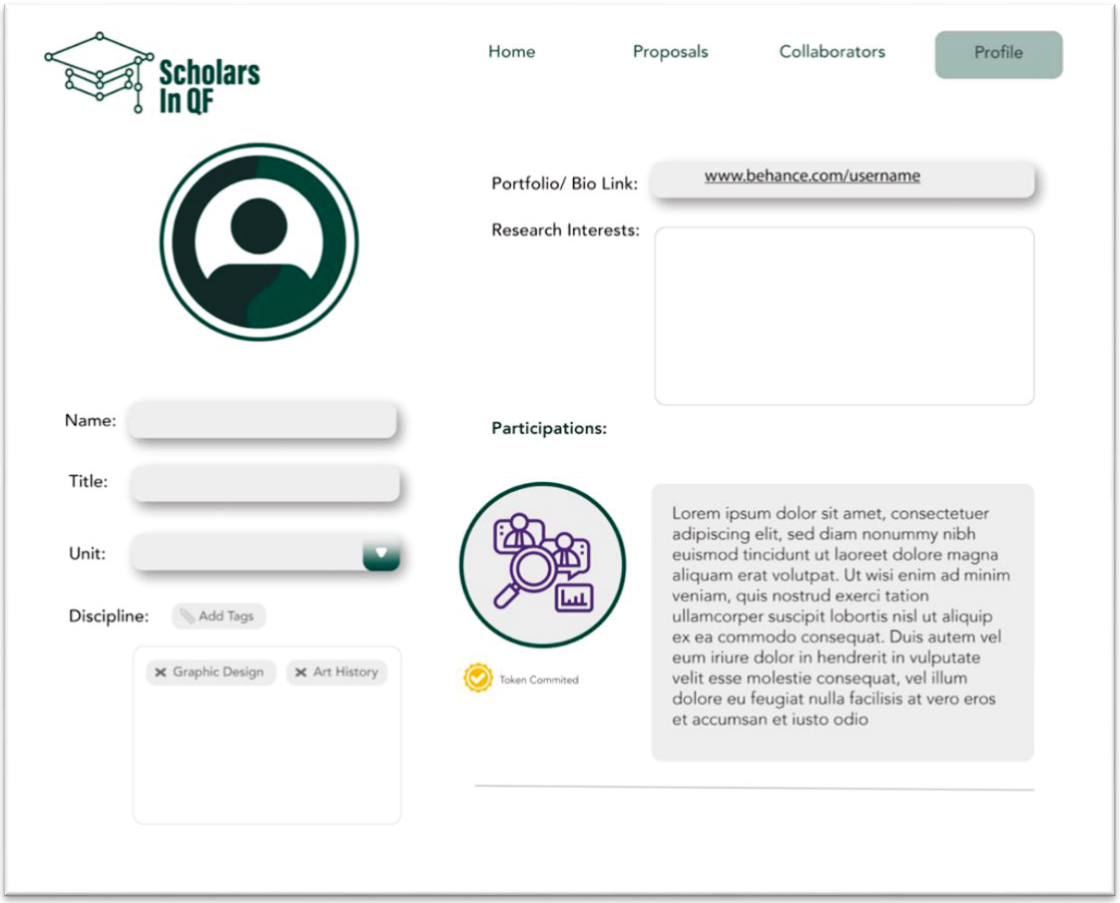

Figure 3. Registering Profile.[42]

It is important to encourage interdisciplinary research projects, hence the system has a feature to submit project ideas Figure 4. Incentive Seed Funding for Interdisciplinary Project Proposals. Projects can only be awarded with the condition that two to three members from different disciplines other than the project owner are be included in the project. There is no formal review process required to start the project. The system will automatically notify registered users by email that a project idea has been submitted and will invite collaborators who had agreed to be part of the project to join the project team.

[42] Image courtesy of VCUarts Qatar – Office of Research.

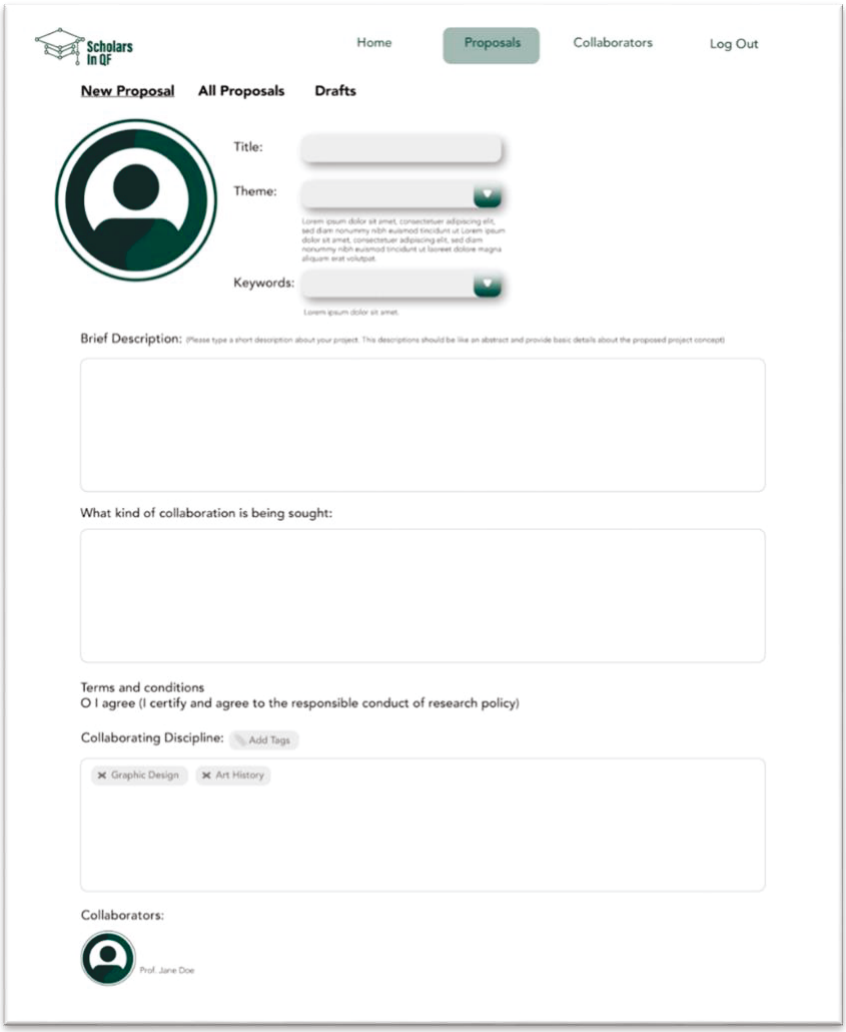

Figure 4. Incentive Seed Funding for Interdisciplinary Project Proposals.[43]

Every invited collaborator can confirm his or her commitment to the project by checking the box "Commit Token." The idea behind allocating a token means that each researcher starts off with a seed funding, which can act as an incentive to trigger participation in a collaborative project. This will in turn help to offset part of the cost of the project. The first version of the website is being currently tested internally at VCUarts Qatar. The website is built and developed

[43] Image courtesy of VCUarts Qatar - Office of Research.

using the Microsoft.Net domain. The final design of the home screen landing page can be seen below Figure 5. Web Application Home Screen and Sign-up Option.

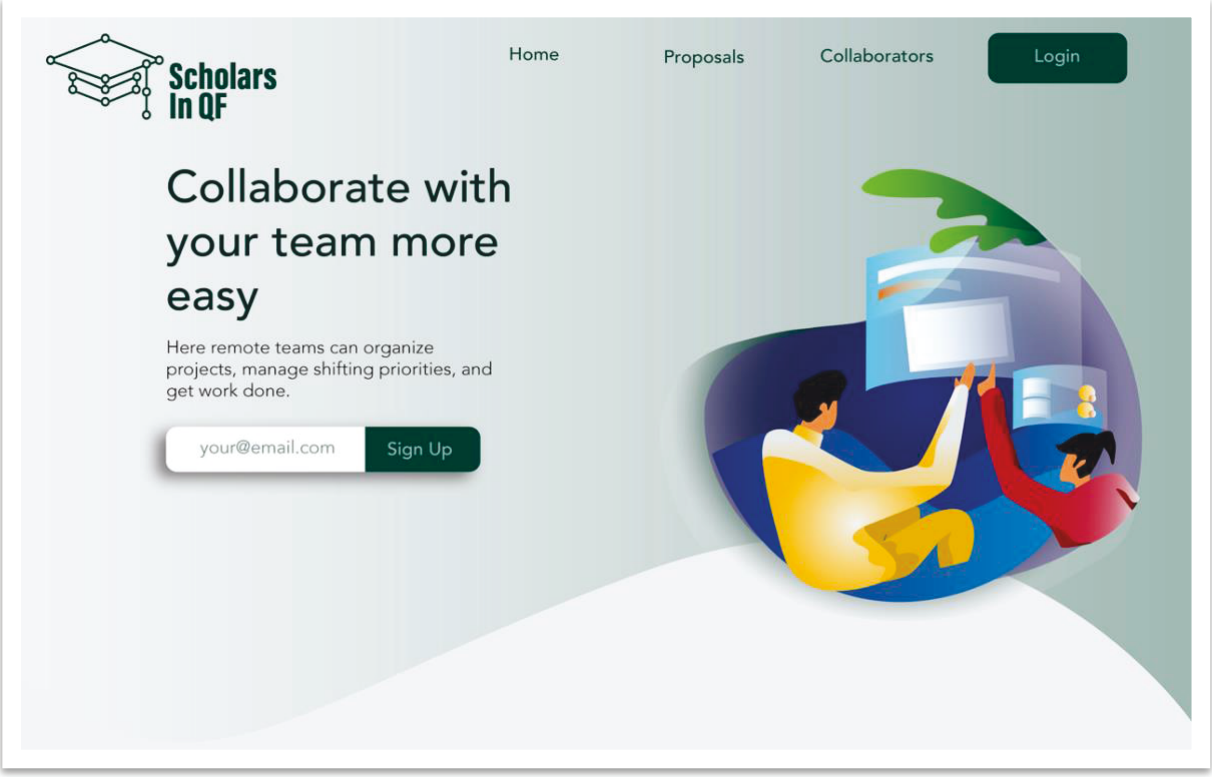

Figure 5. Web Application Home Screen and Sign-up Option.[44]

This testing phase is looking at and will address any gaps and shortcomings of the system. There are remaining tasks that currently need completion such as finalizing the web application with the developer, data entry for VCUarts Qatar's research faculty, revisiting the web application and mobile friendly version of the application (Figure 6. Mobile Friendly Website Version) after the testing phase, performing a quality assurance and asking for feedback from VCUarts Qatar's research faculty.

[44] Image Courtesy of VCUarts Qatar – Office of Research

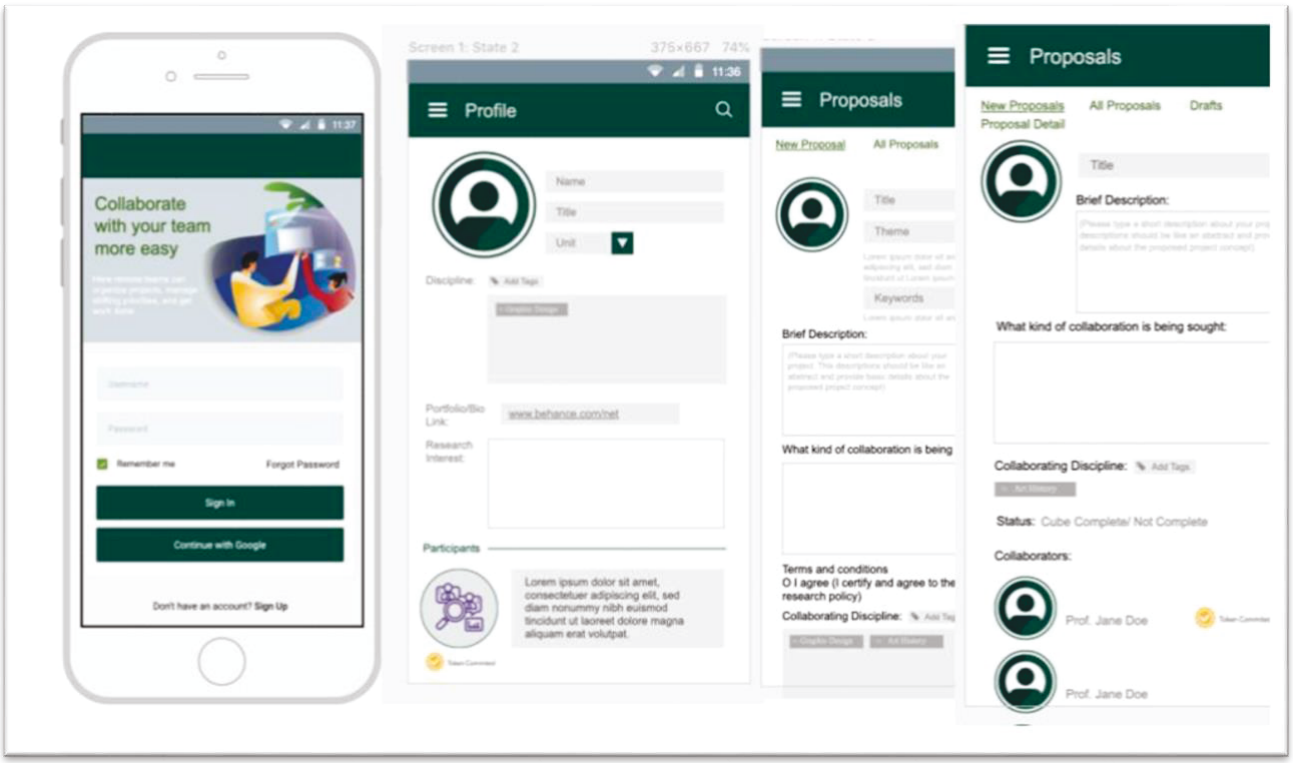

Figure 6. Mobile Friendly Website Version.[45]

Finally, the author will pitch the entire project to QF Board of Directors to endorse for further funding and for implementation, and to request inclusion of the other branch campuses faculty's data in the system. The challenges that may be foreseen include getting the buy-in from all the stakeholders and identifying which department at QF will manage the project further.

5.3. Discussion of Questionnaire.

A survey questionnaire was designed and distributed at different educational institutions in EC via an electronic mail system. The survey form was sent to the respective research offices. The survey questionnaire was designed in such a manner that it could be filled in electronically by researchers related to any field. This allowed the author to collect the data required for this Capstone Project. The questionnaire was distributed amongst nine universities out of which five

[45] Image courtesy of VCUarts Qatar - Office of Research.

universities participated and replied to the questionnaire. The survey was sent to over 200 respondents, and was distributed by three EC campuses and three HBKU centers. Thirty-three (33) responses were collected in total, which is a good figure given the number of universities participating in the survey.

The author deciphered the collected data including point of view of the expert researchers and faculty members working in the different universities in EC. The questionnaire used in the survey contains three main sections. The first section includes background questions on the current role and place of employment of the respondents, and their discipline. The second section contained three closed-ended questions. The third question was a Likert scale.

The first question explores the importance of interdisciplinary research in addressing complex research challenges for research funding agencies, for respondents' respective university leadership, for faculty members at EC campuses, and for QF.

The second question asked respondents if they thought support for building interdisciplinary research teams is useful for their respective research administrators, research faculty, university's leadership, EC's institutions, and QF.

The third question asked respondents to rank the different challenges according to the level of importance of interdisciplinary research teams in EC. A Likert scale is used to examine the main barriers in the implementation of interdisciplinary research system in Qatar. In the third section, emphasis was placed on the respondents' own thoughts on other barriers to research collaboration within EC and how collaboration can be developed and promoted. There were three open-ended questions that gave the respondents freedom to describe their answers in detail. This questionnaire was designed to pave the ground for the implementation of a world-class interdisciplinary research platform at QF (Appendix 2).

5.3.1. IRB approval.

The survey questionnaire and study protocol were reviewed and approved by the local Qatar IRB. The study received an exempt status under the number QBRI-IRB 2020-11-040 (Appendix 3), which has an IRB assurance with the Ministry of Public Health in Qatar. In addition, Johns Hopkins University has reviewed and acknowledged the study HIRB00012026 and has given it an exempt determination (Appendix 4).

5.3.2. Survey Respondents.

For the needs assessment, data was collected through an anonymous survey questionnaire by email through the appropriate channel of communications approved by the respective institutions at EC. The data provided information from respondents regarding the current situation in EC and helped to identify the barriers to IRC.

The major data sources who participated in the survey were the expert researchers in different fields who can provide their insight into the subject. Therefore, the target populations included faculty, researchers, academic and research deans in different disciplines from the seven EC's branch campuses and three research centers: TAMUQ, WCMQ, VCUarts Qatar, HBKU, CMUQ, NUQ, GUQ and HEC-Paris.[46] The deans, researchers, professors and research administrators from the different institutions were asked to participate in order to develop an understanding of perspectives on QF's organizational and individual level.

5.3.3. Survey Limitation.

Due to survey burnout since the COVID19 surge of research, the sample of number of respondents was less than anticipated. However, considering time constraints pertaining to the present degree requirement and the distinct and clear direction of the data, the survey was

[46] "Explore Qatar's Education City," accessed April 4, 2021, https://www.qf.org.qa/education/education-city.

stopped on January 1, 2021 and elicited 33 responses. This low number of responses is seen by the author as a limitation.

Chapter 6. Results and Discussions

The results concluded from the questionnaire support findings of the SPARC's report, which point to institutional and individual challenges, including structures that are not set up to accommodate IRC, deficiency in incentivizing IRC, and barriers to connecting with potential collaborators.[47] This chapter presents the key findings from the survey instrument, starting with descriptive statistics of respondents demographic characteristics, followed by the importance, the usefulness of IRC, and the challenges faced in establishing an interdisciplinary research team.

6.1. Demographic Analyses

The analysis of demographic characteristics includes respondents' current job, discipline, and the institute they work at. The results presented in Chart 1. Current Place of Employment below show that approximately 34% of the responses were collected from VCUarts Qatar, while those collected from Hamad bin Khalifa University accounted for 28% responses.

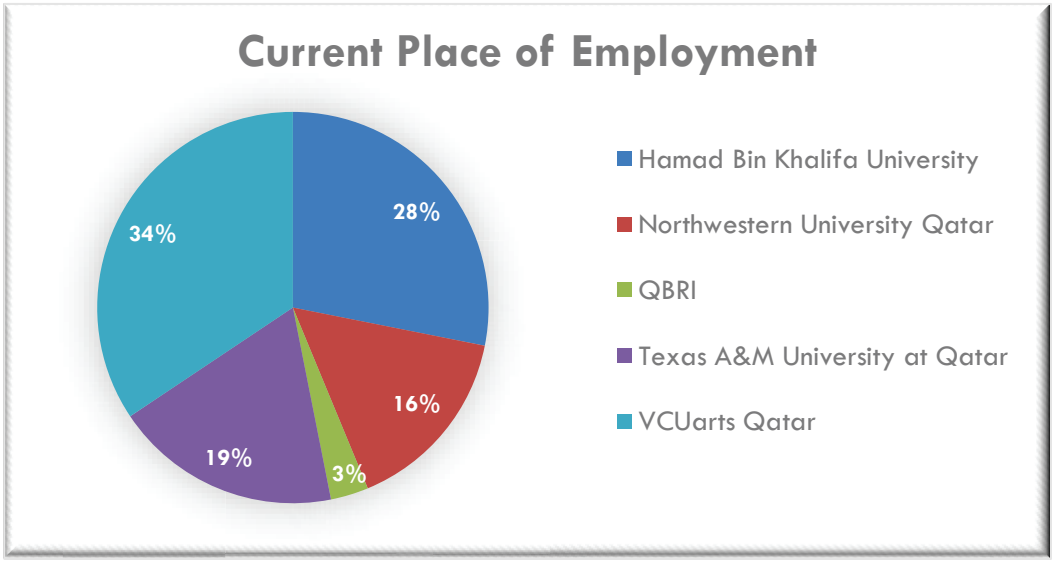

Chart 1. Current Place of Employment.[48]

[47] Veronica Dittman Stanich and Gabriel Harp, *Insights: Interdisciplinary Collaboration in the University* (The Alliance for the Arts in Research Universities, 2018), https://www.a2ru.org/wp-content/uploads/2020/11/Insights-Summary-Collaboration4_copyright.pdf.

[48] Fikria El Kaouakibi, Survey Questions, January 2021.

The results further indicate that the majority of the respondents were faculty members and researchers (85%), followed by research staff (including administrative leaders) (22%), and academic leaders (deans or their associates and assistants) (21%). Chart 2. Respondent Roles shows the results in a pie chart format.

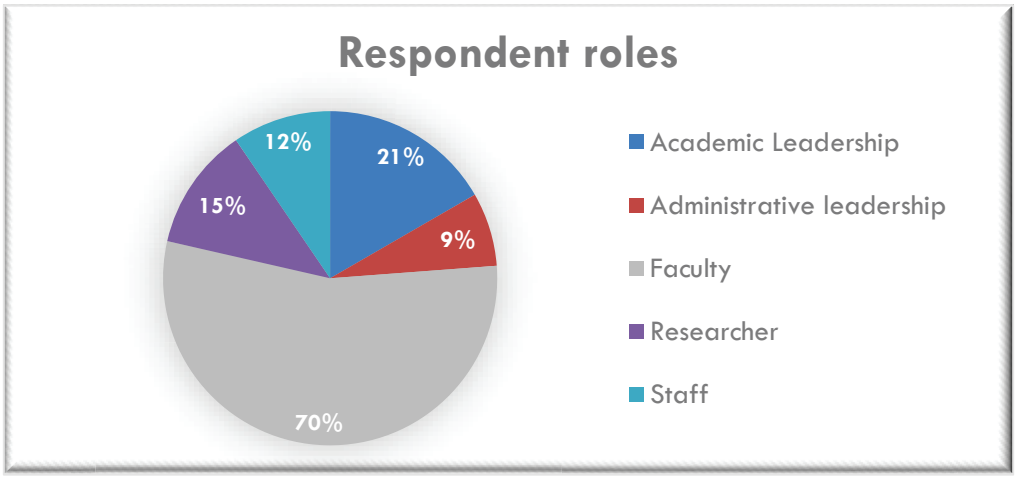

Chart 2. Respondent Roles.[49]

Analysis of the respondents' disciplines revealed that 25% were affiliated with the humanities and 21% were from the field of natural sciences. While 15% were from art and design, another 13% were from the social sciences and 12% from engineering. It needs to be stated that although medical and health professionals did not respond to the questionnaire, the respondents represented many major fields as is required for addressing the objectives of this project and as seen in Chart 3. Respondent Disciplines.

[49] Ibid.

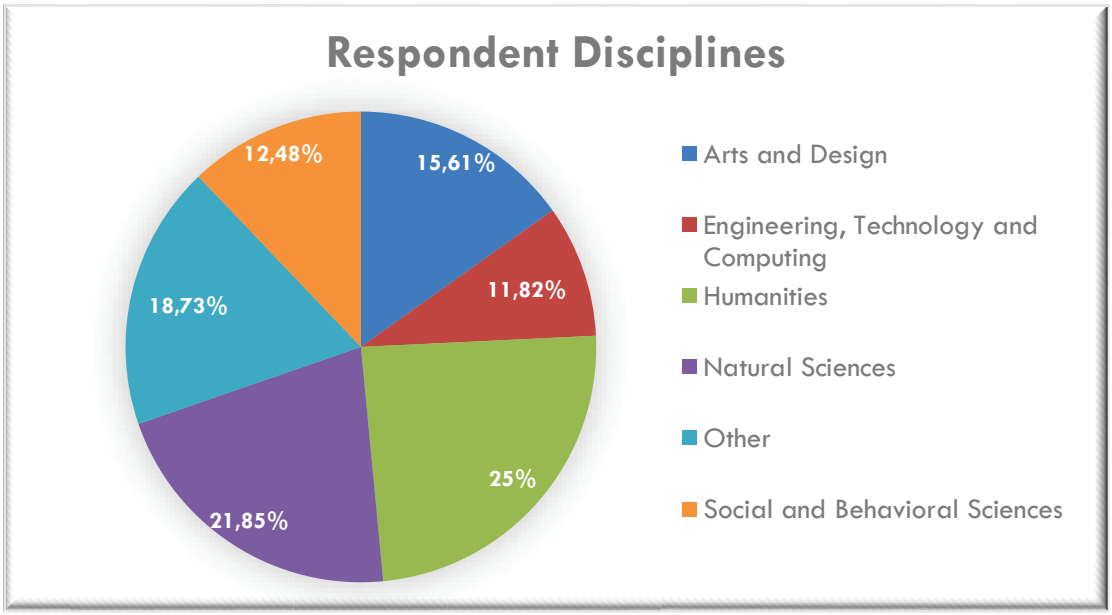

Chart 3. Respondent Disciplines.[50]

6.2. Results.

6.2.1. Importance Attributed to Interdisciplinary Research.

Interdisciplinary research is important at different levels of higher education although faculty members may not find it as little important as their teaching responsibilities, especially those who were hired to teach rather than conduct research. As is shown in Chart 4. Importance of Interdisciplinary Research, the respondents were generally of the view that interdisciplinary research was very important for addressing complex research challenges (73%), followed by those who highly rated the importance of interdisciplinary research to the Qatar Foundation (58%). An additional 45% regarded this type of research very important for funding agencies compared to 42% who considered it important to their respective university leadership (Chart 4. Importance of Interdisciplinary Research).

[50] Fikria El Kaouakibi, January 2021.

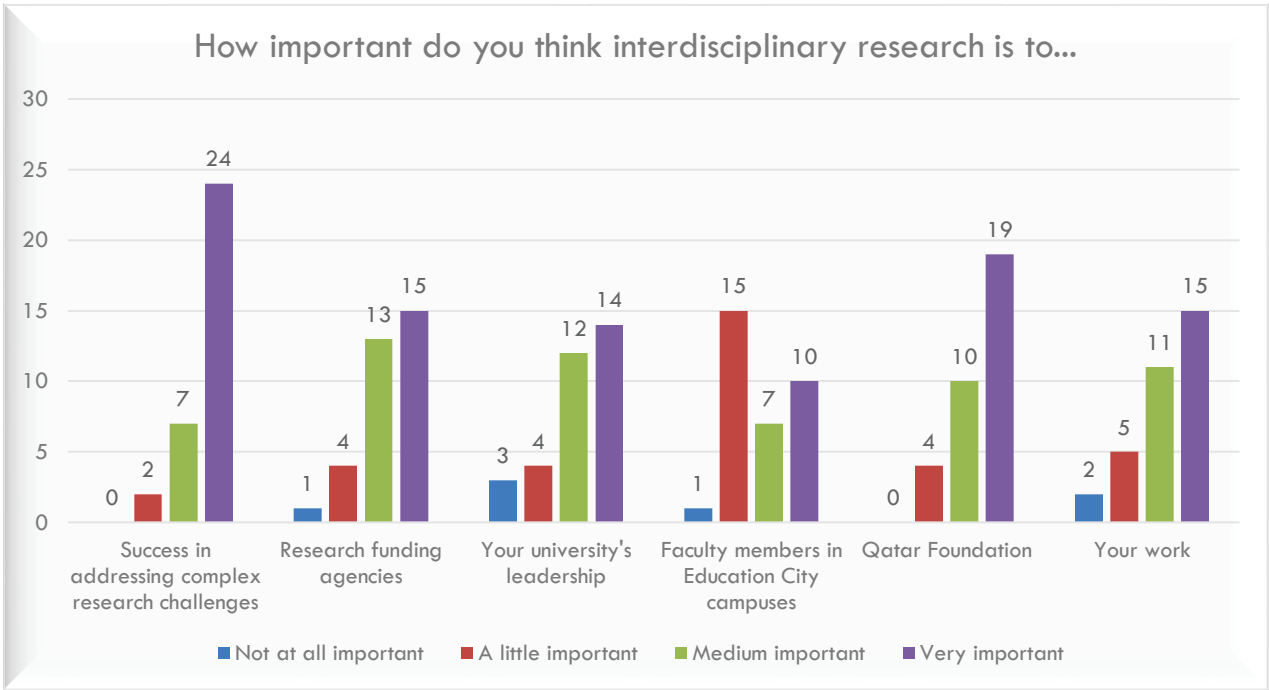

Chart 4. Importance of Interdisciplinary Research.[51]

It is interesting to note that while there is a general tendency for respondents to rate each option in the figure above as very important, interdisciplinary research is perceived as of little importance (45%) to faculty members in EC campuses. From the results given above, it is also possible to see a general agreement that there is a need for interdisciplinary research teams to respond to major complex society-wide issues, such as environmental, energy and health problems. This shows that solving major research issues requires finding new ways to facilitate this type of research collaboration.

6.2.2. Degree of Usefulness of Interdisciplinary Research Teams.

The results given in Chart 5. Support for Building Interdisciplinary Research Teams, suggest that there is a generally positive feeling among respondents concerning the usefulness of supporting ICR. For example, the results indicate that 70% suggest that support for building IRC

[51] Fikria El Kaouakibi, January 2021

would be useful for QF, compared to those who think that support for IRC would be useful to EC colleges, departments and centers (64%), or university leadership (58%).

The results further show that 55% of the respondents indicated that research administrators would benefit from supporting the establishment of IRC. The remaining 48% pointed out that support for building IRC would be useful for research faculty. Overall, these results appear to suggest that all stakeholders would benefit from support for building interdisciplinary research teams.

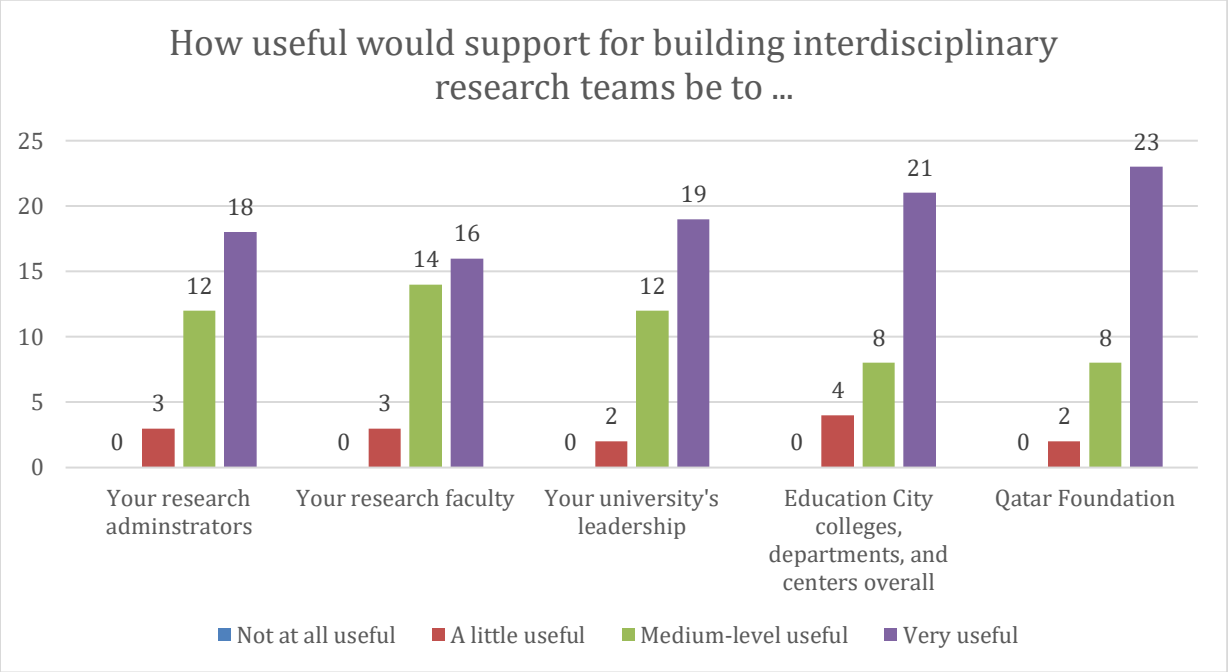

Chart 5. Support for Building Interdisciplinary Research Teams.[52]

6.2.3. Challenges Facing the Establishment of Effective Interdisciplinary Research Teams.

The results shown in Chart 6. Challenge of Forming Interdisciplinary Research Teams suggest respondents were divided in their ratings of the challenges that exist in EC in establishing interdisciplinary research teams. The results can be interpreted as follows: the majority of the

[52] Fikria El Kaouakibi, Survey Questions, January 2021.

respondents identify these three as a medium challenge: 'lack of tools to find interdisciplinary research collaborators' (52%), 'logistics of cross-campus structures' (45%) and 'lack of incentives for interdisciplinary research' (42%).

Furthermore, many respondents identified 'University Structures do not accommodate interdisciplinarity' (39%), 'EC structures do not accommodate interdisciplinarity' (36%), and 'Lack of incentives' (36%) as major challenges to establishing interdisciplinary research. Looking at these different numbers and percentages, it can be concluded there are many challenges that do not have a direct solution and require long-term planning. However, the lack of tools and lack of incentives can be easily addressed by a short-term solution.

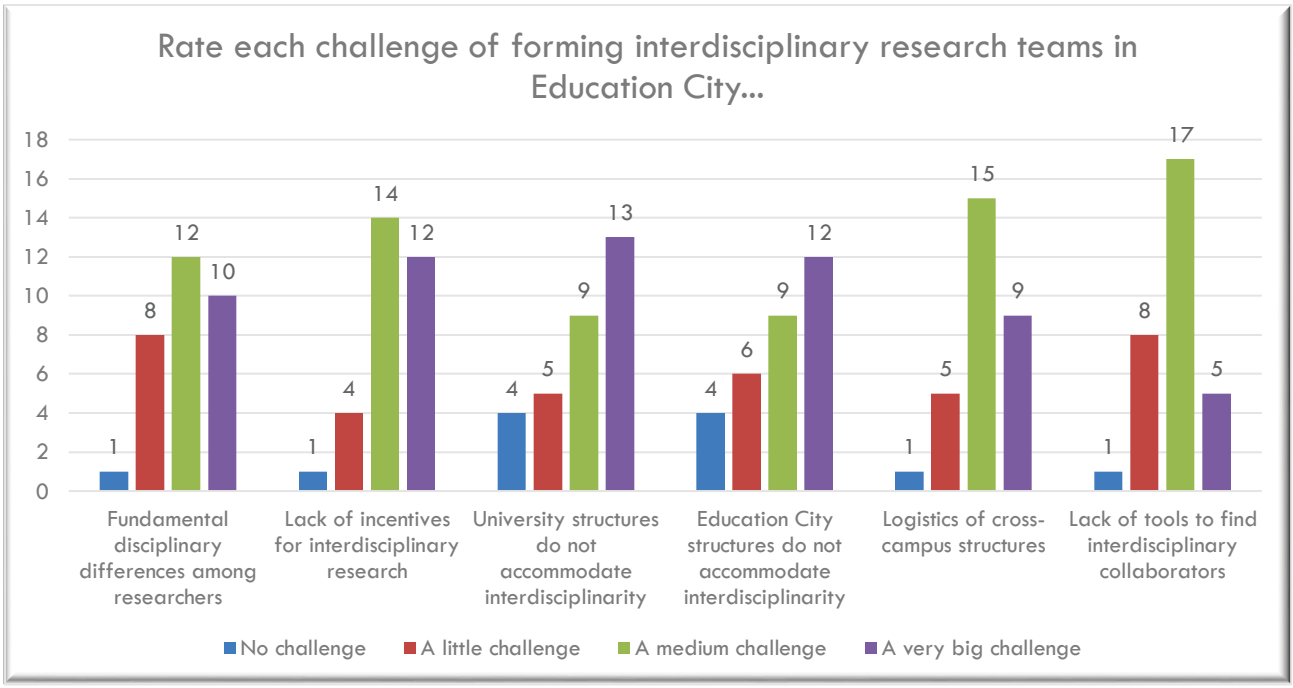

Chart 6. Challenge of Forming Interdisciplinary Research Teams.[53]

[53] Fikria El Kaouakibi, Survey Questions, January 2021.

6.2.4. Ideas for developing or improving Interdisciplinary Research Collaboration within EC Universities.

This section of the questionnaire provided respondents' insights on how research collaboration can be promoted and developed between the Education City campuses and centers. The author spilt responses from respondents into four areas of improvement: (a) at the institutional level (from QF to respective leaders at EC campuses); (b) at collaborators' level; (c) developing a solid structure for incentivizing IRC; and (d) improving logistical structure which include developing platforms for networking and connections.

6.2.4.1. Institutional Leadership positions.

Institution leaders can play a major role in promoting IRC since they are in decision-making positions where they can draft policies and design frameworks in order to institutionalize collaborations between researchers and faculty. As such, they can foster a positive culture of research within EC. As was pointed out by one respondent, "many research-related projects should be encouraged by institution leaders whose role can be decisive in matters related to funding and promoting interdisciplinary research projects, for example."[54]

6.2.4.2. Collaborator's position.

A collaborator should set aside assumptions, characterizations or descriptions of how a certain discipline works and remove negative biases and stereotyping disciplines. Instead, disciplines need to be set on an equal footing, thus valuing all disciplines for their quality and worth. Accounts given by respondents in the open-ended questions lend evidence that "There should be a thorough understanding of the faculty's strengths in

[54] Fikria El Kaouakibi, Survey Questions, January 2021.

research areas" because "Many a time the faculty is promoting few strengths whilst undermining their other sought-after skills." In the words of another respondent, "Lack of understanding of the nature of research in other disciplines. I think that ID research is sometimes discouraged because it is not as easy to evaluate as research solely within a discipline."[55]

6.2.4.3. Developing a Solid Structure for Incentivizing IRC.

It is the belief of the author, that has also been shown in the literature, that for research collaborations to flourish, universities should set up a structure that aims to incentivize these endeavors. In addition, university resources, such as space and equipment, should be made available to facilitate IRC endeavors and review tenure and promotion policies to incentivize research collaborations. Respondents reported that there is a need for more work to be done in order to improve such collaborations, including "additional incentives from each university in EC" and "funding for only interdisciplinary research project." Four of the 33 respondents emphasized the demand for better services such as procurement processes, as indicated by the following statements extracted from the open-ended questions:

> "There should be more readily accessible services, especially for equipment."
> "Some institutions have many of the same equipment, while others have none."
> "Collaboration is dependent on research reagents."
> "Timely delivery of products will improve collaboration--far too many obstacles."[56]

Another theme that came to the forefront was the view of the respondents' that there is a need for quality facilities. Four respondents emphasized how crucial they

[55] Fikria El Kaouakibi, Survey Questions, January 2021.
[56] Fikria El Kaouakibi, Survey Questionnaire, January 2021.

believed it was to have common facilities open to all members of EC:[57] "Usage of common facilities at the same rate is a MUST." Another respondent pointed out that "not all entities have the same core facilities, and these should be open to all members on Education City at the same rate."[58] This raises another point regarding fees and access to centralized resources and pooling facilities. A third key theme that emerged from the open-ended questions was the importance of encouraging faculty to value and practice interdisciplinary/collaborative research. Incentives could be offered as the following respondent suggested "Perhaps change the structure of promotion/tenure/annual assessment to reward interdisciplinary/collaborative research but not penalize single author research."[59]

6.2.4.4. Improving Logistical Structure.

IRC entails collaborative work across two or more campuses. However, the mechanisms and the logistics in current use at EC are not reconciled. The buildings of each unit are fragmented. Respondents highlighted the need to align class schedules, to organize or provide network opportunities and to set up a platform where people can connect and learn other faculty's research interests and activities.

Most respondents identified and highlighted the need for a common ground where researchers and faculty can come together to exchange ideas and engage in more networking opportunities. Thus, an online platform can meet these needs and allow faculty and researchers to share ideas and connect with other experts in their fields of interest. A clear expression of this need can be seen in the following account offered by a respondent in the in the open-ended questions:

[57] Ibid.
[58] Fikria El Kaouakibi, Survey Questions, January 2021.
[59] Fikria El Kaouakibi, Survey Questions, January 2021.

> For the social connection, there should be both on-line and off-line opportunities to network and meet each other. On-line, there should be a central EC website with a searchable database of faculty teaching and research, so that easily one could find all faculty who teach or research issues of climate change, for example. Off-line, we need more EC-wide gathering spaces and events. The Qatar Faculty Forum, for example, could be expanded and given more resources to do so, but right now it is a ground-up faculty initiative with little institutional support. As for the institutional support (or lack of it) from our universities, QF should take the lead by creating interdisciplinary faculty fellows -- say, for one year -- which allows faculty to receive institutional support, a course buy-out, more research or teaching funds as needed, in order to engage in an interdisciplinary project, such as course development/co-teaching, development of an interdisciplinary minor, or a research grant. QF can also show its support for interdisciplinary work by highlighting good work in a regular newsletter and through annual awards -- the awards do not have to be big to make a positive institutional impact on the faculty who are being recognized.[60]

Enforcing IRC would be facilitated by having a platform for exchange among faculty in the various institutions, this is suggested in the following quote:

> Maybe if there was some kind of platform where people could share their projects and what they're looking for - so, for example, if I have a project in the arts and I want to do some kind of installation that requires some engineering work, I currently have no idea how or who to even approach from branch campuses that could help me. but if there was a platform or a way, I know who's who and what they do (kind of like a social networking app maybe? but for research and projects?) then I would know who to reach and how.[61]

This reinforced the need for an online centralized platform. A number of respondents stressed the need for a series of measures that should be taken in to facilitate and enhance IRC within EC. Accordingly, measures suggested by respondents included: more frequent gatherings between faculty across different campuses; creation of an EC research center and facility; allocating funds for collaborations with EC; connecting researchers with willing collaborators; incentivizing these collaborations. One respondent recommended the following sequence or process: “Firstly, find or establish topics to put

[60] Fikria El Kaouakibi, Survey Questions, January 2021.
[61] Fikria El Kaouakibi, Survey Questions, January 2021.

together researchers from two different institutions. Then let funds be available for such a collaboration inside EC."[62]

Another interesting point raised by one faculty respondent was related to curriculum development. That faculty respondent which could contribute to encouraging interdisciplinarity and multidisciplinary from the design phase, as the following quote explains:

> Curricula are siloed, distancing ourselves from the siloed pedagogy will enhance interdisciplinarity and multidisciplinarity... How to do it? Design courses/projects/research that cannot be addressed except with multidisciplinary groups... Project based initiatives rather that subject-based initiatives.[63]

This suggested consideration highlights that shifting mindsets from project based to subject-based initiatives would naturally enhance cross-disciplinary collaborations. This is linked with the importance of institutionalizing interdisciplinary collaboration through policy level measures or making it a requirement as proposed by another respondent: "If it was *required* of each university then people would actually try. if it's something that's just recommended, then no one would do it."[64]

6.3. Discussion and Conclusion.

With the ratings presented in Chart 6. Challenges of Forming Interdisciplinary Research Teams[65] along with the descriptions and suggestions provided in the open-ended responses, it may be argued that institution leaders and QF as a whole could address the challenges facing interdisciplinary research collaboration, such as the logistics of cross-campus structures and the lack of tools available for finding interdisciplinary collaborators. Suggestions for tackling these

[62] Ibid.
[63] Fikria El Kaouakibi, Survey Questions, January 2021.
[64] Ibid.
[65] Fikria El Kaouakibi, p.46.

challenges are provided in Chapter 7. Recommendations. This is where the need for a centralized website (platform) is very visible. Indeed, this website platform can help facilitate finding collaborators in EC. Equally important, through this tool, other networking opportunities can rise, including an EC researchers' forum.

Other key challenges that were highly rated by the respondents, including the lack of incentives, may need long-term strategies from QF and the EC leadership. These strategies could entail aligning faculty time schedules and craft policies and structures related to tenure and promotion policies to incentivize IRC.

In addition, the results derived from the questionnaire further confirmed that the designed web platform is needed and has the potential of addressing the challenges identified by the respondents. Therefore, the web platform can serve to initiate the necessary contacts and allow interested faculty to begin building interdisciplinary research teams. It will also help curb the challenges of finding faculty and researchers to form IRC, to share ideas and to network.

This is an area that can be addressed without drastic changes to the current campus structures. The success of the online platform would enable the leadership to address one of the challenges of forging IRC. Recommendations for addressing the above said challenges are further discussed in Chapter 7. Recommendations.

Chapter 7. Recommendations

7.1. Introduction.

Analyzing the results of the survey, it is evident that there is an immediate need of the interdisciplinary research platform in the Education City formed by the Qatar Foundation. The survey illustrated that the academic experts and researchers belonging to different fields recognized the importance of the interdisciplinary research platform and considered it as an important part of the modern research. The respondents also shared that it is currently hard to find and to get know people who would be interested in their research at EC.

Thus, the quality of the research was impacted and the research results indicated that researchers believe they work in isolation. In addition to this, the author believes that the university websites are often incomplete and do not display complete information on faculty members, which makes it difficult for them to know about the work of different faculty members and choose an appropriate collaborator who could provide them expertise on carrying out the project. A number of critical considerations may pave the way for concrete and actionable recommendations and this may very well improve the prevailing situation of limited IRCs at EC.

The findings identified distinct challenges that need to be tackled in order to offer suggestions for facilitating the formation of an interdisciplinary research platform. Such a platform would aid the researchers to find an appropriate research expert to improve the research quality of the research project proposed by the author. Ultimately, this would enhance collaboration among researchers based in Qatar Foundation, Education City and Qatar more generally and improve the quality of research and education in the country eventually.

Based on the evidence collected and analyzed, a number of recommendations are presented below. The author recommends implementing these suggestions in order to propel this proposed

project forward. The suggestions are meant to support the relevant authorities towards implementing an interdisciplinary approach in Education City in Qatar.

7.2. Recommendations.

7.2.1. Recommendation 1: QF Administrative Leaders and Deans need to coordinate with one another to create solutions that can address the prevailing problems identified in the survey results.

The main aim of the interdisciplinary platform is to increase the coordination between different universities in the Education City that would increase the research quality and assistance to the researchers who are looking for an expert in the particular field who would help them in solving the complex problems. For this purpose, it is recommended that the administrative leaders of all the educational institutes located in the Education City should collaborate with each other and present the solutions towards the prevailing problems.

The collaboration between the administrative leaders would identify the shortcomings in the prevailing system that is an obstacle in the way of an interdisciplinary research platform. In addition to this, the collaboration of the administrative leaders would discuss the potential solutions towards this problem.

7.2.2. Recommendation 2: The Administrative Leaders need to convince the representatives of the Qatar Foundation to establish a permanent interdisciplinary platform that is needed to foster interdisciplinary research.

The administrative leaders have a dominant and persuasive personality, so they can collaborate to convince the representatives of the Qatar Foundation to establish an interdisciplinary platform that is needed. Collaboration and coordination must be at two levels.

Senior level among leaders and decision makers, they should develop protocols and guidance documents for all staff on IRC and hold workshops and create a culture encouraging this spirit.

Also, establishing clusters similar to the current program at the Qatar National Research Fund and across the EC universities rather than within each institution. They could be aligned to Qatar Research Priorities. They would meet regularly formally and socially, and identify cross-cutting research that could benefit from each other but does not only rely acquaintances and known contacts. They would need to establish a collaborative research environment that would provide opportunities, to meet and foster collaboration.

To create an overarching EC research center and facility, the leaders at "QNRF and QF need to take an active part in promoting interdisciplinary research. The current focus on multi-varsity courses is not very successful as most universities are focusing on increasing enrollment in the courses they offer. Over all there needs to be a change in thinking from 'style over substance' to the opposite."[66] In brief, as one respondent put it, for interdisciplinary research collaboration to develop, there is a need for "top level proactive QF department with clear remit."[67]

7.2.3. Recommendation 3: The Administrative Leaders and Deans need to take stock of lessons learned, experiences and guidance resources from other countries that have launched similar platforms to establish sustainable and systematic IRCs.

The concept of the interdisciplinary platform is not new, and many educational systems around the globe have established a collaborative platform to aid the researchers and improve the quality of the research. Qatar Foundation needs to take guidance from such educational systems around the globe and can hire the services of the experts from these educational setups to aid them to form a collaborative setup. These experts could guide Qatar Foundation about the

[66] Fikria El Kaouakibi, Survey Questions, January 2021.
[67] Ibid.

obstacles that can impact the formation of an IRC. As discussed above that Qatar Foundation is motivated to improve the quality of education and research in Qatar and to bring the country at par with other countries around the globe.

In addition to this, Qatar Foundation can also consult with the researchers around the globe to analyze the importance of a collaborative system and its impacts on the quality of education and research. This would further aid in realizing the importance of an online centralized platform.

7.2.4. Recommendation 4: QF needs to increase spaces for informal social gatherings across the EC research community to facilitate exchanges and networking among faculty members and foster greater IRC opportunities.

From the above findings it is also illustrated that the major cause of the lack of interdisciplinary research in EC is the silo effect and the lack of initiative by the faculty members. This is mainly due to the fact that the educational institutes have a tough schedule that leaves no time for the faculty member to collaborate with one another. For this purpose, it is recommended that the faculty members and researchers should try to meet with one another on lunch or any other scheduled free time, where they can discuss their research interests and discuss ways to increase the collaboration between their respective institutes.

The major focus of the faculty members should be to alleviate any hindrance in the interdisciplinary research, and this could be achieved by social gatherings. In addition to this, the EC can also conduct the social gathering workshops that would remove any communication barriers between different institutes. The increase in the social gathering would bring a positive result for the quality of the research and is the solution for other problems faced by the educational institutes in EC collectively.

7.2.5. Recommendation 5: QF and EC Leaders need to Create Supportive Policies and Systems to Incentivize IRC.

Despite the fact that a QF promotes interdisciplinary principles, its processes and frameworks can be slow to adapt and represent these values. It's possible that there is not enough leadership to drive those improvements forward. As a result, a slow bureaucracy continues to follow cross-campus projects, suffocating potential allies with red tape. For faculty that perceive a conflict between their interdisciplinary work and Tenure and Promotion criteria, there is a framework that disincentivizes interdisciplinarity. Hence it is important that QF and EC leaders include IRC in performance appraisal scoring and in promotion criteria.

7.2.6. Recommendation 6: QF needs to Implement and maintain the Central Server to house cross disciplinary information and faculty profiles, encourage its use and make it accessible to all.

Coming towards the final recommendation of the findings is the implementation of the proposed website in QF with the information of all the EC faculty members and researchers, belonging to different fields, having different research experience and serving at any unit. The experience and the field of the faculty member would be displayed on the central server. Hence, the researchers would not have to spend time visiting the websites of different educational institutes in the EC collecting information regarding the faculty members and selecting one according to their preference.

The central server would also alleviate the silo effect that is the major hindrance in the interdisciplinary approach. The author recommends to QF Board of Directors to organize a focus group with key stakeholder from EC research ecosystem after the completion of this project, whereby initial study findings will be presented, discussed, and perspectives teased out to reach

a collective understanding and action plan that will set a roadmap for foster a more proactive and sustainable culture of interdisciplinary engagements.

Chapter 8. Conclusion

As the Qatar Foundation is aiming to improve the educational standards in the country and has established an Education City that comprises of the major campuses of different education institutes around the globe. Qatar wants to stand in the queue of the developed educational countries around the globe and Qatar Foundation is working on this goal by investing in different projects. Despite the investment and development of the Education City, Qatar is still lagging in terms of the research quality and is continuously striving to build its research capacity. Though QF sees and realize the importance of a collaborated interdisciplinary approach, the silos in the research field are one of the reasons that is hindering it.

Researchers find it difficult to connect with other colleagues and experts in their intended field of research. Currently they are connecting by going through the websites of different universities in the Education City and analyze the profile faculty members or researcher or informally at social or networking events. However, the latter do not happen often enough or the timings may not coincide with each other's time schedule. The literature review and the needs assessment survey conducted as a part of this project revealed that the interdisciplinary collaboration is needed and is a crucial way to increase the quality of the research. Hence, a centralized platform containing all the information of all the researcher in EC, is an initial step to encourage collaboration and alleviate the challenge of not knowing each other and silo effect.

The author believes that the implementation of this project, will result in QF implementing the website and mobile application and gets the buy in from all the EC leaders.

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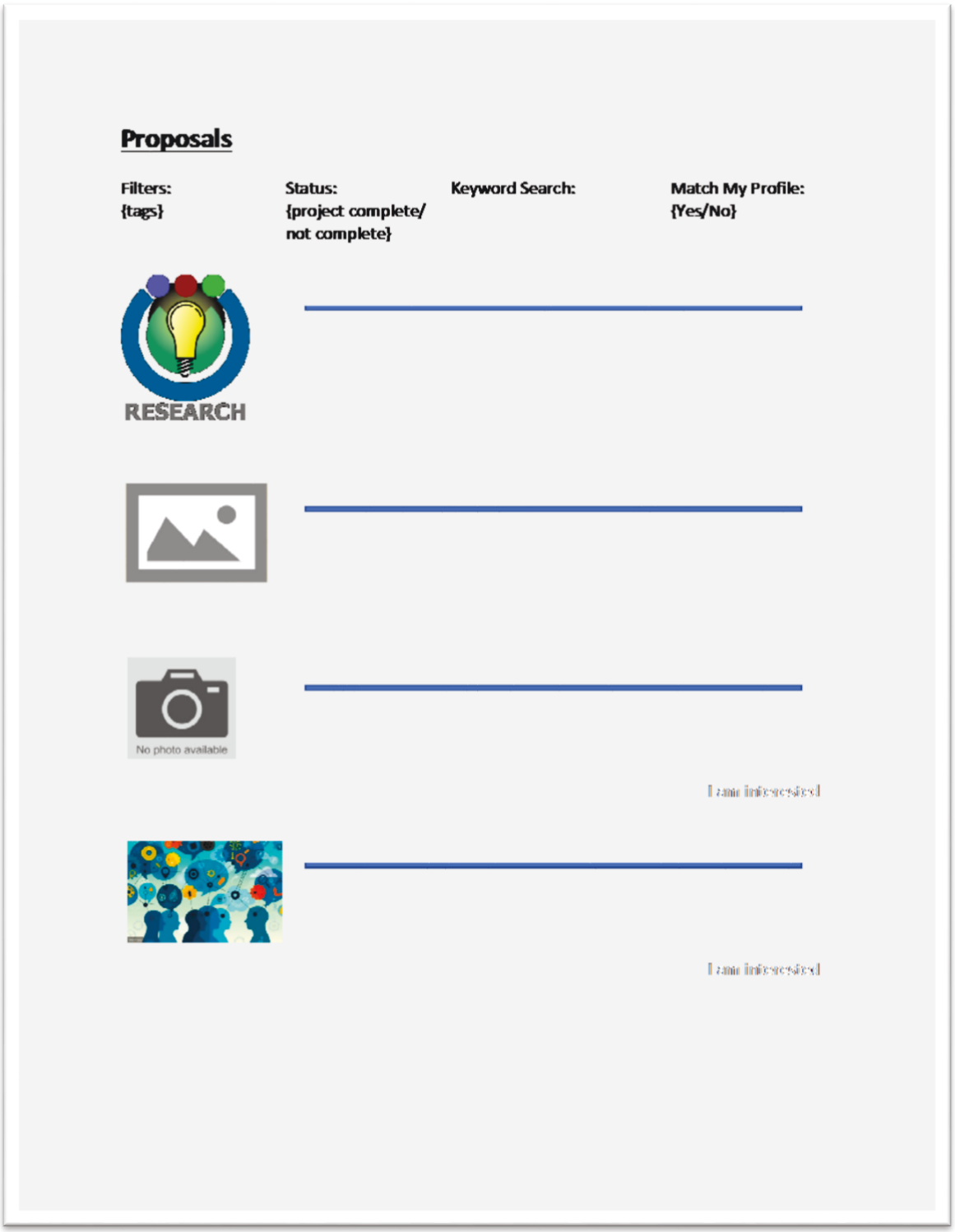
Appendices

Appendix 1. Visual Images of Profile System



Profile

Name:

Title:

Unit: (VCUart Q, Texas A&M , WCMC,...)

Discipline: {tags}

Upload a profile photo or a 1-minute video

Graphic Design
Art History

Portfolio/Bio Link:

Research Interest:

Participation:

RESEARCH

Token Committed

Interested

New Proposal

RESEARCH

Upload a picture or a 1-minute video that represent your project

Title:

Theme:

Please select a theme from the option listed, which is most closely aligns with your project's topic. The selected theme will help users on the website search for projects related to overarching themes. If the theme does not align, choose other and will review

Keywords:

Type keywords from dropdown list.

Brief description: (Please type a short description about your project. This descriptions should be like an abstract and provide basic details about the proposed project concept)

What kind of collaboration is being sought:

Terms and conditions

O I agree (I certify and agree to the responsible conduct of research policy)

Collaborating Disciplines: {tags}

- Interior Design
- Mathematics

Collaborators:

Prof. Joe Smith

Collaborators

Filters: **Keyword Search:**
{tags}

Name: Prof. Joe Smith
Title: Associate Professor Interior Design
Discipline: Interior Design
Projects: 3

View profile

Name: Mrs. D Jones
Title: Associate Professor Graphic Design
Discipline: Graphic Design
Projects: 0

View profile

Name: Mrs. D Jones
Title: Professor Liberal arts & Science
Discipline: Mathematics English
Projects: 1

View profile

Name: Mr. David Philips
Title: Professor Liberal arts & Science
Discipline: Mathematics Physics
Projects: 1

View profile

I am interested

Proposal Details

Title:

Brief description:

Upload a picture or a 1-minute video which represents your project

What kind of collaboration is being sought:

Related Discipline: {tags}

- Art History
- Language
- Interior Design

Status:

PROJECT complete/not complete

Collaborators:

Prof. Joe Smith **Token Committed**

Mrs. D Jones

Prof. P Jane **Token Committed**

Interested Collaborators: (only for project owners)

Mr. David Philips View profile Add to project

Commit Token

Appendix 2. Questionnaire

1. Consent to Participate *

Check all that apply.

- [ ] YES, I voluntarily agree to participate in this study. By continuing with this survey, I affirm my consent to participate and acknowledge that I meet the requirements for participation.
- [ ] NO, I do not wish to participate. Please exit me from this survey.

Background Questions

2. Current place of employment *

Check all that apply.

- [ ] Carnegie Mellon University in Qatar
- [ ] Georgetown University in Qatar
- [ ] Hamad Bin Khalifa University
- [ ] Northwestern University Qatar
- [ ] Qatar Foundation
- [ ] Texas A&M University at Qatar
- [ ] VCUarts Qatar
- [ ] Weill Cornell Medicine

Other: [ ] _____

3. Current Role *

Check all that apply.

- [ ] Administrative leadership
- [ ] Academic Leadership
- [ ] Faculty
- [ ] Staff
- [ ] Researcher

Other: [ ] _____

QATAR BIOMEDICAL RESEARCH INSTITUTE
IRB APPROVED
APPROVAL DATE: 11 NOV 2020
EXPIRATION DATE: 10 NOV 2021

QBRI-IRB-2020-11-040- Participant information sheet _V1_NOV_2020_5pages.pdf

4. Related Discipline *

Mark only one oval.

- Natural Sciences
- Engineering, technology and computing
- Social and Behavioral Sciences
- Arts and Design
- Humanities
- Medical and health professions
- Other

Skip to question 5

For the following questions, 'interdisciplinary research' entails faculty, staff, and students from the Arts and Humanities working together with those from STEMM disciplines on shared research projects.

5. How important do you think interdisciplinary research is to: *

Mark only one oval per row.

	Not at all important	A little important	Medium important	Very important
Success in addressing complex research challenges				
Research funding agencies				
Your university's leadership				
Faculty members in Education City campuses				
Qatar Foundation's leadership				

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APPROVAL DATE: 11 NOV 2020
EXPIRATION DATE: 10 NOV 2021

6. How useful would support for building interdisciplinary research teams be to ... *

Mark only one oval per row.

	Not at all useful	A little useful	Medium-level useful	Very useful
Your research adminstrators				
Your research faculty				
Your university's leadership				
Education City colleges, departments, and centers overall				
Qatar Foundation's leadership				

7. How much of a challenge forming interdisciplinary research teams in Education City are... *

Mark only one oval per row.

	Not a challenge	A little challenge	A medium challenge	A very big challenge
Fundamental disciplinary differences among researchers				
Lack of incentives for interdisciplinary research				
University structures do not accommodate interdisciplinarity				
Education City structures do not accommodate interdisciplinarity				
Logistics of cross-campus structures				
Lack of tools to find interdisciplinary collaborators				

Skip to question 8

In answering the following open-ended questions, please do not include any identifiable, sensitive, or off-topic information in your answers.

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IRB APPROVED
APPROVAL DATE: 11 NOV 2020
EXPIRATION DATE: 10 NOV 2021

QBRI-IRB-2020-11-040- Participant information sheet _V1_NOV_2020_5pages.pdf

8. Please describe what other barriers to research collaboration are within Education City. *

9. Please describe how research collaboration between the education City campuses and centers can be promoted or developed? What steps should be taken to enhance this collaboration? Can you give an example of how we can improve research collaboration? *

10. What's your overall assessment of research collaboration within Education City? *

11. Do you have any other comments or feedback you would like to share? *

Thank you for your participation!

QATAR BIOMEDICAL RESEARCH INSTITUTE
IRB APPROVED
APPROVAL DATE: 11 NOV 2020
EXPIRATION DATE: 10 NOV 2021

Appendix 3. QBRI IRB Approval

Qatar Biomedical Research Institute
Institutional Review Board
IRB Approval Letter

Fikria El Kaouakibi **Assistant Director of Research** **VCU-Qatar**	
IRB Protocol Reference Number:	QBRI-IRB 2020-11-040
Project Title:	Bringing arts, humanities, and STEMM together: A profile system for facilitating interdisciplinary collaboration within Education City campuses, colleges and research centers
Review Type:	Exempt status
QBRI-IRB Approval Date:	11 November 2020
QBRI-IRB Expiration Date:	10 November 2021

The QBRI Institutional Review Board (IRB) has reviewed your application that was submitted the above referenced protocol (2020-11-040). It has been determined that your research proposal is eligible for **exempt status and Approved** for one year effective November 11 , 2020. This falls under the category (2) in MOPH guidelines, regulations and policies for research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The research must be conducted according to the submitted research protocol outlined in the approved proposal. Please consider that any modifications to any aspect of the referenced study may render this approval invalid. Any amendments must be submitted to the IRB office and it cannot be implemented until the IRB approval has been given.

It is imperative that any serious adverse events experienced during the course of this study by research subjects, are immediately reported to the IRB office.
Request for a renewal, if required, should be submitted to the IRB at least 40 days prior to the expiry date to allow the IRB sufficient time to review and approve the request. It is the sole responsibility of the investigator to ensure the timely renewal of the IRB. Please note that it is the investigator's responsibility to ensure that they have a valid CITI certificate in the relevant curriculum during the course of the approval.

QATAR BIOMEDICAL RESEARCH INSTITUTE
IRB APPROVED
APPROVAL DATE: 11 NOV 2020
EXPIRATION DATE: 10 NOV 2021

Wishing you all the success in conducting your research.

Dr. Khalid Al-Ali
Chairperson
KAlali

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Fax: +974 4454 1770
ص.ب: ٣٤١١٠
الدوحة - قطر
هاتف: ٤٤٥٤ ٧١٥٢ ٩٧٤+
فاكس: ٤٤٥٤ ١٧٧٠ ٩٧٤+

Appendix 4. Homewood Institutional Review Board Acknowledgement

Homewood Institutional Review Board
3400 N. Charles Street
Wyman Park Building, Suite N468
Baltimore MD 21218-2685
410-516-6580
http://homewoodirb.jhu.edu/

Michael McCloskey, PhD
IRB Chair

Date: November 23, 2020

PI Name: Marianne Woods
Study #: HIRB00012026
Study Name: Bringing arts, humanities and STEMM together: A profile system for facilitating interdisciplinary collaboration within Education City campuses

Date of Review: 11/23/2020
Date of Acknowledgement: 11/23/2020
Expiration Date: 11/22/2021

The above referenced study has been *acknowledged*.

Review Type:	Exempt
Funding Agency:	Not funded
Grant or Contract Number:	
International Sites:	Yes
Maximum number of participants:	100
Vulnerable populations:	None
Consent process:	
Assent Process:	

The Board determined that this research meets the criteria for submission of a Progress Report. The Progress Report must be submitted at least 6 weeks prior to the expiration date shown above on this

notice. If the Progress Report is not submitted prior to the expiration date all ongoing research activities must stop immediately, including data analysis. Before any research activity can resume, you must submit the Progress Report.

No changes may be made to the protocol or the consent form without the approval of the Board.

Please keep in mind that it is your responsibility to inform the HIRB of any adverse consequences to participants that occur in the course of the study, as well as any complaints from participants regarding the research. In conducting this research, you are required to follow the requirements listed in the *HIRB Policies and Procedures Manual*.

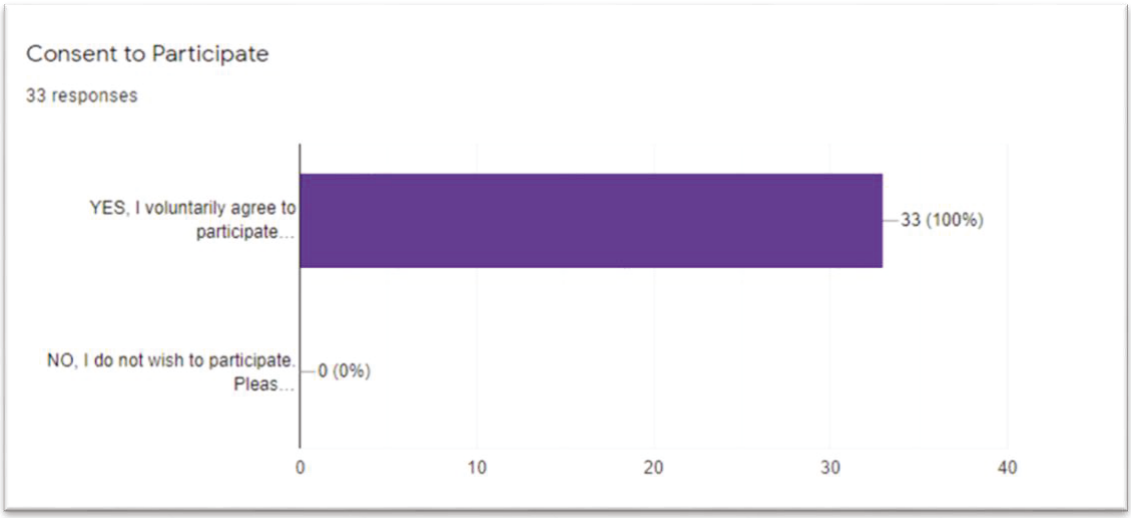
Approved Documents:
Consent or Assent Materials:
Consent material

Recruiting Materials:
Email introduction

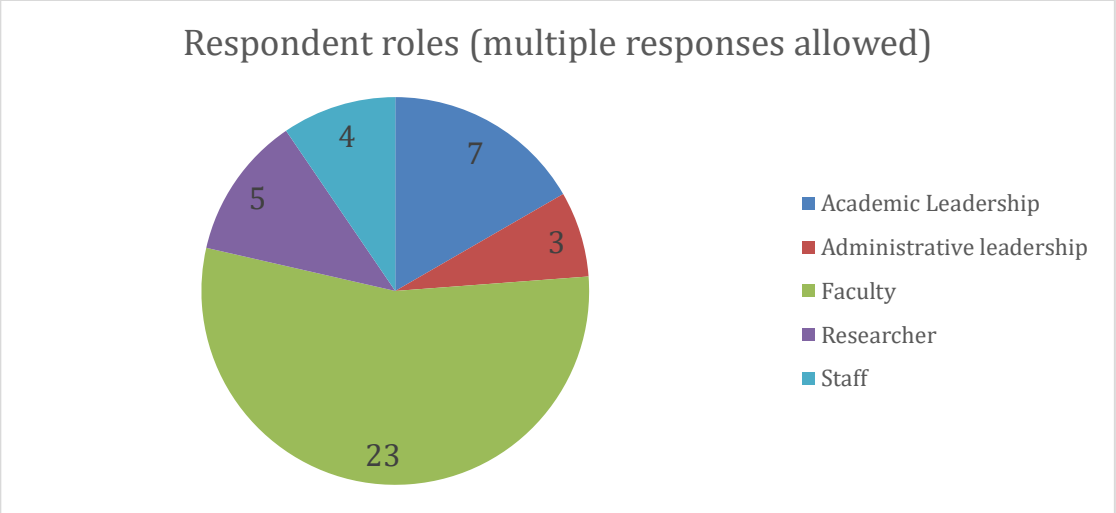
Study Team Members:
Fikria El Kaouakibi

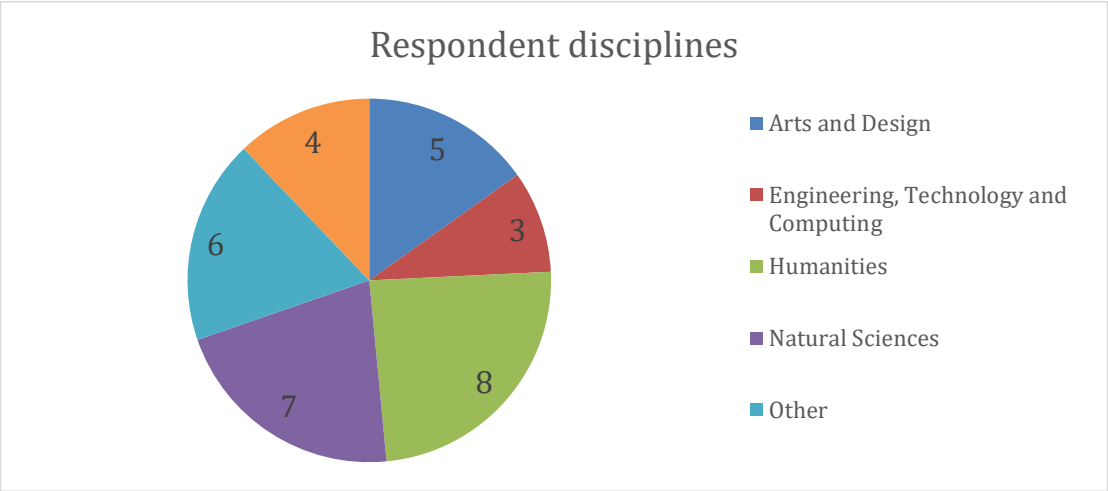
Appendix 5. Survey results

APPROVAL IS GRANTED UNDER THE TERMS OF **FWA00005834** FEDERAL-WIDE ASSURANCE OF COMPLIANCE WITH DHHS REGULATIONS FOR PROTECTION OF HUMAN RESEARCH SUBJECTS

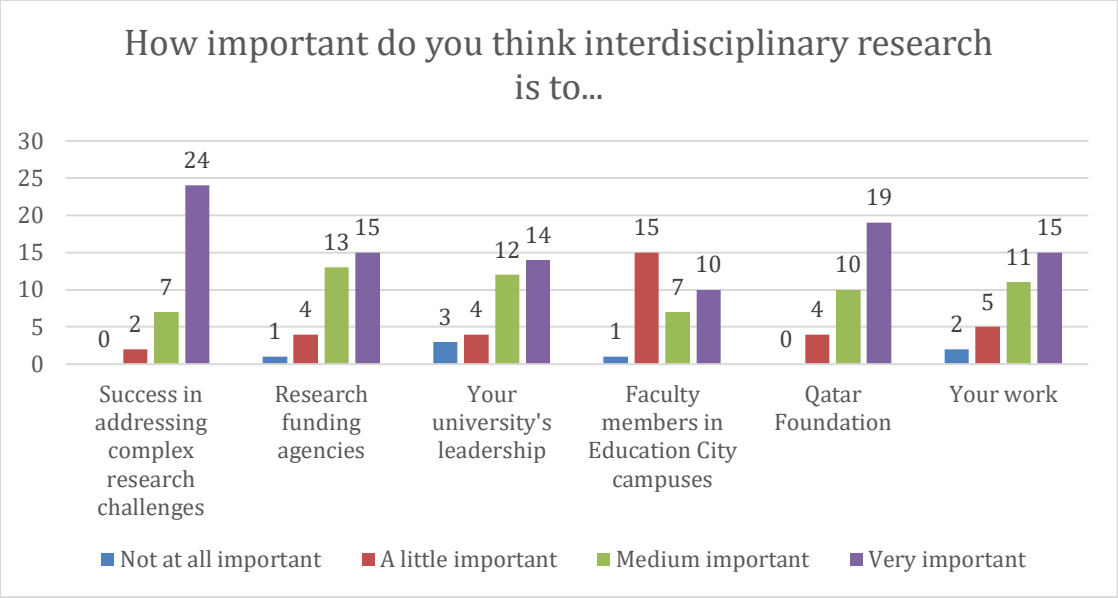


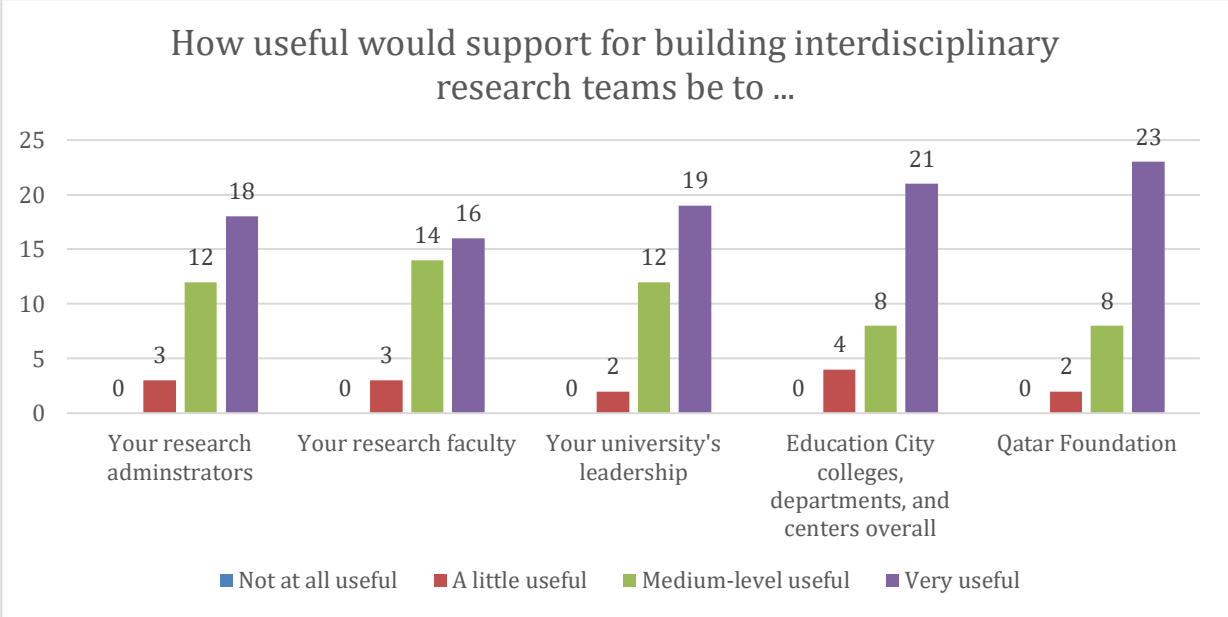
Background Questions

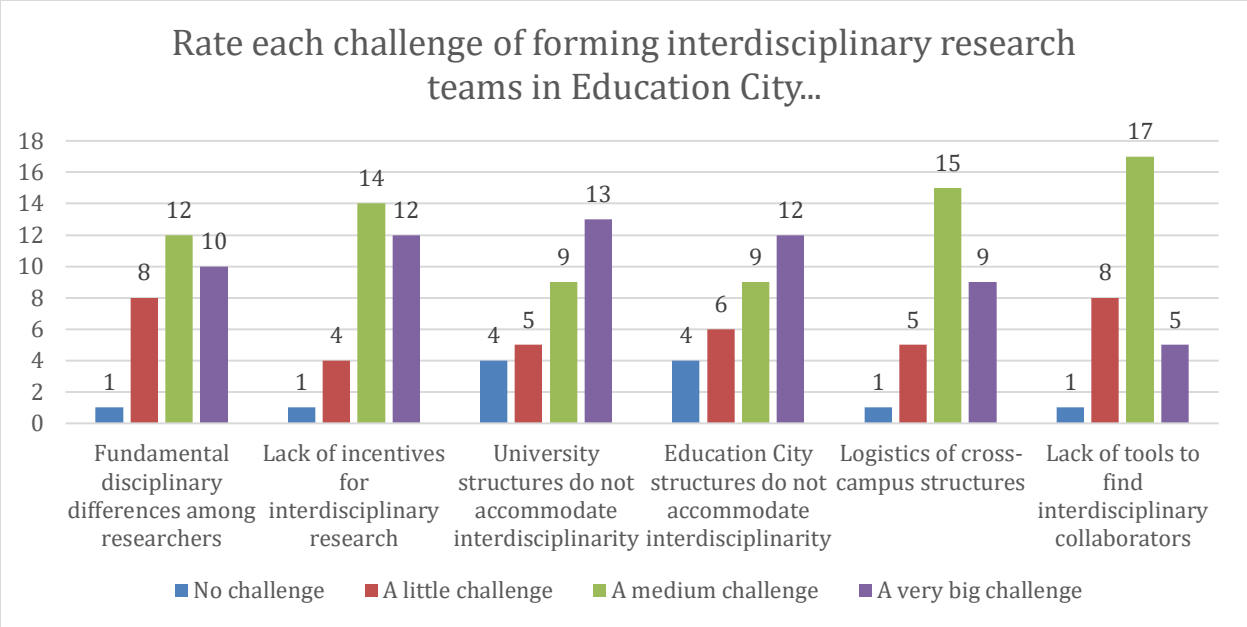




For the following questions, 'interdisciplinary research' entails faculty, staff, and students from the Arts and Humanities working together with those from STEMM disciplines on shared research projects.


How important do you think interdisciplinary research is to...
30
25
20
15
10
5
0
0 2 7 24
1 4 13 15
3 4 12 14
1 15 7 10
0 4 10 19
2 5 11 15
Success in addressing complex research challenges
Research funding agencies
Your university's leadership
Faculty members in Education City campuses
Qatar Foundation
Your work
Not at all important
A little important
Medium important
Very important


How useful would support for building interdisciplinary research teams be to ...
25
20
15
10
5
0
0 3 12 18
0 3 14 16
0 2 12 19
0 4 8 21
0 2 8 23
Your research adminstrators
Your research faculty
Your university's leadership
Education City colleges, departments, and centers overall
Qatar Foundation
Not at all useful
A little useful
Medium-level useful
Very useful



In answering the following open-ended questions, please do not include any identifiable, sensitive, or off-topic information in your answers.

Please describe what other barriers to research collaboration are within Education City.33 responses

1) Equipment availability without charge
2) On the connection side, often people just do not know each other - their teaching, their research, their interests and skills. On the structural side, we have little mentorship, administrative support, and career incentives from our universities to make an impact in interdisciplinary research.
3) Protectionism and lack of esteem for other institutions
4) Long term commitment to funding programs
5) Getting to know people from other institutions
6) Lack of forums to meet and get to know other faculty members.
7) Lack of incentives and exploratory funding
8) Humanities and Social Sciences are in a difficult situation. Younger researchers, including postdocs, are more adept at re-focusing their research and working on projects with

STEMM colleagues. Moreover, it is more difficult to properly execute research projects and receive funding as funding priorities locally and globally have changed dramatically.

9) Cross-institutional hiring
10) Competition between institutions
11) access to equipment and services
12) none
13) Mostly campus structure and buildings make it feel like we are in silos. Buildings should have been connected with bridges. Buildings are so big compared to number of ppl they are small sized campuses on their own.
14) 0
15) Research work can be done without funds if faculty members have less service work and less teaching duties. It is not the case. Hence, funds (of PhD students and postdocs) are a tool for making advances in research. The lack of funds for research is a first barrier before starting a collaboration. A second barrier, I believe QNRF will not easily fund a project where PIs are only from inside Education City. It is very difficult to find research funds in Qatar outside QNRF (this is a 3rd barrier).
16) At XXX there isn't a strong culture of evidence-based research and many faculties at XXX are not interested in doing research.
17) The lack of incentives, disagreement on the leading institution, sharing intellectual property sometimes poses a barrier
18) Different campuses ferociously protect their turf. Each campus is dominated by faculty and leadership from one particular disciplines (e.g., Engineering, Medicine etc. etc.). this creates a tendency to over emphasize the significance of a single field over others. Consequently, faculty teaching courses in the core curriculum are marginalized by default.
19) Competitive environment for limited resources
20) Collaborative research doesn't count as highly towards promotion and tenure as single author research.
21) Variance of subjects
22) Bureaucracy
23) Lack of understanding of the nature of research in other disciplines. I think that ID research is sometimes discouraged because it is not as easy to evaluate as research solely within a discipline.
24) Visibility, funding, incentive
25) There is an overemphasis on STEM and no opportunities for research funding in the Humanities.
26) we don't know each-others work, we work in isolation
27) people's willingness to do the work and step out of their comfort zones.
28) Insecurities among researchers than hinder collaboration.
29) scheduling
30) Disciplinary differences, time, and funding.
31) mostly institutional barriers - paperwork, lack of agreements, lack of cooperation
32) Lake of collaboration

Please describe how research collaboration between the Education City campuses and centers can be promoted or developed? What steps should be taken to enhance this collaboration? Can you give an example of how research collaboration can be improved?33 responses

1) By funding researchers together
2) For the social connection, there should be both on-line and off-line opportunities to network and meet each other. On-line, there should be a central EC website with a searchable database of faculty teaching and research, so that easily one could find all faculty who teach or research issues of climate change, for example. Off-line, we need more EC-wide gathering spaces and events. The Qatar Faculty Forum, for example, could be expanded and given more resources to do so, but right now it is a ground-up faculty initiative with little institutional support. As for the institutional support (or lack of it) from our universities, QF should take the lead by creating interdisciplinary faculty fellows -- say, for one year -- which allows faculty to receive institutional support, a course buy-out, more research or teaching funds as needed, in order to engage in an interdisciplinary project, such as course development/co-teaching, development of an interdisciplinary minor, or a research grant. QF can also show its support for interdisciplinary work by highlighting good work in a regular newsletter and through annual awards -- the awards do not have to be big to make a positive institutional impact on the faculty who are being recognized.
3) More funding opportunities both within institutions and between institutions could better incentivize interdisciplinary collaborations
4) There are challenges even within universities.
5) More gatherings between faculty from different campuses
6) Need additional incentives from each university in EC.
7) thematic workshops, multiversity funding opportunities
8) Such projects would have to be encouraged by administrators.
9) Collaborative grants, more centralized services.
10) There must be funding for only interdisciplinary research project.
11) There should be more readily accessible services, especially for equipment. Some institutions have many of the same equipment, while others have none. Collaboration is dependent on research reagents---timely delivery of products will improve collaboration--far too many obstacles.
12) n/a
13) Other than connecting the buildings, not sure.
14) 0
15) Firstly, find or establish topics to put together researchers from two different institutions. Then let funds be available for such a collaboration inside EC. I do not believe that QF will promote such an internal collaboration.
16) Create an Education City research center and facility.
17) Creating incentives such as research programs requiring inter-campus collaboration such as the QNRF cluster project, information sessions on IP management

18) QNRF and QF need to take an active part in promoting inter disciplinary research. The current focus on multi-varsity courses is not very successful as most universities are focusing on increasing enrollment in from other campuses in the courses they offer. Over all there needs to be a change in thinking from "style over substance" to the opposite.
19) Assisting researchers with meeting willing collaborators and incentivizing these collaborations
20) Perhaps change the structure of promotion/tenure/annual assessment to reward interdisciplinary/collaborative research but not punish single author research.
21) There should be a thorough understanding of the faculty's strengths in research areas. Many a time the faculty is promoting few strengths whilst undermining their other sought-after skills.
22) Usage of common facilities at the same rate is a MUST. Not all entities have the same core facilities, and these should be open to all members on Education City at the same rate.
23) Prioritizing interdisciplinary research in terms of funding and visibility. Stop relying on discipline-driven metrics to assess research quality. People will not look to work outside of their discipline if it is more work for a "lower score".
24) Research days, facilitate introduction, funding
25) Provide funding for specific interdisciplinary projects.
26) maybe it’s time to together start an education city centre for CROSS DISCIPLINARY research that can be led by team from all universities
27) if it was required of each university then people would actually try. if it's something that's just recommended, then no one would do it. maybe if there was some kind of platform where people could share their projects and what they're looking for - so, for example, if I have a project in the arts and I want to do some kind of installation that requires some engineering work, I currently have no idea how or who to even approach from branch campuses that could help me. but if there was a platform or a way, I know who's who and what they do (kind of like a social networking app maybe? but for research and projects?) then I would know who to reach and how.
28) faculty aren't good at working with others.
29) coordinate schedules of all EC universities
30) Curriculum are siloed, distancing ourselves from the siloed pedagogy will enhance interdisciplinarity and multidisciplinary... How to do it? Design courses/projects/research that cannot be addressed except with multidisciplinary groups... Project based initiatives rather that subject-based initiatives....
31) top level proactive QF department with clear remit
32) It will complement and coordination of problem solving of Qatar challenges

What’s your overall assessment of research collaboration within Education City? 33 responses

1) Not very high
2) Huge, huge potential. Would love to see the institutional structures in place that would make EC a global powerhouse in interdisciplinary research.

3) It does occur but it is still not as dynamic or widespread as it could be.
4) Poor
5) There is some collaboration but not a lot. I don't think people know how to go about it.
6) Still lacking, but opportunities exist.
7) very poor compared to what could have been
8) In the sciences research collaboration within Education City is more organic. However, internal collaboration between and among Humanities scholars has to be encouraged since Humanities are under threat everywhere.
9) It is relatively good, but it could be improved by further incentivizing collaboration and removing administrative barriers.
10) minimal
11) It seems non-existent. Many are not willing to share important samples such as patient samples to facilitate research. We requested samples since May 2020 and still waiting.
12) n/a
13) Seems very low. People seem to work in silos.
14) 0
15) Universities inside EC are competing entities. There exists a reduced number of common research projects. In general, I observe universities as competitors, i.e., they are not willing to collaborate.
16) There is much room for improvement.
17) Still in a premature stage and needs tool to foster and encourage further engagement
18) Opportunities are limited. Most collaboration is with faculty in Qatari institutions as it increases chances of getting research funding. Lack of graduate programs in branch campuses makes it hard to hire research staff.
19) Difficult
20) Low
21) 5 out of 10
22) Collaboration cannot be forced if there is no common research interest. IT should be natural.
23) Some is happening, but there appears to be a lot of untapped potential. Since so much is now assessment driven, people are not willing to gamble on research that is outside of the standard protocols of their discipline for fear of compromising the evaluation of that research. No one is going to want to include an artistic component in their research if that is going to compromise the evaluation of that research.
24) Little to none
25) Virtually impossible with the current hierarchical priorities.
26) not familiar
27) I don't think it exists to be honest. or it's very minimal - like if people know each other personally they might collaborate, but I have yet to hear of anything that's being done.
28) I think it's an area that needs significant improvement.
29) I really don’t know

30) QF has paved the way for good opportunities... institutions, faculty, researchers need to do their homework.
31) very poor - too difficult to carry out
32) Gray research but it needs to utilize expertise from all universities

Appendix 6. Short Biography.

Fikria El Kaouakibi is the Assistant Director of Research at Virginia Commonwealth University School of the Arts in Doha, Qatar. Previously, she worked as the Senior Research Officer for over four years and was promoted to her current position in 2019. She holds a Bachelors in Financial and Business Management from the Karel de Grote Hogeschool in Antwerp, Belgium. She is currently working on a Masters in Research Administration at Johns Hopkins University, Baltimore, MD.

She has over nine years of experience working in the research administration field at different institutions at Education City. She manages all types of research funding programs, including institutional and external sponsored programs. She coordinates with Virginia Commonwealth University's Office of Sponsored Programs for all matters related to the administration of research, compliance, and regulatory, financial, and legal affairs. She serves as

the liaison officer between VCUQatar and its home campus in Richmond and offers support for faculty ranging from initial planning through all the stages of the research proposal development process.

She is highly motivated and passionate to learn more about the field she is working in. She strives to influence research administrators in the region, particularly the MENA region, and advocates to value the Arts as a research discipline by using her expertise and continuous professional development in the field. She is the author of two articles in NCURA magazine: "Research Administration in the Middle East and North Africa: Research Administrator for the Arts at an International Branch Campus." NCURA, p.34, Volume 51, No.3, May/June 2019 accessed from https://www.ncura.edu/Portals/0/Docs/Magazine/2019/MayJune2019_NCURAMagazine.pdf) and "Developing Cultural Awareness in International Research Collaboration." (NCURA, p.56, Volume 52, No. 5, Oct/Nov 2020 accessed from https://www.ncura.edu/Portals/0/Docs/Magazine/2020/OctNov2020_NCURAMagazine.pdf)