School Reform in the Middle East: Educational Researchers Adapting to the Arab Spring

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Introduction

Research organisations, including think tanks, technical assistance providers and universities, exist in the Arab world within complicated political environments. They are caught between international and national funding streams; autocratic, precarious and changing governments; conservative populations (and in the case of Gulf Cooperation Council, or GCC, countries, large expatriate populations) and populations of low socioeconomic status. In these contexts, these organisations struggle to know (a) what to convey so as not to jeopardise funding or support; (b) who to convey it to, considering the changing administrative landscapes; and (c) how to convey it, given rapidly changing beliefs, assumptions, and aims within Arab societies.

Education policy serves as a unique opportunity to study these tensions, as it was not a direct and immediate issue of country governance and political participation in the Arab Spring. Instead, it is a basic function within governments that reflects wider societal values but does not instantly stand out at the top of legislative or presidential agendas, except perhaps in GCC countries. Nonetheless, education policy has very real political consequences, as it involves all families within a society; demonstrates underlying political, economic, and social philosophies; and shapes citizens' thought processes and behaviours.

Research organisations have contributed to reform agendas in the past, many of which have been implicated with foreign funds that set certain countries on very unique courses of change and reform. Others have provided political parties – some of which are very new in the political arena – with ideas about education. Many promote ideas that are synonymous with educational reform in Western Europe and

the US, but researchers and advocates are not always sure how to communicate those ideas to specific constituencies most effectively. Furthermore, as the Arab countries haltingly embrace democracy, think tanks and other research organisations are likely to become more prominent and important in politics, policy and educational practice. Additionally, such organisations have strategic influence in the expansion of foreign-based institutions, firms, and NGOs providing various educational services to Arab countries.

In this chapter, we consider the current efforts of existing organisations in the Arab countries that produce research, offer advice, advocate, organise conferences, and publish a range of materials on education policy reform or development. Additionally, we consider multinational and foreign organisations that have produced research within the Middle East, as these organisations (though they are not necessarily think tanks: e.g., USAID) have influenced educational policy in the region. Through our analysis of various reports, policy recommendations, networks of scholars, linkages to international and local universities, we also reflect on our own experience of establishing a new university-based research centre in Egypt.

Our main interest is in understanding the cultural views on education and how those views get translated into policy and practice. In particular, we want to understand how such organisations can better understand their public status and the consequences of that status on the work they do. To illustrate, following the Arab Spring, think tanks such as the Carnegie Endowment and some universities, such as the American University in Cairo, have promoted 'citizenship' education. The resistance they have encountered has not necessarily been about the ideas themselves, but often about the positions these organisations hold in society. In sum, though the ideas may be acceptable to policymakers, that American organisations, for instance, have instigated projects in Tunisia, Egypt and elsewhere is seen by some as external political meddling and not objective educational advice.

The purpose of this exploration is to understand the challenges of think tanks' research and advocacy for educational reform. Our intent is to decipher how the shaping of messages can take into account the on-going and complicated regional changes and still promote positive and productive educational reform. If we desire to influence educational reform, we have to ensure that our messages, and the vehicles we use to convey our messages, are appropriate, sensitive, and targeted.

In such a complex topic area, some serious questions must be asked. First, what responsibility or justification do researchers have to influence the stability of strong traditional cultures that have lasted for centuries, while working to modernise inequitable education systems? Second, how can international think tanks encourage educators to use education as a means for empowerment and peace, as well as for identity and cohesion? These questions guide our thinking as we explore the changing dynamics of the region in conjunction with specific targets of educational reform.

A brief remark about the boundaries of this analysis is necessary. Though the Arab countries are quite different, and perhaps becoming even more so, we examine a cross section of these countries via their education research and policy advice, because the region shares language, religion and traditions, as well as multilateral organisations (for example, the League of Arab States has considered education reform to be a priority). In no way do we intend to portray the countries as monolithic, but we do believe knowledge flow about education is greater among Arab countries due to the common language and multilateral organisations. Additionally, the educational heritage of the region shares a common bond, as early forms of education in many countries consisted of study and memorisation of the Koran. This in part influenced a focus on memorisation in contemporary formal education systems. Finally, Arab countries are often targeted simultaneously by think tank research and advocacy messages. So, to conclude, the countries we focus on in this chapter include those that are member states within the Arab League and our aim is to understand how education in this part of the world is guided by the work of think tanks.

The primary research team is comprised of Ted Purinton, a faculty member with the Graduate School of Education at the American University in Cairo, and Amir El Sawy, a graduate of the college. The American University in Cairo is an independent, not-for-profit university in Egypt that uses an American liberal arts curriculum and an American academic governance model. Though the university has a long history in Egypt, it has always been a comparably elite institution with nearly half of its faculty coming from the US or Europe. It has simultaneously been identified as an Egyptian institution and an American one; in the region, people regard it with a combination of respect and disdain. In short, it is an integral intellectual contributor to the region, as well as a perceived threat.

Our interest in exploring communication challenges for research organisations in the region is quite personal. We recognise that the elite and foreign status of the American University in Cairo is at times a benefit (in that society seems to be looking for solutions that a modern research institution is prepared to produce) and at times a drawback (it is often considered to be out of touch with regular Egyptian society). With that recognition, while producing a specific research project since 2012 – on STEAM education (science, technology, engineering, mathematics, with the addition of the ‘arts’) – we have had multiple conversations with researchers and communication staff at think tanks, funding agencies, technical assistance providers, and universities. Seeking feedback on the work, we have gained valuable insight into how to communicate solutions to governments, schools, reformers, and citizens.

A review of the literature

By and large, researchers, think tanks, and advocacy organisations have promoted the modernisation of educational systems in the Arab countries, and have conveyed this desire for modernisation by examining inputs, outcomes, and contextual social issues.

- Inputs are the resources of an educational system, such as teachers, textbooks, physical spaces, policies, and so forth.
- Outcomes are the results of the system, whether related to learning, social control, or social capital.
- Contextual social issues are the elements that may influence either the inputs or outcomes but are not directly controlled by the system. Common examples in educational achievement outcomes are socioeconomic status, the education level of the mother, or the nutritional levels of the children.

Starting with the contextual social issues, many reports have been released recently on youth dilemmas and post-university joblessness. The Brookings Institution, for instance, published a book in 2009 on general youth issues entitled *Generation in Waiting: The Unfulfilled Promise of Young People in the Middle East* (Dhillon and Yousef 2009). The book examines several countries in the region through the lens of various concentration areas, including employment, poverty, and education. The Middle East Youth Initiative, a part of the Brookings Institution, has had significant impact in the understanding of regional youth issues through its reports on the competing pressures of an interconnected, globalised world and the strong, conservative local social norms. A good example is Diane Singerman's work on the conflicts of marriage expectations, educational opportunities, and employment; her term, *waithood*, has summarised the awkward experiences that young adult Arabic people face as they delay marriage until later in life in the face of economic troubles (Singerman 2007).

Gender is a very common topic related to education. Reports such as the World Bank (2004) assessment, *Gender and Development in the Middle East and North Africa*, the Center of Arab Women for Training and Research (2009) report on *Arab Adolescents: Values and human rights*, and the Population Reference Bureau's *Empowering Women, Developing Society* paper (Roudi-Fahimi and Moghadam 2003), or the well-known (and wide-ranging) Education for All Global Monitoring Report, *Gender and Education for All: The Leap to Equality* (UNESCO 2003), have kept track of gender disparities in educational opportunity and outcome and have proposed various policies and practices to decrease gaps.

Among related social issues, these two – gender and youth – are the most well reported, but there is definitely a distinction in the literature between educational reform and social reform. However, to achieve equality effective reform, school systems themselves must be catalysts for the improvement of gender disparities. Indeed, many of the reports also concern themselves with reform in economic, political, labour and other domains, as gender inequality presents issues that are so widespread within societies and so deeply ingrained in cultures that they permeate multiple areas of life.

Outcome focused research usually uses economic measures to determine impacts of educational policies and practices. In the case of think tank research, economic analysis is used to promote different policies and practices. Often the outputs of such research – reports – are broader in scope than just education, though they contain policy recommendations for education, as it is seen as a contributing factor to the social outcomes. Research on how existing educational systems impact economic development has been particularly prominent. Studies such as *The Jordanian Economy in a Changing Environment*, published by the Center for Strategic Studies at the University of Amman (Saif 2004); *Enhancing Egypt's Competitiveness*, published by the Egyptian Center for Economic Studies (Reda 2012), or *Le Système Éducatif et les Classes Moyennes au Maroc*, published by Institut Amadeus (2010) see education as quintessentially linked with economic progress. Recommendations are usually quite vague in such reports, calling for broad improvements for the sake of the economy.

Finally, input focused research, which usually has the most prominent role in specific educational reform actions, focuses mainly on the technical and operational elements of education, including educational labour, teacher preparation, assessment, curriculum, instructional methods and institutional governance. For instance, the RAND Corporation has conducted multiple evaluation studies of reform efforts in Qatar, providing recommendations on student assessment (Gonzalez, Le, Broer et al. 2009). The Carnegie Middle East Centre has produced reports on citizenship education from a curricular perspective (Faour 2012; Faour and Muasher 2011). The United Nations Development Programme published a report on human opportunity, focusing on educational elements such as early childhood education, enrolment trends – the *Arab Human Development Report 2002: Creating Opportunities for Future Generations* (2002). As a final example, the Brookings Institution published a report entitled *Higher Education Reform in the Arab World* (Wilkens 2011). These reports provide specific guidance on the actual steps of reform, or they point to specific faults in the technical systems of educational programming.

A brief note is necessary on the distinction between contextual social issues (*outcomes*) and *inputs*. Though such issues as literacy are indeed educational issues, in the remainder of this chapter we will focus on *inputs*: specific actions that policymakers and practitioners can take with direct regard to educational systems. If the research merely examines an issue, such as literacy, without a technical perspective (i.e. involving *actions*), then we have considered it to be a contextual social issue, albeit one that deeply influences inputs and outcomes. The literature clearly shows that education both impacts on and is affected by so many other areas of society. It is worth bearing in mind that no report can accomplish everything at once, and no think tank can build expertise in all areas of need within a region or country.

Five main issues emerged from the STEAM education reform work regarding the challenges of research communication for education reform in the Arabic countries:

- international influence;
- the cultural role of Islam;
- cultural views about girls;
- the demographic transition; and
- political participation.

All five areas provide distinct communication barriers. Until researchers understand these, the kind of reforms they advocate simply will not take place. Our hypothesis is that researchers attempting to reform education must speak the language of the people affected, not the language of policymakers: mainly because the policymakers make political decisions based on their own personal experiences and understandings of education. Indeed, we posit that a policymaker's views will likely end up being shaped more by his or her role as a parent than as a politician.

International influence

To begin with, we look at the influence of internationalisation in the educational sector. The Arab region consists of some countries that have high oil wealth and low indigenous participation in the private sector: some that have crumbled under the negligence of dictators; some that have resisted gender equality; others that have embraced the modern world; and everything in between. One very significant challenge regarding education exists, however, in most of the countries: the remnants of European colonisation. Education is often considered to be a modern measure of economic development. However, with a lasting legacy of education programmes and teachers from abroad, or the emulation of other school systems, together with an increasing realisation of the impact of this on Arab cultural identity, citizens are engaged in sometimes awkward practices and decision making about education for their children. Whether attempting to build national identity through programmes containing outdated curricula or, conversely, choosing American, British, French, or German school 'brands' with the intent to increase social status, many Arab families consider educational decisions quite differently than their governments. Of course, this is not to say that governments are not themselves impressed with international models but, often, international models prevail for the sake of conditional funds (Ginsburg & Megahed 2010).

In countries such as Qatar and the United Arab Emirates, governments have appropriately targeted a growth in 'human capital' (i.e. the capacity of the workforce) through education to ensure both sustainable economies – given that their wealth is primarily a function of oil – and wider indigenous participation in the private sector. On the last point, a mismatch of the educational system to the skills required by the private sector has resulted in fairly high unemployment. In countries such as Egypt, Yemen and Morocco, education has not been reformed radically, but when reform has occurred it has often been in an attempt to boost the entire economy through

skills and knowledge or to comply with aid requirements (especially when dealing with such issues as gender equity) and international standards. In Gulf countries, many 'branch' campuses from universities in the United States and the United Kingdom have been set up in an attempt to increase indigenous 'human capital', even though impact has yet to be shown.

In contrast, in poorer countries, where fewer branch campuses have been set up, as the cost of doing so would likely be too high for their potential return, many locally owned private schools work hard to attract tuition fee paying parents by offering locally interpreted versions of American or British curricula. Increasingly in these countries, nationally focused programmes are also becoming more popular, as some parents wish to inspire local values instead. The issue of identity is supremely central to educational endeavours in the Arab world, whether it be related to upper class alignment to international institutions, in the adoption of international practices, or in the general unease with internationalisation.

As researchers encourage reform in the education sector, a serious challenge they face is how to walk the fine line between encouraging better education performance relative to other countries, and helping each country to identify their own unique approaches to their educational challenges. It is possible that the subtle issue of international influence is a political pendulum, where liberal international values are prised on one side, and conservative patriotic ones are prised on the other – without realisation that the middle ground, particularly incorporating international standards with local values, is perhaps the wiser route.

The cultural role of Islam

Education in Islamic societies has historically been posed as a means of understanding the word of God. In the early periods, prior to 1200 AD, a great diversity of instructional methods and curricula were used. By 1300 the role of education in Islamic societies took a decidedly narrower approach (Cochran 2011), with an increasing rejection of humanistic sciences.

Memorising the Koran became an important vehicle for attainment of religious inspiration. Additionally, didactic instruction was viewed as a way to transmit knowledge from the teacher to the learner in a way that would create a bond from one generation to the next. Most education scholars trace this approach through history to more modern methods.

While religion is still often part of the curriculum, even in public schools it is sidelined by the major modern school subjects: mathematics, history, literature, languages and humanities (except in certain religious schools, such as the Al-Azhar education system in Egypt). The prominence of memorisation and didactic transmission of knowledge characterises today's schools as can be seen in the prevalence of strictly lecture-based methods of teaching.

Cultural views regarding girls

While girls' schools have, for well over a century, been a central component of the educational offerings of most Arab countries, literacy and formal education for girls has, as in many other regions throughout the world, lagged behind literacy and formal education for boys. While much Islamic practice has historically encouraged girls' education, particularly in rural areas, the time and effort families invest toward the formal education of daughters is often quite a bit less than that of sons (Zaalouk 2004). We find that this is not due to 'Islamic views' of education for girls, but rather a result of family structures, developed through an intersection of cultural and religious values, dictating that women stay at home while men go out for work. If, for instance, the distance needed to travel to school in a rural location is long, a family may choose to keep its girls at home, as opposed to its boys, due to the cost of transport alone – taking into account the perceived higher return on that investment.

While many countries have increased access for girls, social norms continue to influence the equity of education in actuality, particularly in rural areas (Zaalouk 2004). Furthermore, social norms carry over into classroom practice. Traditional, religious attitudes to teaching do certainly play a role in the conservatism of Arab education, and, in 2013, there is still low access to education for girls in rural areas. In urban areas there is increased access, but still low equity. Though a country may make great strides in access, researchers must strive to be acutely aware of the content of education in classrooms increasingly populated by girls, and the ways in which teachers behave toward girls in their classrooms.

Demographic transitions

Across societies, as literacy increases, so does contraception (Courbage and Todd 2012). As contraception increases, older, more traditional ways of life begin to fade away. Families shrink, and women seek education and formal employment. In sum, '…cultural progress destabilises civilizations' (Courbage and Todd 2012).

Due to a current youth bulge in the Arab states and North Africa, in the coming years and decades great transformations will inevitably take place in the region. In addition, the development of new demographic transitions and relationships is being aided by the rise of communication technology.

Political participation

Finally, we focus on political participation, by considering two essential aspects: citizenship education for future participatory capacity and educational governance for existing educational policy. Curricula for citizenship education assume that children, young people, and young adults can learn habits, frameworks and skills for lifelong participation in political endeavours: from voting, to community service to active engagement in the public sphere. Political participation through the lens of

educational governance, on the other hand, focuses on those who make the decisions for educational institutions.

Although educational systems generally tend to mirror their societies, it should come as no surprise that, given the centralisation of educational systems, citizens have had little direct influence on educational policy. Of course education has been a mechanism of social control, but it has also served as a tool for larger political agendas. For instance, the Mubarak administration in Egypt (1981-2011) maintained strict centralised control of the Ministry of Education out of nervousness that local decisionmaking might provide inroads for regional political domination of the Muslim Brotherhood (Ginsburg and Megahed 2010). Although many think tanks focus on education policy for economic and human development reasons, the politics of what children learn in school – and the politics of who makes decisions about what children learn in school – are supremely important.

Developing a STEAM Education Centre: objectives and challenges

To illustrate how the issues relating to education reform can become critical hurdles for research communication, we will describe a portion of our own work on developing a STEAM[1] (science, technology, engineering, arts, and mathematics focused) education research centre in Egypt at the American University in Cairo. Working with many professionals – researchers, public relations specialists, communication experts, philanthropists, development specialists, and political analysts – we explored for this case study the various communication challenges that prevent reform from gaining traction.

STEM education is now a very popular concept in education reform circles, and many reports and conferences have put forward arguments and strategies for increasing and enhancing STEM education. Within the region, most find ground to criticise both the scientific output in the Arab region, and the educational opportunities meant to increase it (Adams, King, Pendlebury et al. 2011; Sawahel 2011). However, some necessary steps for reform have also been taken, and there have been some notable Arab scientific successes in the region (Brewer, Augustine, Zellman et al. 2007). UNESCO has also sponsored numerous conferences on science education for the region.

One main objective detailed in many STEM education reports and conferences is promoting the reform of methods of teaching. Such work intends to change the culture of teaching and learning in some of the more technical subjects by making it more hands-on, integrated and relevant. Most of this reform seeks to make science and mathematics instruction in schools more focused on problem solving than on rote memorisation. Yet other work on STEM reform aims to encourage economic

1 Note that the centre we refer to is called STEAM, as we have undertaken the inclusion of arts and humanities as a focal point in regular STEM education; but most global research, much of which we discuss here, refers to STEM.

growth through 'human capital'. Some of the work advocates for decreasing the gender gap in the sciences and in engineering.

STEM education curricula, as introduced in many countries, have been a seemingly simple solution for responding to reports about 'human capital' challenges, low scientific output and rote instructional methodologies. Despite such research trends, and the varying reasons for countries pursuing such reforms, the STEAM Education Centre was developed with the ultimate goal of encouraging interdisciplinary, hands-on, problem-based learning in schools and universities. The activities of the Centre are aimed at enhancing science and mathematics curricula and pedagogical methods to engage students, develop problem-solving skills, and maintain educational relevancy. It is the Centre's view that rote learning of science and mathematics curricula, and decontextualised pedagogy, have contributed to alienation of many students from those subjects, as well as limited skills for applying those subjects to real world problems.

As with all STEM reform agendas, two central problems exist.

- First, **it is easier for policymakers to insist on changing what gets taught when what they really wish they could do is change the entire educational system**. The implementation of revised curricula is fraught with socio-organisational challenges. A new curriculum is an easy target for policy analysts, as well as regular citizens, to turn to when critiquing educational systems, as it is both the content of education and an apparent (and sometimes) available product. As a result of its prominent role in education, and its place in the debates on the relevancy of social interventions, it is often seen as low-hanging fruit for analysts and critics.

- Second, **the curriculum is symbolic of the values that any society intends to transmit to its youth**. Thus proposals for change are often seen as threats. Indeed, science and mathematics do not carry much value-based baggage (compared to, for instance, citizenship education), but in a society that places great emphasis on transitional markers in education – the various tests to get into university, the awarding of a university degree, and so forth – curricular change can have very high emotional impact.

These two problems, from our experience, have posed essential challenges to gaining traction in practice. Because of the issues above, policy is the simple part: policymakers can encourage the modification of the curriculum, and that modification can reflect high-level policy goals that have policy-level salience. Such goals, including STEM, are both internationally savvy and economically-minded. Thus, through our case study, we argue that think tanks and research organisations may actually be targeting an incomplete audience with their work in educational reform. We show that policy-level reforms may be drastically insufficient for making any noticeable change.

Setting up the STEAM Education Centre in Cairo

In 2011, upon the prompting of many international research and donor organisations, the Egyptian Ministry of Education endeavoured to make STEM education a central goal in its reform strategies. Foundations responded by bringing in international speakers. USAID, the US Agency for International Development, responded by providing funding for five STEM schools to be created based on models in the US. Various other efforts were also initiated in order to strengthen the general education of mathematics and sciences in public schools.

In response to these policy initiatives, in 2012 the Graduate School of Education at the American University in Cairo opened a STEAM Education Centre as an effort to influence policy and practice for STEM/STEAM education in Egypt and the region. The following text summarises the objectives of the Centre:

> AUC's STEAM Education Centre has as its ultimate goal the teaching and learning of science, mathematics, and engineering at all levels and all sectors of Egyptian education. We believe that classroom instruction, whether in early primary grades or graduate school, should be dynamic, hands-on, intellectually stimulating, age appropriate, and fun; it should be delivered in a well-planned curriculum and assessed by authentic, performance-based measurements. Science, mathematics, and engineering, in particular, should be taught with interdisciplinary means in ways that encourage creativity, ingenuity, exploration, and life-long learning. We believe this is possible at all levels and that such dynamic teaching can reinvigorate the learning and assessment process for all subject areas in Egyptian schools.
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> STEAM conducts its work synergistically on three levels: (1) conducting rigorous research to inform and influence teachers, leaders, and policymakers; (2) providing school-based professional development, coaching, and instructional leadership; and (3) developing models of school-based reform, including instructional leadership models, data-driven decision-making protocols, teacher evaluation strategies, job-embedded professional development plans, and research-based resource allocation strategies. The centre examines STEAM education holistically by analysing all aspects of educational improvement.

The inclusion of the arts into the regular STEM reform concept is an added twist to this reform agenda. Whereas many STEM practices and policies aim to increase knowledge and skill in the mathematics and sciences, and to increase the attractiveness of engineering as a potential profession, adding a component for the arts is a way to ensure that skills in creativity and communication are enhanced simultaneously. As an illustration, classroom projects that simulate engineering activities (and attempt to address instructional learning objectives in mathematics and sciences) can include design components; rather than just 'solving' problems, such approaches also encourage students to think aesthetically. Another example is addressed directly by ABET accreditation standards (standards for accreditation for

university engineering programs): a significant emphasis has been placed on ensuring that engineers can, in addition to being competent in their disciplines, communicate clearly to non-engineers and lead team-based projects, among other things.

Many aspects of the development of the centre demonstrate both challenges and possibilities for how think tanks and university-based researchers might influence practice and policy. To summarise these challenges and possibilities, we outline two critical issues that we have encountered: practice and implementation.

Implementing STEAM reforms

Integration of subjects and instruction through problem-based learning requires a significant amount of knowledge about certain kinds of teaching that many teachers do not possess and an acceptance of educational philosophies that many teachers and parents do not have. As an illustration, in 2012 we invited teachers and leaders from local schools and universities to various public lectures with distinguished researchers in education from around the world. Attempting to include them in the creation of STEAM education policy in Egypt, we believed it would be both technically necessary for them to understand STEM/STEAM in the international context and organisationally decent to include them in the high-level conversations. The effect of this has been undesired, however, as we have prompted great confusion. In our attempt to get the highest quality and most current research to the teachers and leaders, we did not address some of the more fundamental concerns they have about the educational environment, such as classroom management, authentic assessment and student-centred methods of teaching.

In this case, our communication was not tailored to the audience: we made the mistake of assuming that these teachers and school leaders had the same concerns as policymakers and researchers. Teachers were confused about the more complex topical presentations that were understood easily when presented in other countries. Leaders were frustrated that the most common issues of pedagogy continued to be ignored: they wanted teachers to refine skills in instructional differentiation (handling learning disabilities in general classrooms) and behaviour management. We clearly dealt with different issues to those the audience needed and wanted. Other examples of this have also been seen in trainings, publications, reports, and consultations. Though we wanted to move forward with some very cutting edge ideas, quite often we first needed to deal with the basics.

Equipping teachers and school leaders with evidence-based instructional strategies is important, as practitioners must carry out the work themselves. However, it is equally important that students and their parents are convinced of the merits of such strategies as well. The incentives within the larger system of Education in Egypt are skewed toward assessments that test very narrow knowledge (i.e., the tests ask for discrete bits of knowledge without consideration of their application or issues of interpretation, as many modern tests are capable of doing). Students in Egyptian schools take the Thanaweya Amma (‘general test’) high school assessment that has

tremendous influence on university admissions and career trajectories, and so an industry of private tutoring has proliferated around it. For that reason, at schools that charge tuition in particular, even the most innovative ideas are often squelched due to the pressures of the tests (Herrera and Torres 2006). Indeed, simply changing curricular content is much easier than changing what gets taught, and how. In other words, official curricula often do not match the actual content taught within individual classrooms (Coburn 2004; Spillane 2006). Added to this, many textbooks in Egypt are considered to contain factually incorrect information (Dakkak, 2011). With all of these issues in mind, despite the possibilities for inserting STEM/STEAM concepts into curricula, instructional practice, policy guidelines and funding streams, some significant challenges are still there, and the centralised textbooks that contain information on the tests are still seen as of critical importance to families and students.

One interesting example of this came from a recent funded project on new STEM high schools (carried out by another agency, but with some support from the STEAM Education Centre). With the establishment of the first school in 2011, the Egyptian STEM school project has focused on the curriculum, mainly as a way to find a way around the Thanaweya Amma. To accomplish this, existing national textbooks were barred at the school, in favour of pre-approved websites, hands-on projects, and other textual materials that had not been produced by the Ministry of Education. Yet students still obtained copies of the old textbooks and read them, even without requirement, primarily out of concern that they may, ultimately, be held responsible for some of that knowledge, even though the school insisted that would not occur. Imagine: over a hundred teenage boys sneaking science textbooks into their dorm room beds at night! This alone is evidence of the force of institutional practice on culture.

Our experience demonstrates that the route from policy to practice is indeed long. We aimed initially to focus mostly on policy, and yet, we recognised that policymakers could not, in fact, assist us in our endeavours. When it comes to education, the people who carry out the work and are consumers of it are perhaps the more important actors. One particularly interesting example of how we incorporated this recognition that citizens could be at the front-line of educational change came from some work we did with another new STEM school established outside of Cairo by the Egyptian government under the USAID project. We deliberated over how evidence-based practice could best be integrated into the school, amid the heavy constraints of the test-based culture. In the end, we decided strongly against having researchers provide the evidence-based information directly. We believed that our communication skills were better honed for policymakers, and that we lacked the experience to make the communication successful. So, instead, we recruited young graduate students to shape the research messages in a way that takes advantage of their closer generational similarities. For instance, many of our graduate students were directly involved in the revolution on 25 January, 2011; even though they are just a few years apart, many of the high school students watched from the side lines. Of all our communication techniques this personal connection, in encouraging conversations

about the benefit of innovative education – and the simultaneous real-life examples from people who have made it through university and are now in graduate school – has been hugely successful. Students, themselves, have changed how they talk with their parents about the school: they have become more positive about the benefits of a STEM education. This showed us, albeit in a minor way, that think tanks and research organisations indeed should look to address the 'street level bureaucrats' and people providing good community examples at least as much as policymakers (Lipsky 1980).

Conclusion: recommendations for researchers and think tanks

All in all, we have come to understand that research attempting to influence policy and practice must reach all parties in an educational context at the levels of complexity that fit them best, with regard to their applied function in the context. Each party has a responsibility to communicate with the audience in mind. In previous decades, education reform ideas were communicated directly from think tanks and funding agencies to governments that implemented them quickly and often poorly. Following the recent revolutionary wave, we believe that researchers must communicate with citizens. In Egypt, with a population that barely trusts government at all (in early 2014) – and education being a political issue that is so personal to many families – we have learned that citizens must be given the opportunity to engage with the ideas that we, as researchers, would like to see implemented. Citizens themselves have to ask for reforms with specific, tangible, local solutions, from their governments. If we continue to promote ideas only to governments, we know these ideas will not hold in society.

To conclude, we come back to the larger picture of educational reform in the Arab countries and consider the five frameworks discussed earlier – international influence, the cultural role of Islam, cultural views about girls, the Arab demographic transition, and political participation – describing ways in which researchers could be both more strategic and more accesible in how they communicate to their target audiences. We also close each sub-section with lessons that we, as researchers, will implement in our future work with the new STEAM Education Centre.

International influence

There is a tendency in educational policy communities to compare surface-level features, and adopt merely those features without understanding the underlying contextual features. For instance, education ministers throughout the world have noted the educational successes in Finland and Singapore, and have attempted to copy the most apparent strategies: lengthier teacher training, greater selectivity in teacher preparation programs and targeted, low-stakes assessments (as opposed to constant, high-stakes, year-to-year testing). There are two essential problems to consider with this kind of comparison. First, there are differing underlying cultural views of teaching. In Singapore and Finland, teaching is regarded as a more venerable profession compared with many other countries and this, in turn, permits higher

salaries in exchange for more extensive training, more selective recruiting, and more focused classroom practice. In most countries throughout the world, teaching tends to be viewed partially as low-skilled labour, partially as caretaking. As a result, professionalisation attempts, though successful in Finland and Singapore, have not been as successful in other countries for a combination of political, economic, and social reasons, usually unique to each country.

The second problem with importing ideas from successful countries – commonly termed 'borrowing' – is demographic. Singapore and Finland are wealthy countries. While Finland has less diversity, Singapore has a more tightly controlled government; in both cases, dissent is not as prevalent in educational policy as in larger, more diverse, and more economically volatile countries. One might reasonably ask why United Arab Emirates (UAE) has not had as much success with educational reform: after all, it is a small country, geographically, and very wealthy. Why has it not been able to adopt similar policies and achieve similar successes? While some of the answers will become more apparent as we move through the five analytic frameworks, one way to think about this is that the UAE, though wealthy, is not economically stable. With a massive foreign population doing significant amounts of its professional labour and a less educated indigenous population doing much of its government work, the UAE government itself has shown concern for its economic stability, given volatile oil markets. In an attempt to increase indigenous 'human capital', the government has imported a variety of universities through branch campus arrangements, and it has continued to import many foreign educators. While these are significant steps toward improving educational outcomes, unless education is regarded as an esteemed profession – and unless Emiratis build capacity within their own population, rather than importing it – the educational system will continue to be externally driven.

Though the Arab countries will continue to experience economic volatility for some time, educational policy can only move forward with an appropriate understanding of social, political, and economic contexts. Without these, researchers and think tanks will continue to send Arab countries on rat races, by advocating policies on the merit of them being adopted elsewhere. Indeed, the Arab countries should test specific strategies used elsewhere, but their adoption must be exercised within the broader contexts of local constraints. And researchers can convey that message better if they seek to understand those underlying issues first.

With regard to the new STEAM Centre, we have noted a major problem in implementing various strategies. Schools, teachers, parents, students, and policymakers wish to see the programmes and strategies that are implemented in Europe and US to be replicated in Egypt. While such desires are important, effectiveness of such efforts is hindered by the limited exposure the participants have had with the model schools and teachers. Additionally, much of the literature we have used to justify and promote the STEM idea comes from Western Europe and the US. Too much of the research that guides education reform in developing countries comes from the 'best practices' of developed countries. In some regard, this is because the

market for such research at the university and practice level is much more developed in these countries. But it simply does not work, both for technical implementation and for cultural reasons. Developing a literature at the site of implementation is essential for citizen and policymaker acceptance, and will become a far better practical tool.

Cultural role of Islam in education

The view of learning as memorisation, rooted in early conceptions of personal religious development, persists within Arab cultures. As in many conservative traditions throughout the world, there is a tendency to view phenomena in terms of right versus wrong, as opposed to a more liberal spectrum of diverse social systems and interests. Reforming the memorisation-centred learning culture is not as much an issue of 'modernising' the curricula as it is of broadening the number of methods at people's disposal. 'Modernised' curricula will make little difference in practice if the teaching and learning processes do not also adopt diverse systems, and learn from them. As researchers, we must demonstrate school-to-school, teacher-to-teacher, student-to student, that this is possible, and must choose advocates who are a good fit as communicators in each context. In choosing those advocates, we are reminded of Rogers' (1962) diffusion model: new adopters are mainly convinced by seeing that others have had success with an innovation.

As we have shown, researchers may have a stronger impact if they modify who they see as targets for educational reform. As has been documented, although a high-level curriculum is an easy target for education researchers, and is readily accessible for critique, more appropriate targets might be assessment systems, and parents', students' and teachers' cultural perceptions of knowledge transfer. In terms of the STEAM Centre, we have already had some success in changing educators' and policymakers' views regarding interdisciplinary, hands-on, relevant instructional methods. But we recognise that we will need to engage in a broader campaign to demonstrate its benefits before we convince many Egyptian citizens of the value of these innovative educational practices.

Cultural views regarding girls

Researchers have found over the years that it is easier to increase girls' access to schools than to increase attendance or to change teachers' and parents' views about the potential of girls: both during the learning process, and in the subsequent labour market. Think tanks can continue to push for access – which is still needed in many Arab countries – but that access will do very little if there is little perceived value in girls taking full advantage of that access.

Therefore, researchers and think tanks can have a much more effective role in this if the target of reform is broadened from just the political system to the communities and families involved (Zaalouk 2004). In a sense, what it means is that think tanks and researchers must strike up a more direct conversation with communities.

While this may be less comfortable for researchers who have become accustomed to working at the interstices of power, usually in cosmopolitan capital cities, it seems this is the only practical and honest way for foreign reformers to move girls' education forward in other countries.

While teachers and parents must be constantly reminded about the equal potential capacity that girls and boys have in the sciences, we also recognise that these girls will soon graduate into a society that does not necessarily agree. Thus, we will increasingly need to show what gender equity looks like in practice. This means that researchers, once again, must address citizens directly, not just governments. Indeed, the Egyptian government has permitted and even supported schools and educational reforms that benefit girls for quite a long time; in order for those schools and policies to matter, people must be the direct recipients of knowledge and ideas.

Demographic transitions

Just as think tanks and researchers must honour their responsibility to communicate strategies and the reasons for curricular modernisation, increased access and the modification of assessment structures, they must also pay close attention to the new and unique realities that will present themselves in the coming decades.

Researchers working in poorer, North African, Arabic speaking countries such as Morocco, Egypt, or Libya, for instance, can learn not only from the successes of educational reform in the developed world, but also from the failures. Similarly, researchers working on educational problems in the wealthy Gulf Cooperation Council countries must heed the decades of failures associated with the transplantation of educational institutions from one country to another. In many ways, researchers must develop the capacity to think beyond their own research and the canon of educational literature as it currently exists.

Thus, it is increasingly important moving forward that the STEAM Education Centre in Cairo is a producer of local knowledge for local consumption. This is a hard aim to achieve, as the ideas seem appealing to parents and policymakers essentially because they are imported from abroad. Yet, consider the distinctions between STEM reforms in the US and Germany, and the purpose of the STEAM Education Centre in Egypt: in the US, for instance, STEM education is often thought of only as a method of increasing interest in and capability for engineering and science professions. In Egypt, engineering is an extremely popular and competitive profession already. Demographically, methodologically, the issues are radically different, and therefore, the methods of addressing them should also be very different.

Political participation

This frame is perhaps the best place to conclude, as it reminds us that real democracy and genuine citizen decisionmaking would prevent policymakers from implementing reform in a vacuum. As we have tried to show in this chapter, messages about

educational reform may be less appropriate in the hands of policymakers and more appropriate in the hands of the parents, students and teachers. Citizens of Arab countries regularly express dissatisfaction with their educational systems. With the right strategies, citizens could be more instrumental in creating reforms that will yield the outcomes they desire.

In terms of upcoming research communication for schools development proposed by the STEAM Education Centre, we will engage in the development of new school-based governance structures, to encourage students and parents, as well as community business owners, to have a say in school management. Indeed, we see this as an essential method of communicating to the Ministry of Education the ways in which education can occur. Demonstrating good governance is best done in practice, we believe, by coaching participants through successful processes.

One central reform agenda in the developed world has been to increase the amount of knowledge that parents have about schools and the educational process, in part to increase competition between schools. While the merits of such a strategy are still being debated, it does send a powerful message that the process of education cannot and should not be kept a secret from those who use and benefit from it.

Educational reform is complicated work made more challenging by its interconnection with nearly all aspects of political, social, and economic life within countries and cultures. Ultimately, in a dramatically changing and increasingly vocal region, we find that the most powerful audience for educational reform is not, in fact, the policymakers, but the people. Thus, we must encourage new approaches for think tanks and universities in communicating research, possible outcomes and innovations directly to citizens in Arab countries. In many ways, for educational systems to improve, think tanks must begin to see their role in the region as actual educators.

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