

Observations on startup and operational challenges for US engineering programs in the Middle East

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Abstract

The increasing need to educate students to prepare them for work in a global workforce has resulted in a rapid increase in the number of western universities establishing campuses abroad. While international exchange programs and collaborations are widely applied and offer a valid alternative to convey global competencies to the students, the establishment of a branch campus offers additional systemic advantages, such as the seamless integration of the academics, a more international projection of the university, and additional global access points for students. In addition, the host country often is very interested in attracting highly regarded western institutions, and generally provides appealing conditions for the establishment of a branch campus. While this framework depicts a winning combination, the reality of startup and day-to-day operation often uncovers unexpected challenges; this work discusses observations in establishing a branch campus and implementing US engineering education in the Middle East (specifically in Dubai, UAE).

Startup challenges may manifest at many levels, ranging from alignment of expectations among between host and the US Institution, to student recruiting and market penetration, to classroom challenges regarding the implementation of typical US education values (such as independent thinking and personal initiative, which often represent a new approach to learning for the local and regional students, who originate from school systems that stress other approaches). In addition to attaining name-recognition and visibility for the institution in a highly competitive market, the difficulty in recruiting top students is compounded as typically the tuition of US Branch Campuses needs to be significantly higher than that of the local government supported institutions (which are typically free for nationals). Moreover, the academic success of the students is also conditioned by social values and rules, which may differ from those typical of the western world (and due to the highly diverse student population of the region may differ significantly within a single cohort), and can have a direct impact on the effectiveness of a US style engineering curriculum delivery.

It is important for institutions with the intention to deploy internationally to consider these challenges for a successful program implementation, and this paper reviews observations and lessons learned, as well as some specific initiatives undertaken by university faculty and administration to enable Middle Eastern students to succeed in a US Engineering program.

Introduction

Higher education institutions worldwide are under pressure to adapt to the rapidly changing requirements of a global workforce environment. These pressures may be analyzed at many levels ¹, for example one of increased global exposure, increase in student recruiting, globalized research opportunities, and finally – and perhaps most important - universities worldwide are faced with the challenge to produce graduates that are ready to engage on a global stage. International skills, such as successfully negotiating with international partners, or collaborating on multinational design and engineering teams, imply a new set of skills that higher education needs to impart: global competencies ².

There are many alternatives to imparting these competencies ³, and the most effective one arguably is to provide "full cultural immersion" experiences for the students. These again can take on a variety of forms ⁴, such as exchange programs, partner institutions, summer travel abroad, etc, however the one that guarantees the greatest level of compatibility with the programs offered at the home campus is the one of establishing branch campuses. The trend to establish branch campuses has proliferated worldwide ^{1,5}, in particular in high growth locations where local students would otherwise not have access to the home campus.

However imparting global competences is not the only reason for Western institutions to seek to establish branches abroad ⁶. Projecting the Institute name and student access globally can add a dimension that is very beneficial in today's competitive market. Some Institutes even build their entire corporate image on the globalization of their programs in the form of international branch campuses ⁷. Thus establishing an international presence in the form of a branch campus goes beyond enhancing student education, and includes a strengthening of the brand and competitiveness in both the local and global markets.

The Middle and Far East has developed into a prime attraction point for US universities^{8,9}. In particular the Gulf Region, and due to a favorable political environment that is both resource rich and tolerant of western lifestyle, while at the same time being strategically located to access all population intense markets of India and China, as well as the Middle East and North Africa (MENA) countries, has seen the establishment of a number of US institutions over the past decade ¹⁰. These institutions have had mixed success; some have prospered and developed into centerpieces of the educational landscape ¹¹, while others have had to close within a year or two of opening ^{12,13}. Of particular importance is the funding model pursued by the respective University and country or Emirate; while fully government funded institutions (such as NYU Abu Dhabi¹⁴ and Masdar Institute of Science and Technology (MIST) – technical not a branch campus, but built with direct involvement of MIT¹⁵) have sufficient backing to rapidly develop world class infrastructure while others, in locations that are less philanthropic in their higher education investments into foreign institutions, discover that they cannot survive in a highly competitive market. Further examples exist, where western style institutions were initiated but closed after only a a short period of operation (i.e. Dubai Aerospace Enterprise University), or where insufficient student numbers have triggered the closing by generating a lack of commercial viability, such as for the University of Waterloo, or Michigan State.^{12,16}.

Thus while a series of advantages speak towards establishing a branch campus, also a number of challenges are created in such an international deployment. From an academic perspective, it becomes imperative to ensure adequate delivery of the academic programs (which may or may not be identical to the home campuses'). The successful implementation of these programs, in particular if they need to be aligned with multiple accreditation bodies, may be challenging ¹⁷. From an operational perspective, western universities expanding into the Middle East encounter a mix of student skills and attitudes that do not fit seamlessly into the US Education mold ^{10,17}. In addition, the student recruiting process and admissions timing differs significantly from western models, and the university selection and decision-making process becomes a family affair as opposed to a student's personal choice. Often religious factors play an important role, such as choosing institutions that conform in a specific measure to traditional Islamic values such as gender separation; this often becomes a point of difficulty for US institutions who, in order to

maintain their basic values, need to find special arrangements that may even contradict the law of the land (for example in regards to internet access and freedom of speech 8,9).

This paper draws from the author's observations of the entire academic community in Dubai. The observations reflect both a systemic perspective regarding campus formation, faculty hiring and campus consolidation, as well as an operational perspective regarding attracting, maintaining and graduating top quality students, and the peculiarities resulting from the highly diverse environment that emerge in the classroom.

Discussion

The challenges presented here are roughly divided into startup challenges, which typically are temporary in nature and occur between the decision of establishing the branch campus and the first intake of students, and operational challenges, which typically emerge during the operational phase of the campus. The challenges discussed here are those which have been observed in practice, and are by no means exhaustive. In particular, the focus relies on challenges that have direct repercussion on startup and subsequent daily operation, and do not include an analysis of the business viability and financing of the branch campus.

Startup Challenges

Leadership selection

A new branch campus is a startup operation by definition, and thus requires the simultaneous creation of the appropriate physical and human infrastructure to recruit the first cohort of students and initiate operations. It is a difficult task to strike the appropriate balance between the necessary startup costs to establish an infrastructure capable of running the university and delivering the courses to the same standards as the home campus, to those startup expenditures desirable to also generate an image that attracts students and conveys credibility in the academics (and also longevityⁱ) of the institution. This startup process invariably requires a centralized governance structure more resembling that of a corporation rather than the typical shared governance of a University. While such a structure is needed during the initial years and until a critical mass has been attained, in order to attract and retain high caliber faculty, a smooth transition to a shared governance environment needs to be initiated at the appropriate time. In addition to these challenges, the location of the branch campus often places special requirements on the leadership. This is particularly important in the Middle East, where personal relationships dominate the business interactions that are critical for success. This requirement demands that the branch campus leadership be well versed and connected in the host country, which in turn may require a leader rooted in the local environment. On the other hand, this strong and centralized leadership required for this initial phase, combined with possibly local origin, may generate interaction challenges with the established governance structure at the main campus.

ⁱ Due to the already frequent and public closing of Institutions of Higher Learning in the UAE, the potential students are starting to incorporate a consideration of "will the university survive" into their choice. This reinforces the gravitation towards the older, more established institutions, and makes the startup phase for any new campus more difficult.

Organizational structure and accreditation

Is it viable that the faculty members report to the home campus department chairs (who are generally far away and unaware of the peculiarities of the location and day to day challenges, but at the same time need to ensure the academic rigor of their department), or should the branch campus generate its own departmental structure to ensure alignment with the local needs, both from a student and from a faculty perspective? This point may have direct repercussions on the accreditation status of the branch program, as well as on the faculty satisfaction and retention, as discussed below. Perhaps an intermediate solution could be considered, where local independent departmental structures are developed (including oversight and assessment internal to the respective branch campus, and which may transition to a peer basis as shared governance is increased), but which at the same time are aligned with the main campus by appropriate relationships between the branch and home campus chairs that ensure upholding of the academic standards.

Another important point in the organizational structure, and one that has direct implication on accreditation status, is the degree of curricular flexibility between the locations. Some degree of flexibility is needed due to the differences in teaching resources and laboratories, quality of students, and qualification of faculty. This need can be difficult to embrace for departments that pride themselves of a long history of success, and an established and fine tuned curriculum. The branch campus faculty, generally not being representedⁱⁱ in the curricular committees of the main campus, has little input in home campus curricular decisions, and thus has very limited influence in shaping the curriculum to be suitable for the branch campus. This leaves only two options: either the branch campus receives an appropriate level of curricular independence (for example ensuring alignment of the outcomes, but not of the week-by-week content), or a decoupling of the accreditation process from the main campus may become necessary (which can have negative repercussions on the marketing of the university and degree to the local students). An additional difficulty in maintaining strong overlap between the courses in the home and branch campus, may be different accreditation requirements that need to be applied at the branch location and that may be in disagreement with the home-campus accreditation requirements. For example, accreditation in the UAE is carried out by the Ministry of Higher Education Commission for Academic Accreditation (CAA), which imposes different requirements (a more prescriptive process is followed than the outcomes-based ABET accreditation) than in the US.

Upholding home institution values

A secular, coed education, with full freedom of speech defines the basic character of most western universities. Some of these basic premises can be illegal in countries in the region where freedom of speech is not guaranteed, and religion is engrained in every aspect of daily life. It is thus imperative for universities establishing a branch campus to clearly articulate the operational mode and the level of departure from its intrinsic priorities that it can accept, and thus thereby assess the viability of the endeavor. This compromise between identifying institutional values and local law can be difficult to attain.

ⁱⁱ Due to distance considerations.

Operational Challenges

Once the university reaches operational stage, challenges emerge in the day-to-day interaction with and learning process of the students. These challenges are compounded by the very diverse student body composition, and are well aligned with the typical diversity related challenges in the USA. However, a majority – minority is difficult to define, as the classes are often composed of a series of national or ethnic groups. This very multinational composition has a series of implications that can be observed:

Faculty recruiting and retention

In order to uphold the quality of the academic programs at the branch campus, it is imperative to recruit and retain highly qualified faculty, often with the requirement of having specific experience teaching in a western curriculum. Faculty that possess these criteria generally have spend a significant portion of their academic career in a western country, and thus have developed in and acquired the values of the traditional, research-driven western academic environment. While financial considerations may play a role in transitioning to a startup university in the Middle East, the career development and advancement obstacles faculty encounter on site often result in a decline of the offer of a stay of reduced duration, and thus a high faculty turn-over rate with its associated negative connotation towards the student body. The career development and advancement obstacles typically are:

- High degree of teaching focus at the branch campus. This is for two reasons; the first being that a primary objective of the branch campus is to quickly become self supporting (unless the institution receives significant financial support from the government, which is only the case in a very limited number of institutions), and the only revenue stream is students; thus the course offering has to be maximized with a minimum number of faculty.
- The second reason is the lack of research opportunities and the associated revenue stream. Research expenditures in the UAE (as a percentage of GDP) remain at very low levels when compared to western nations (0.02%, as compared to 3.8% for Sweden ¹⁸, with limited more recent data available ¹⁹). Until recentlyⁱⁱⁱ, the only research grant awarding entity was the Emirates Foundation for Philanthropy, with very limited funds aimed at supporting research in a small number of fields. In addition, the award process often extends over multiple years, making it very difficult to plan research activity. The few Universities that have a research component in their activities, generally receive funds directly from the sponsors, and allocate them internally (and thus without undergoing a comprehensive competitive selection process). It is thus significantly more difficult for faculty at non-government funded universities to develop a research portfolio within the UAE without bringing funds in from abroad^{iv} than in, for example, the US. This severely

ⁱⁱⁱ The ICT fund has recently been participating in the allocation of funds towards scholarly development.

^{iv} Funds from abroad are typically not available as national funding agencies such as the National Science Foundation do not fund projects abroad. In addition, there are strong limitations on allowed transfer of knowledge between the Middle East and many western countries, further limiting availability of foreign research capital.

restricts the advancement and development opportunities of untenured faculty, which in turn decreases the attractiveness of a UAE position for untenured faculty in a careerbuilding phase.

• Lack of tenure opportunities. Due to the specific labor laws of the UAE, and the often foreign status of the faculty working at branch campuses, a tenure process such as the typical American tenure and promotion process is difficult if not impossible. In addition, and depending on the corporate structure and the governance of the University branch campus, faculty contracts are typically made with a local corporate entity and not with the main campus, and thus no tenure and promotion possibilities are available. The upholding of the same academic standards and the assessment of these standards from the main campus, while not having the same input or rights than the home campus faculty, can lead to a perception of a "second tier teaching only" faculty group at the branch campus.

The cumulative result of these difficulties is that recruiting and maintaining competent faculty is difficult and undergoes a high turnover rate²⁰. Faculty that moves to the UAE is either often very early career, who have difficulties to find tenure track positions in the US (and thus possibly not optimally qualified to deliver first rate instruction), or late career, who no longer have a research focus and view their tenure in the UAE as an extended cultural visit (and where also the motivation to deliver first rate academic performance might not be as pronounced as for someone in a research inspired, peer reviewed tenure process). In addition, there is a third group that seems to dominate the teaching scene of the branch campuses: the western-educated faculty who have roots or personal interest in living in the Middle East. They are willing to move to the Middle East at their career prime and adapt to the more limited opportunities for publications and research. For them, a place like Dubai presents them with a perfect combination of career and culture.

Other approaches for staffing the branch campus include temporary exchange; for example Waterloo and RIT (for some of its programs) have created successful models to attract faculty from the main campus who come to Dubai to teach for one academic term. This however entails the difficulty that often tenure-track faculty are reluctant to spend more than few weeks away from the main campus, as their home-campus research activities are disrupted. Temporary exchange is best implemented in courses and degree programs (and this is often not adaptable to engineering) that can be condensed to a few week of blended online and in-class instructions, and thus do not require extended absences from the main campus.

Assessing University-readiness of incoming cohorts, and developing success skills

The educational attainment seems to vary significantly across the different high-school systems in the region and when admission is heavily based on students' GPA in high school, the students perform differently in classrooms. This is evidenced by the typical bi-modal distribution of the students' cumulative GPA performance and by the significant percentage of students who are below their nominal academic year-level status. Though this model reflects a quality grading system and maintenance of teaching standards, it presents challenges to the branch campus that leads to the expansion of the core programs in order to offer fallback options for students not meeting the high GPA requirements of their majors or decide to remove the underachieving students from the institute. Both solutions can be costly and detrimental to the future operation of startup institutes.

A question on whether to administer a standardized university entry test such as the SAT can be raised. The difficulty in administering and requiring a standardized test such as the SAT is that the SAT is aimed at assessing a US secondary background, which is rarely the case for incoming students in the region. Requiring such a test can decimate the applications (not necessarily because of lacking readiness, but because of the hurdle this unfamiliar test represents), and thus admissions decisions often tend to be based on GPA or class rank in high school (the SAT being optional). However, the TOEFL (Test of English as a Foreign language) is a test that is well known and universally administered in the UAE, and can be (and is typically) included as an admissions requirement.

In addition to assessing the academic readiness, which is a systemic admissions challenge, the professors in the freshman courses are confronted with students who struggle with the behavioral components required to succeed in a US-style engineering program. These components include study skills, time management skills, communication and teamwork skills, as well as a different notion of what constitutes plagiarism and cheating, and require a deliberate effort by the faculty and institution to address these shortcomings². Specialized student success course components have been proven to be effective; if not in "normalizing" the diverse skillset, at least in raising awareness of the need to develop this skillset. Developing these habits requires a continuous effort in all courses throughout the curriculum (not just the success course), and faculty should include corresponding components in the course assessment.

Remedial work in Mathematics and English is required by most incoming students. Given the often difficult to assess entry qualifications, Universities typically offer "bridge programs", that allow students that may be qualified based on the entry requirements, but who do not place into the first year typical calculus courses of the engineering programs, to start their studies.

Career-oriented curriculum and integration of the coop education

Programs that integrate cooperative education in their curricula can be a challenge in countries like the UAE. Strict labor laws and visa requirements for non-Emiratis, combined with a lack of tradition of experiential education components, make it difficult to establish and require US style coop education curricular components. In the case of RIT, engineering programs integrate a 50-week cooperative education that can be completed in 4 blocks (2 semesters and 2 summers). In order to ensure a meaningful work experience related to the student's field of study, employers are asked to extend a compensated work experience to the coop students (this is the Rochester model). This model can be particularly challenging to implement in the UAE, where any industry experience component required by bachelor degrees is typically fulfilled through unpaid internship experiences, which may not reflect the depth of exposure desired by the university. In addition, Emiratisation can limit number of coop options for non-Emirati students. However, the whole region remains open for the students to accomplish their coop education.

National clustering and social hierarchies

The transition from the respective secondary education system to university can be a challenge for the local students. The UAE and Gulf States being societies with a tribal social hierarchy is

present in the differing, nationality inspired, secondary school systems that often reflect the specific national values. The graduating students form these systems feel most comfortable in the company of peers who have similar backgrounds, and thus a first observation is a clustering of students if not by national origin, then by secondary education background. This clustering often reflects the social hierarchies in the UAE, and groups of Emirati students tend to represent the most dominating group, with other ethnicities sliding into the roles that they are accustomed to in the UAE society. The resulting undesirable multi-class formation within the student body, where students often seek to remain within their "comfort zone" of peers that are of similar ethnicity and who have a similar background and learning style, make it challenging for faculty to stimulate the cross-cultural class dynamics necessary for effective building of global competencies. This is perhaps most noticed when US study abroad students join a local class, and requires dedicated measures by faculty to stimulate collaboration among the groups ⁴.

Recruiting and retaining student in engineering disciplines

Attracting and retaining students in the Engineering disciplines is of critical importance to achieve the transition to a knowledge-based economy ²¹. Engineering students are often frustrated during the first two years of their college due to the lack of hands-on learning experience and the high concentration of foundation courses in mathematics and physics ²². They are essentially detached for too long from what has brought them to engineering as a discipline of building, designing, and optimizing systems. To improve student retention and engagement in engineering, RIT introduced 1-credit hour lab courses for freshmen students in electrical and mechanical engineering that are hands-on focused, but educationally comprehensive. The objective of these courses is to engage students from day one in the best practices of the engineering programs through learn-by-doing approach. They learn how to operate the lab instruments and the basic offerings of the CAD and engineering tools they will use throughout the course of their 5 years program and professional career.

A second challenge is recruiting and retaining Emirati students into the engineering disciplines. Emirati secondary education, with few exceptions 23 , does not provide a solid basis for success in STEM fields²¹. In addition, although significant efforts are being made towards further "Emiratisation" of the workforce, the primary employment destinations for Emiratis continue to be government offices and government owned entities, which often require more managerial skills rather than STEM. Financial considerations also represent a strong driver towards the state owned universities, as tertiary education is free for Emiratis, and student life is subsidized with significant monetary stipends. It is thus a challenge to attract and retain Emirati students into engineering programs, both at graduate and undergraduate level, and can best be accomplished with financial incentives to approach those granted by the state institutions. This year, the UAE government through its ICT Fund entity, has granted RIT Dubai 24 scholarships allocated equally between bachelor and masters programs. The scholarships give students a monthly stipend and pay for their university fees. The scholarship fund allowed RIT Dubai to tap into a new recruitment domain of Emirati students who have traditionally preferred the public universities for their higher education, but at the same time it presents new challenges for RIT Dubai. In particular, some students did not choose the engineering and networking because they have demonstrated particular attainments in math and physical sciences; rather it is the combination of the American education and the scholarships that have attracted them to these programs. In comparison to last year (without the ICT scholarships), most of the Emirati students who joined RIT Dubai chose business for their study while electrical engineering and networking (the ICT scholarship disciplines) saw a very small enrollment. This year, while it is early to project the retention rate in the ICT disciplines, there are already some indications that students are looking for transfer alternatives after they completed one term of study and some have already declined the scholarship after few weeks of study.

In addition to these factors, simple day-to-day challenges, such as the need for developing a policy regarding allowing or not class interruptions during prayer time, or the attraction and retention of female students (specially in the STEM fields) without providing strict gender separation on campus, may represent a significant acceptance challenge in the conservative Emirati society. It may constitute a significant hurdle for traditional Emirati families to allow their children to study at a coed institution.

Conclusion

Starting and operating a branch campus that delivers US-style engineering education in the Middle East represents a difficult exercise in global academe and international business. Challenges abound beyond the basic startup components such as financing the operation and creating the local relationships necessary to pursue such an endeavor. These range from startup and systemic issues which impose a special set of requirements from the leadership and startup-crew, to the ability to anticipate the day-to-day difficulties originating from diversity issues and local habits, to understanding (and to the greatest extent possible anticipating) the special characteristics of the local student body, industry, and research environment. In addition to confronting these challenges in the branch campus location, which can a more or less arduous process depending on the level of due diligence applied very early on, the institution needs to rapidly develop an awareness of the implications these challenges and decisions may have on the home campus to branch campus relationship including governance and accreditation, curricular development, faculty hiring and strategic planning.

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