The Non-Curriculum Challenges and Opportunities of Administering a U.S.-Based M.S. Degree in Kilimanjaro, Africa

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Abstract

In the world of pharmaceuticals, regulatory science is an emerging field that has goals of developing tools, drugs, devices, and practices to increase benefit and lower risk concerning safety, quality control, and effectiveness. The dangers of having a subpar or non-existent, regulatory science practice can be costly at best or lethal at worst. Formal education at the graduate level to train professionals is a relatively new field. Research has been done on the practice of regulatory science, and on the institutions educating these scientists. The university's investment, in particular, has the ultimate goal of getting sustainable medicine to Africa. The collaboration of the university's Biotechnology Innovation and Regulatory Science program with the Kilimanjaro School of Pharmacy is helping to provide good regulatory practices in Africa.

Designing an applicable, theoretically sound and pragmatically implementable curriculum was the first step. This curriculum has been discussed in a previous paper on this topic. The risks of attending class through war torn territories, lack of information technology infrastructure, language, cultural implications, and the payment of tuition and fees are but a few, and perhaps most administratively challenging, of the challenges and opportunities yet to be documented and presented. This paper, therefore, focuses on the many non-curriculum challenges and opportunities of delivering a U.S.-based M.S. degree in Kilimanjaro, Africa. A program individuals' risked their lives to participate in.

Program Background

The Biotechnology Innovation and Regulatory Science (BIRS) program is a 33 credit hour MS program that includes 21 required hours and 12 elective credits. The curriculum aligns with identified key competencies for regulatory science programs and prepares the student for further study if desired. Included in the required hours is a directed project. The directed project is an independent study course that allows the student to apply their program learning to a project that proves to be value added within their company.

It was determined the best approach to administering an MS program in Kilimanjaro, Tanzania, Africa, would be a distance-hybrid delivery model; with the face-to-face component being on-site in Kilimanjaro. The administrative organization for the program was/is the university's Center for Professional Studies in Technology and Applied Research (ProSTAR).

Springer, Terruso, Speer, Ekeocha, Byrn & Clase [1], previously documented many of the considerations for program content, duration, format and administration. Through an

international compare and contrast of somewhat similar programs, both credit and non-credit, the aforementioned paper described their methodology as:

> *The methodology employed encompassed a time-phased set of inter-related activities as described below.*
>
> *A compare and contrast was performed by identifying and normalizing categories of cost, availability, and curriculum*
>
> *Program offerings, nationally and internationally, were mapped to the normalized data for cost, availability and curriculum*
>
> *A compare and contrast was performed by characterizing and normalizing best practices, nationally and internationally, across identified programs*
>
> *Comparison of normalized data (other identified programs) to the [University] data was performed to determine criteria of preeminence; considering such factors as cost, mode of delivery and curriculum*

Conclusions from this scholarly publication were documented and are repeated below:

> *When comparing the other domestic institutions to [the university's] BIRS master's and certificate programs, there are some best practices that surface.*
>
> *Worker-friendly administration of the programs. Due to the applied nature of this field, many individuals are working while earning the degree or the certificate. Most of the institutions offer some kind of flexibility (including this university), whether it is online, in-person on the evenings or weekend, or some hybrid combination.*
>
> *Program Cost – [the university] is very cost competitive with most of these degrees. There are a few that are less expensive, but the ones that provide a similarly styled program, curriculum and/or delivery, are comparably priced.*
>
> *Program delivery – the benefits (contact and cost) of a distance-hybrid style of program delivery appears to be a best practice when delivering a program outside of the U.S. The face-to-face element of [this university's] program delivery model provides the dual benefit of personal contact and efficiency of delivery; yet, never compromising on effectiveness.*
>
> *In the final analysis, [this university's] global regulatory science program, delivered internationally in Kilimanjaro, Tanzania, benefited significantly from the collective understanding gained from the market research performed. The findings support that the program cost is economical and the flexible program delivery and program administration that aligns with the schedule of working*

professionals helps contribute to long-term success and sustainability, both nationally and internationally.

Non-Curriculum Challenges

The fundamental premise of this paper is not the aforementioned curriculum component of the program, but the non-curriculum components attendant to information technology infrastructure, cultural and language barriers, tuition assessment and collection, and, risk of attending classes in a war torn area of Africa.

Lack of Information Technology Infrastructure

Africa is the second largest continent in the world. It is composed, at present, of 54 countries and possesses many complexities. Below depicts the numerous inhabitant countries of the continent and their corresponding flags. The many flags in the figure below help to heighten awareness to the multitude of complexities potentially not thought of when referencing the continent of Africa.

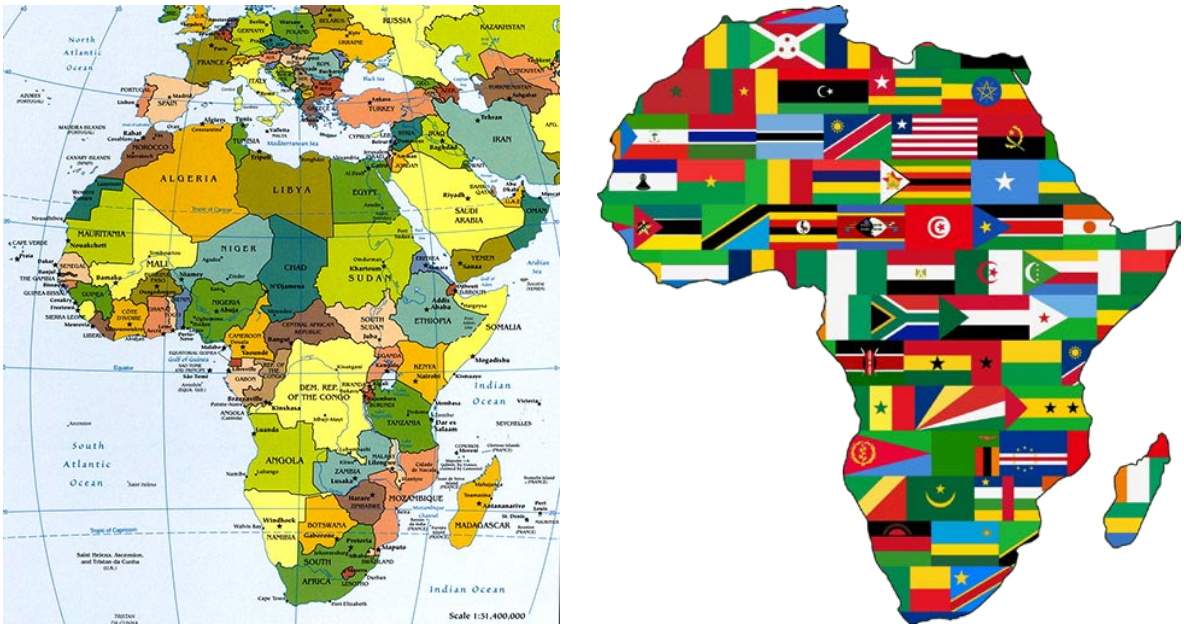

Figure 1 - Countries of Africa and Corresponding Country Flags[16,17]

Within the continent of Africa sits the country of Tanzania; located on the southeastern side of the continent. Kilimanjaro resides within Tanzania, near the border of Kenya.

Figure 2 - Kilimanjaro, Tanzania[18]

In addition to a lack of education for many Africans, access to other resources have large disparities as well. Sub-Saharan Africa accounts for 95% of those living without electricity[2] and 41% of Sub-Saharan Africans are currently living in extreme poverty[3]. However, the rate of internet accessibility has been climbing at a quickened pace. The growth of users in Africa has been seven times faster than the global average, with a 3600% growth between 2000 to 2012[4]. However, access still varies greatly from country to country. In Tanzania, 5.4% of the population have access to the internet, whereas in Nigeria, 47.4% have access[5].

The Biotechnology Innovation and Regulatory Science (BIRS) program, as administered in Kilimanjaro, Tanzania, required a distance education component, aside from the above referenced face-to-face component. The distance education component required the technology to support uploading and downloading of assignments and required electronic components of the program from the Learning Management Systems used by the university. The tangential and most widely used component of this program, required extensive use of information technology

through web-based applications and services; such as Google for research searches and other scholarship-based archives.

While distance education and information technology in general is not typically a topic of conversation in the United States, it very much becomes a topic of concern when in Africa.

The distance-hybrid delivery model; with a face-to-face component being on-site in Moshi, Tanzania was an asset for these professional students. The majority of these professional students travel from other countries such as India and China as well as to remote rural areas within Africa. This could hinder access to the course management site, where course lectures and assignments were housed, due to unreliable internet connection. Students especially would find the internet connection unreliable during the rainy season (March – May). At times, students would need to access their courses when they entered an area where the internet reception was better. It became apparent that it was necessary to spend additional time covering semester specifics during the 2 weeks' face-to-face time to better prepare students for upcoming assignments found on the course management site. Reminder emails were increased throughout the semester to heighten communication.

Besides the course management system, WebEx technology was used for follow-up meetings, live lectures, question and answer sessions, etc. Again, being dependent on internet access, lectures were recorded and placed on the course management site so the lectures could be reviewed at a time better suited for the students. A call-in number was always available for those students that could utilize that feature. The time difference, while agreed to by the students, often posed a problem even though it was always set as New York time. This in part was due to the students' travel schedules.

Cultural and Language Barriers

There are several thousand different societies or ethnic groups in Africa. Generally, they can be recognized by a common culture, religion or language.

Africa is the poorest and most underdeveloped continent in the world, even though it has an abundance of natural resources such as coffee, tea, cotton, cobalt, platinum, gold, and others[5]. East Africa, especially, but generally Sub-Saharan Africa, or the area of Africa lying south of the Sahara Desert, is considered by some geneticists the origin of the human race[6]. In the recent past, Sub-Saharan Africa (SSA) has had notable rising poverty rates[7]. Sub-Saharan Africa, in particular, is *the* poorest region in the world due to "legacies of colonialism, slavery, native corruption, socialist economic policies, and inter-ethnic conflict," along with the AIDS pandemic and exploding orphan numbers[6]. The excessively population increase has to do with the total fertility rate of Sub-Saharan African women, which is 4.9 babies/woman, more than twice the global average of 2.4[8].

The total fertility rate is premised on the number of babies the average woman would bear over the course of her life if she were to survive until the end of her reproductive years and age-specific birth rate were to remain constant[13,14].

> *"…Demographers measure fertility in different ways. They start with the simplest observation: the number of births each year plotted against the numbers and ages of the rest of the population. From there they calculate the "crude birth rate," which is the number of children born per 1,000 people in that particular year. The crude birth rate isn't particularly useful, but for sake of context, the U.S. population was about 312 million in 2011 and about 4 million babies were born, so the U.S. crude birth rate was around 13. By combining the crude birth rate with other census data, you can determine "completed fertility," which is the number of babies actually born to each woman in American by the time she's 50... And finally, there's the "total fertility rate." The TFR is closely related to completed fertility: It's the number of babies the average woman would bear over the course of her life if she were to survive until the end of her reproductive years and age-specific birth rate were to remain constant[13] (p. 5)."*

A few quick facts on total fertility rate and its implications on the world population[13] (p. 11).

- The American fertility rate currently sits at 1.93
- In order for a country to maintain a steady population, it needs a fertility rate of 2.1
- Which means that the Japanese and Italians (with fertility rates of about 1.4) are on the verge of downsizing their countries. Their cities are dwindling; some small towns are on the cusp of simply closing
- 1979 world's fertility rate was 6.0, today it's 2.52

A remarkable fact about the entire continent is, according to the United Nations, the median age of 19.5[9]. The life expectancy at birth ranges from country to country, but is still well below the United States. The median life expectancy at birth for the United States is 79.8 years, where in Sub-Saharan Africa (SSA) it ranges from 64 years in Kenya[5] to 32.6 years in Swaziland[6].

In 2013, the average level of child mortality in SSA shrunk to 93 deaths/1,000 live births from 188 deaths in 1990, but children are still fifteen times more likely to die before their fifth birthday than those in developed regions[8]. SSA accounts for 71% of the global total of those living with HIV, with an estimated 24.7 million people in 2013[10]. What is alarming is the number of physicians to the population. In Tanzania, for example, the number of physicians in relation to the population is 0.03 physicians/1,000 population[5]. To put this into perspective, the United States has 2.45 physicians/1,000 population.

In regards to language, Africa is noticably diverse with an estimated 1500-2000 African languages in four main groups: Afro-Asiatic, Nilo-Sharaian, Niger-Saharian, and Khoisan, which are divided primarily by geography[11]. Most of the people living in Sub-Saharan Africa speak at least one of the six hundred Bantu languages, along with the European language of the former colonial ruler[6]. Education is complicated and varies widely in Sub-Saharan Africa due to the lack of wealth the country faces. From 1999-2012, pre-primary education increased by 2.5 times, but still is extremely low with an average gross enrollment ration of only 20%, which ranges from 2% in the country of Mali to 100% in Ghana, Mauritius, and Seychelles[8]. More than 50% of school-aged children globally who are not enrolled in school live in Sub-Saharan Africa.

A total of 43 students represented six African countries – Nigeria, Kenya, Uganda, Tanzania, South Sudan, and Zimbabwe. English is a primary language for these countries, but there were still difficulties in communication that became apparent during the application phase. Well-known documents that are referred to as transcripts and diploma in the United States were soon discovered to be referred to by a different name. This miscommunication created delays in the admission process as multiple documents would be submitted while missing documents were not received. Revised wording was quickly added to the application instructions to improve communication. 'Official transcripts' quickly became "An official transcript bears the original signature of the registrar and/or the original seal of the issuing institution. A *transcript* is an official report supplied by a school on the record of an individual student, listing subjects studied, grades received, etc." In addition, "A *diploma* is a document given by an educational institution conferring a degree on a person or certifying that the person has satisfactorily completed a course of study. (Known as Academic Certificate in Tanzania).

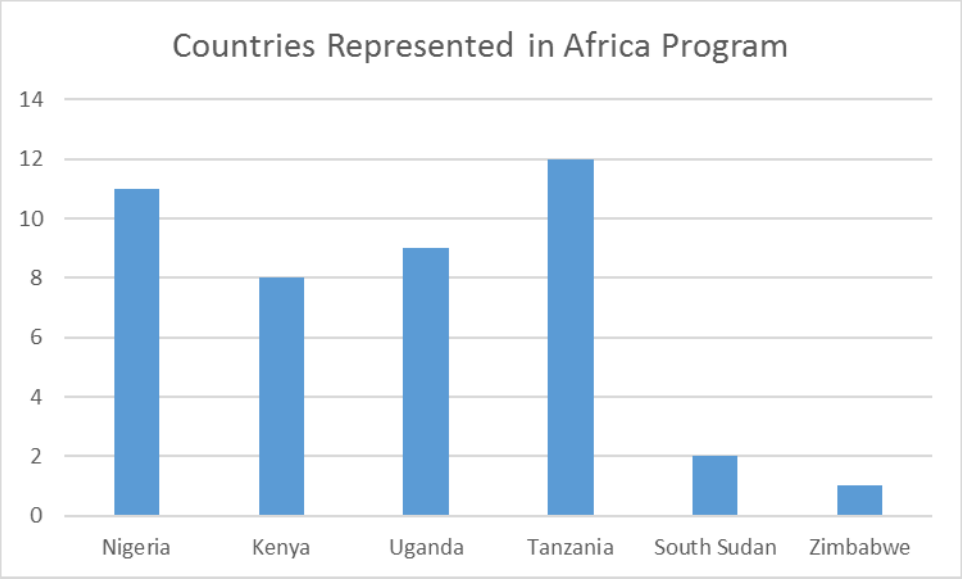

Figure 3 – Student Identified Home Country Representation

Currency Challenges

Interestingly, but not surprisingly, in Sub-Saharan Africa payments for nearly all purchases are made in cash; only a small population of upper-class households have the ability to use credit cards, online banking, and the like. Kenya, for example has 90% of retail transactions done in cash and based on a Gallup survey of eleven countries in sub-Saharan Africa, more than 80% of adults' bills are paid in cash[12].

The participants in this instantiation of the BIRS program were funded in total by corporate funding. While this eased the student burden, it made the university process somewhat cumbersome and difficult to manage. From a corporate perspective, it was not good practice for a corporation in Kilimanjaro, Africa, to be viewed as showing preferential treatment from other residing corporations. This may give the appearance of impropriety. This misgiven perception had to be balanced with the greater good of providing world-class education to the attending African population.

In the end, the university managed to anonymously provide the student tuition through a corporate grant; which, subsequently, was not considered a grant subject to university revenue sharing. This allowed the entirety of the grant to be applied to the benefit of the student tuition and the greater good toward the country of Africa.

Another issue that arose in the application process was the use of credit cards for the application fee. Many African applicants did not have a credit card and the University Graduate School only accepts credit cards for the application fees. Students used friends' and relatives' credit cards in order to pay the fee. Administratively, great care was taken to adhere to university policies and procedures. Moving forward, greater awareness and experience is expected to ease this process.

Risk of Attending Class

Nearly 50% of Africa's 53 countries are in conflict of one kind or another[15].

> *This is the story across much of Africa, where nearly half of the continent's 53 countries are home to an active conflict or a recently ended one. Quiet places such as Tanzania are the lonely exceptions; even user-friendly, tourist-filled Kenya blew up in 2008. Add together the casualties in just the dozen countries that I cover, and you have a death toll of tens of thousands of civilians each year. More than 5 million have died in Congo alone since 1998, the International Rescue Committee has estimated.*

> *…Even if you could coax these men out of their jungle lairs and get them to the negotiating table, there is very little to offer them. They don't want ministries or tracts of land to govern. Their armies are often traumatized children, with experience and skills (if you can call them that) totally unsuited for civilian life. All they want is cash, guns, and a license to rampage. And they've already got all three. How do you negotiate with that?*

Africa's constant state of turmoil causes risk of life or limb just by moving across these many countries; even if the purpose is for education or continuing education.

The African students made the journey to Kilimanjaro, Tanzania all four semesters of their educational studies. Students' journeys differed depending on their country and location to Tanzania. Approximately 15 African countries were in civil war[20]. On occasion, "security issues" or "unrest in the country" would be brought to the attention of the US professors and/or administrators by the students. Each situation was reviewed individually to determine if assignment extensions or other interventions were needed so not to penalize the student.

Many students came from major African cities that are heavily populated. One student described the traffic she faced in her own country of Nigeria in the university Alumnus magazine,

> *"… the 12-mile arduous drive to and from home every day, a trip that can take between 45 minutes and four hours each way because of "terrible traffic and crowded streets and roads" in the hot, humid city of 25 million and growing. We face unpredictable, horrendous traffic every day."*[19]

Lagos Nigeria is one of the fastest growing cities in the world. The travel to class could be long and difficult. Once they arrived in Moshi, transportation was arranged for them to and from the class location.

The countries' economic instability created another travel barrier. Students would face challenges for raising travel funds as noted by one student "… with the present exchange rate absurdity in Nigeria."

Conclusions

The challenges faced in delivering online or distance-hybrid programs in the United States are typically premised on curriculum determination, faculty availability, perhaps delivery mode (100% distance, distance-hybrid, on-site), and providing the greatest learning experience practicable for optimum assimilation and ideally subsequent application.

While the above are the same challenges faced in delivering a program from the United States to Kilimanjaro, Tanzania; there are more. The additional administrative challenges in delivering a

program to Kilimanjaro, Tanzania, also include such things as culture and language barriers, a lack of information technology infrastructure, currency utilization, and, risk of life.

This paper has elaborated on the experiences, both expected and unexpected, of delivering a fee-based MS degree on-site using a distance-hybrid delivery model in Kilimanjaro, Tanzania. While it is expected future instantiations of this program, delivered to a comparable audience in this same format to this same Country may be easier, the Country specifics suggest comparable challenges would still exist. The experience gained from the first delivery of this program, however, would prove to be most useful in creating memory maps of those things that work, and those that would not.

Relative to graduation rates, 100% of the students are on track to graduate within four years (2 cohort groups) from the first cohort program start. On graduation, of the first cohort, nearly 20% of the graduating students from Kilimanjaro, Tanzania, found funding to fly to the United States to attend their graduation ceremony with other campus-based graduating M.S. students. To quote one of these many students "…I have learned a lot from this program. The knowledge is like a burning fire within my bones. I have to judiciously, efficiently and effectively disseminate it."

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