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Skills for Work – The Oil & Gas Case in Mozambique

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Abstract

With the recent development of the extractive industry in Mozambique, a question arises: will education be prepared to give a capable response? The work presented here is part of a larger study funded by Sasol on competencies in Mozambique and the capacity of Education to respond over time to industry demands. The capacity to develop human capital is a challenge for countries like Mozambique and only the development of the Education System can respond to this challenge.

1 Introduction

Mozambique has experienced a significant increase in activities associated with the mining and exploration of its mineral resources, with major oil and gas discoveries, development and production in the central region and anticipated development and production in the northern region. This has led to a dramatic increase in the inflow of foreign labour. Given the importance and high potential levels of economic growth that these projects might bring to Mozambique, together with the acknowledgement that the country does not have the required skills readily available to implement/deliver on these projects, the Government has approved the decree for contracting foreign labor in the mineral resources sector4.

Although it is important for the Government to approve the inflow of foreign labour to the country to meet immediate needs, there is a major concern about the lack of availability of Mozambicans to sustain these projects in the long term. The progressive increase in the activities of exploration and processing of mineral resources in Mozambique calls for a corresponding increase in qualified and seasoned technical professionals. The country is facing a general shortage of skilled labor especially in the mining, energy and chemicals industries, resulting in a very high dependency on foreign labor. To mitigate the shortage of in-country technical professionals, it is important to have a holistic view of the current scenario to address the perceived skills' gaps and, at the same time, respond to sector needs from a projects and operations perspective.

2 The oil and gas industry

The oil and gas industry in Mozambique could attract significant foreign direct investment and generate substantial direct and indirect jobs going forward. Investment in human capital is essential in a sector that is focused on competitiveness and productivity. However, the lack of human resources, mostly in technical and management areas, may jeopardize these investments, as the field lacks Petrochemical Engineers, Petroleum Engineers, Geologists and Welders, to mention just a few. These human capital needs are a constant challenge to daily maintenance and operations, with all players being affected, from oil and gas companies to contractors. The main reason for the lack of competencies is well known: focused mostly on children's access to school, Mozambique's young and fragile education system does not produce enough qualified manpower to face the country's numerous challenges. The industry knows that, if doesn't face these challenges today, there could be a labor crisis within the next decade.

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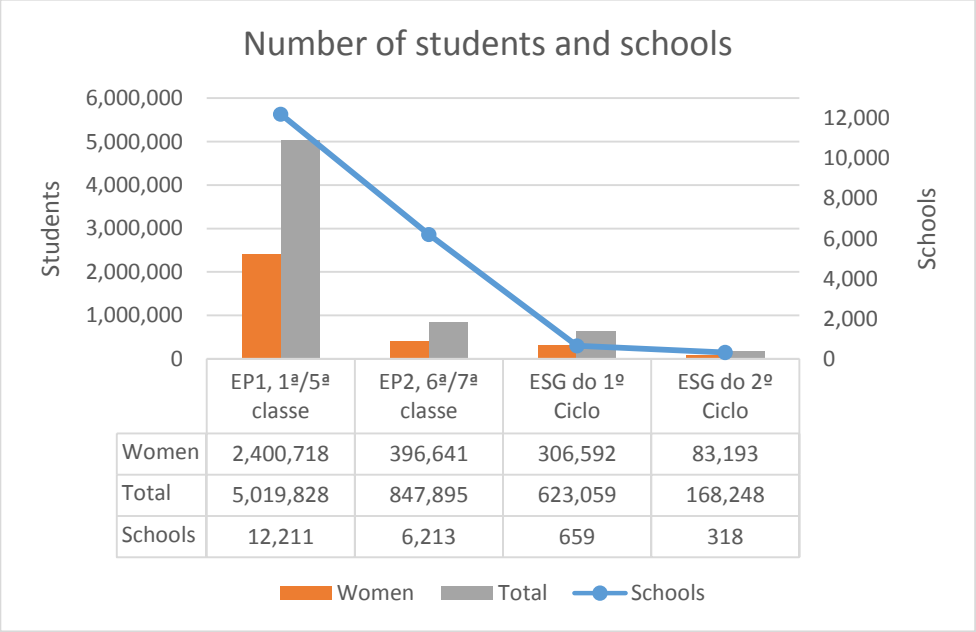
The oil and gas industry has been through various stages of technological development since the Industrial Revolution, and these developments have accelerated in recent years. Geopolitics are rapidly changing; environmental concerns are rising; global demand for crude oil and natural gas is escalating. The prices for crude oil and natural gas have remained high, and investment in the oil and gas industry has surged. Consequently, the industry is increasingly facing a shortage of qualified workers.

The industry is currently showing shortages in a wide range of skilled occupations, including technical, management, financial, marketing and leadership. Globally, almost four out of five oil and gas companies reported that technical skills were a key shortage area, and half stated that management skills were in short supply.

3 Where are the students?

3.1 Primary and Secondary School

The education field falls under two ministries. Primary and secondary education is under the Ministry of Education and Human Development, while Superior and Technical and Vocational Education sits under the Ministry of Science and Technology. Primary and secondary education represents the highest number of students – a total of 5,867,723, distributed as follows:



	EP1, 1ª/5ª classe	EP2, 6ª/7ª classe	ESG do 1º Ciclo	ESG do 2º Ciclo
Women	2,400,718	396,641	306,592	83,193
Total	5,019,828	847,895	623,059	168,248
Schools	12,211	6,213	659	318

Figure 1: Students and School in Mozambique. MINEDH (2016)

When it comes to primary school, there are many factors contributing to poor student performance – in many cases, as poor as not obtaining the basic reading, writing and counting skills after seven years of school attendance. The reasons for this range from poor conditions for teaching and learning, to the degraded state of schools and the lack of materials, combined with the lack of motivation of teachers (high absenteeism and career abandonment) and insufficiently trained school directors. These factors have presented Mozambique with a complex reality, hard to fight.

Enrolment in secondary schools grew significantly between 2004 and 2014, with the number of students rising 34% as a result of a high transition rate from primary school (nearly 95%). In the same period, gross enrolment rates increased from 21% to 42% for the first grade, and from 6% to 21% for the second grade.

As a result, 23% of secondary students had to move to night shifts and student numbers per class are high – between 60 and 41 students, for the first and second grades of secondary school. Between 2009 and 2014, in terms of the daily shift, the number of pupils in first grade rose by 43% and pupils in the second grade went up by 83%. Many of these, however, were taking place in the old primary schools, without suitable conditions to accommodate secondary schooling.

While the secondary school curriculum emphasizes life skills and labor market demands, the implementation of these has been difficult. The lack of teachers for the vocational subjects, lack of knowledge on issues like gender and poor access to books, equipment and other teaching materials make it very hard to succeed. The number of teachers has been rising steadily. In 2015, there were 22,450 secondary school teachers in the system, of which 66% held bachelor's degrees.

It is important to note that nearly 70% of secondary school first grade teachers are teaching second grade, and 50% of these have no qualifications to teach this grade. Also, despite having the required psychoeducational training, the majority of teachers have no access to continuous training, in order to improve and update their knowledge. So far, we have a picture where many students get to secondary school lacking basic skills and where teachers show poor teaching performance and low motivation. Consequently, secondary school completion rates remain low, when compared to the average of sub-Saharan African countries. As an example, in 2011 Mozambique had a 19% secondary school completion rate, for the first grade – while the average for sub-Saharan African countries was 42%.

The school abandonment rates are high and, although there aren't global evaluations for secondary schooling, indicators suggest that quality is low and most students don't achieve the competencies defined by the curriculum. The limited resources allocated to secondary schooling are an obstacle to quality and broader access. Budget figures from 2013 show that secondary schooling was awarded 23% of the total budget for the education sector – compared with an average for sub-Saharan African countries of 29%. Also, 97% of the budget for secondary schooling is allocated to wages, leaving a very small amount for other investments in this sub-sector. This is not expected to change in the short-term, as primary school, with nearly 6 million students, take the biggest slice of the education budget.

3.2 Higher Education

Following Mozambique's independence, higher education has expanded significantly, reaching national coverage due to the four major public universities and some higher education Institutes. The following table shows how students are distributed in terms of public universities and institutes, with Universidade Pedagógica, Universidade Eduardo Mondlane, Universidade Zambeze e Universidade Lurio indicating highest attendance levels.

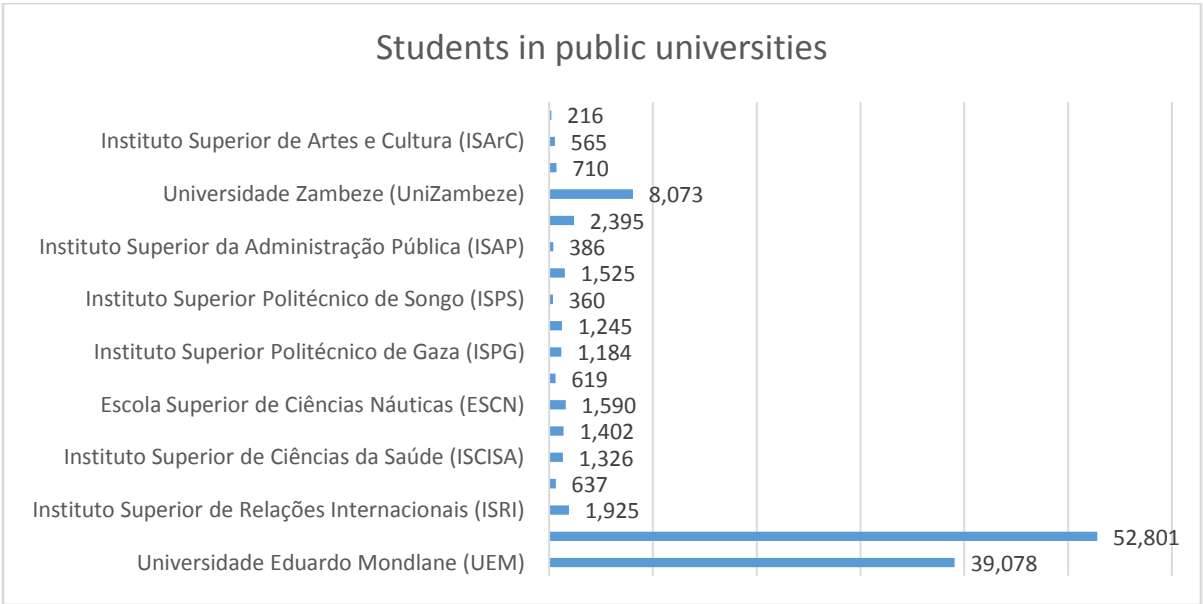


Figure 2: Students in Public Universities. (MCTESTP)

The table above may indicate a good number of students, but the problem is that they will remain students for a very long time. Despite being the largest universities, these institutions – like almost all higher education institutions, both public and private - present a very small number of graduates each year – around 7%. There is no information on what causes this bottleneck effect. As young people tend to start their own families early, and must provide for them as well as pay for their studies, we can assume this is one of the causes.

Students take longer to finish their degrees – more than twice the expected time – with significant consequent cost for universities, families and industry. The latter is unable to plan its human resources due to uncertainty regarding the number of graduates.

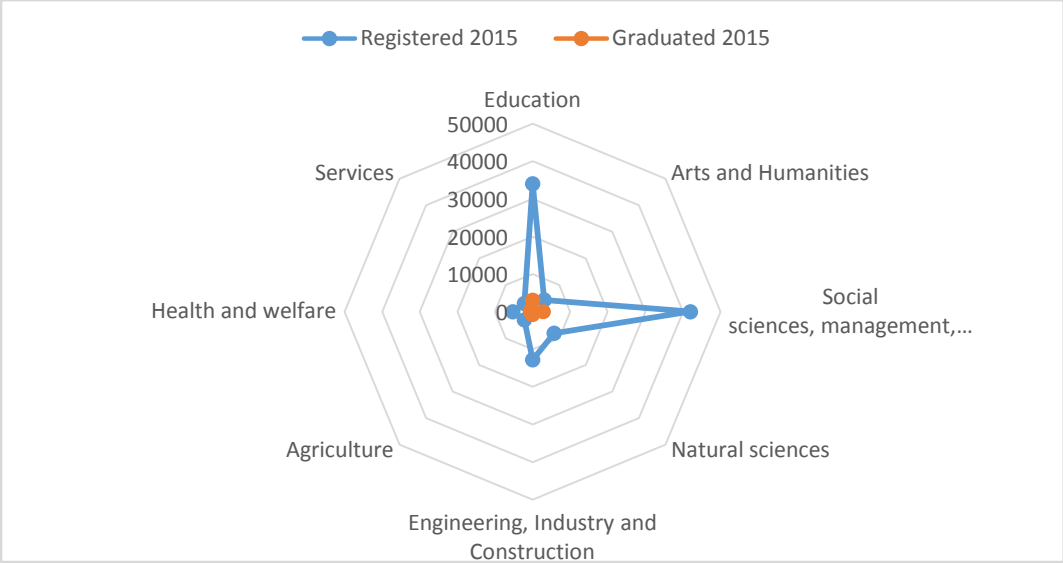


Figure 3: Students registered vs. Students graduated in Public Universities. (MCTESTP)

The graphic above highlights the problem. Of the 100,031 students registered in 2015, we immediately notice that the majority are in Education, Social Sciences, Management and Law courses. It is also apparent that the number of graduates is minimal, when compared to the number of students registered. This means that universities face a major bottleneck problem, as they fail to put their students into the market. For universities, this also affects the process of teaching and learning, as it makes classes and laboratorial practices crowded and harder to teach.

3.3 Technical and Vocational Education

Expanding and improving the quality of Technical and Vocational Education (TVET) has been a major priority for the Government in the education area. The main objective is to create a skilled workforce that can meet the needs and new demands of the labour market. The growth and development of the economy needs complex and specialized skills, in all technical and scientific areas related to the oil and gas industry, from lab to desk, and field workers.

Analyzing the type of course provided, we can conclude that there were nearly 70,000 students in TVET, with approximately 17,000 attending oil and gas related courses. Unlike Higher Education, TVET has high graduation rates. Annually, almost one third students enrolled, graduate from TVET Schools. This means that nearly 15,000 students conclude their professional education every year.

If we apply the same formula to oil and gas related courses, we conclude that one third of 17,000 students graduate each year – meaning approximately 5,600 graduates are able to enter the oil and gas labor market – it is, however, impossible to tell if they choose this market or other job offers that also matches their skills. Postgraduate training Besides the existing general STEM courses, some universities have launched graduate programmes for oil and gas related subjects, including Oil Engineering, Cartography and Geological Research, Applied Geology and Petroleum Engineering. However, these target a small number of students.

4 Trained, but not skilled

So, when crossing the labor market figures with the education figures, we can conclude that there is a gap between the market needs and the graduation results. The Education field provides training on almost every area related to the Oil & Gas field, but there are not enough graduates in the scientific areas to fulfil the market needs. Besides that, when auscultated, Oil & Gas companies refer to a lack of competencies from their graduates, as well as a severe need for further training, in order to be able to cope with the positions they're taking over.

Students finish their training and enter the labor market, but lack the necessary skills to perform a good job. Why does it happen? It is necessary to keep in mind that students arriving in TVET and universities are the result of a 10-year path in an education system that is, globally, very weak. In many cases, students weren't able to properly achieve basic skills such as reading and writing.

The education system is big, confuse, with a difficult organization and severe quality issues that undermine the acquisition of basic competencies. It also lacks practical and laboratory teaching – as neither public sector nor private companies invest enough in courses that need expensive labs. So, the first challenge when educating for the country's future needs –particularly those of the oil and gas industries –is to reduce this imparity and ensure that enough students head for STEM courses. Then, it is necessary to invest in technical capacity – by providing students with practical experience and laboratorial competencies, field trips and materials. This is an important issue to be addressed by all the key players in this field – education in general, TVET, universities and companies, in order to add value to the Mozambican labor market and industry. In addition, while TVET seems to be managing to graduate a relatively high number of students, compared to those enrolled, the higher education system faces severe bottleneck problems. Students do not finish their courses on time, taking four to six years more than anticipated. Understanding this, we conclude that is very difficult for companies to count on national manpower when working on their HR plans.

As TVET and professional training, it seems like the hard work over the last decade is starting to pay off, as we can witness some change in both companies' and students' vision of this education sub-systems. This is also the only area of education where profound changes are taking place, in a visible effort to evolve into a more efficient structure in the medium term.

5 Conclusions

Before addressing the problem of the quality of education and the way it aligns with the needs of the oil and gas industry, one first needs to face the first major issue: 80% of Mozambican students have no interest in STEM subjects. Recognizing this, the first course of action involves attracting students to these subjects.

Oil and gas companies – as well as the government itself – should develop programs to raise awareness and attract students to Science before they proceed with their studies. Science communication is an important tool to make students passionate about Science and Technology. Exhibitions, science fairs, science games, TV programs and magazines, experiments all play an important role in this regard. Companies should create and support these activities and tools, in order to help attract students to these subjects.

Oil and gas companies should continue to support higher education, with more grants and specialized courses for a higher number of students, because their dedicated graduate and Master's programs only target a very small number of people. Infrastructures is another big issue. From secondary school to universities, access to labs and technology is minimal. In the Science and Technology area, access to practical education is essential to ensure skilled workers. Companies can help to create Centres of Excellence for students to practice and develop their taste for Science.

In terms of higher education, this could also mean a deeper involvement in education processes. The lack of teachers with expertise in these scientific areas can be addressed through the participation of experts and technicians from companies in the education process.

Also, companies from the sector should actively participate in the TEVT and professional training reforms currently taking place, to help shape the oil and gas education sector. They also need to maintain their internal training for new workers, in addition to supporting long-life learning, on an annual basis, so workers can recycle their knowledge and abilities and develop new skills. Companies can engage their employees, as well as their families and communities, in early education programs, targeting Math's and Science areas, to help shape a new generation of students. From primary to secondary school, companies could play a very important role, as they are close to the communities in which they are situated and have the knowledge and the means to perform such work.

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