A case study on **local community employment and skills challenges** in SA that has broad applications to the mining industry as a whole

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Problem Statement

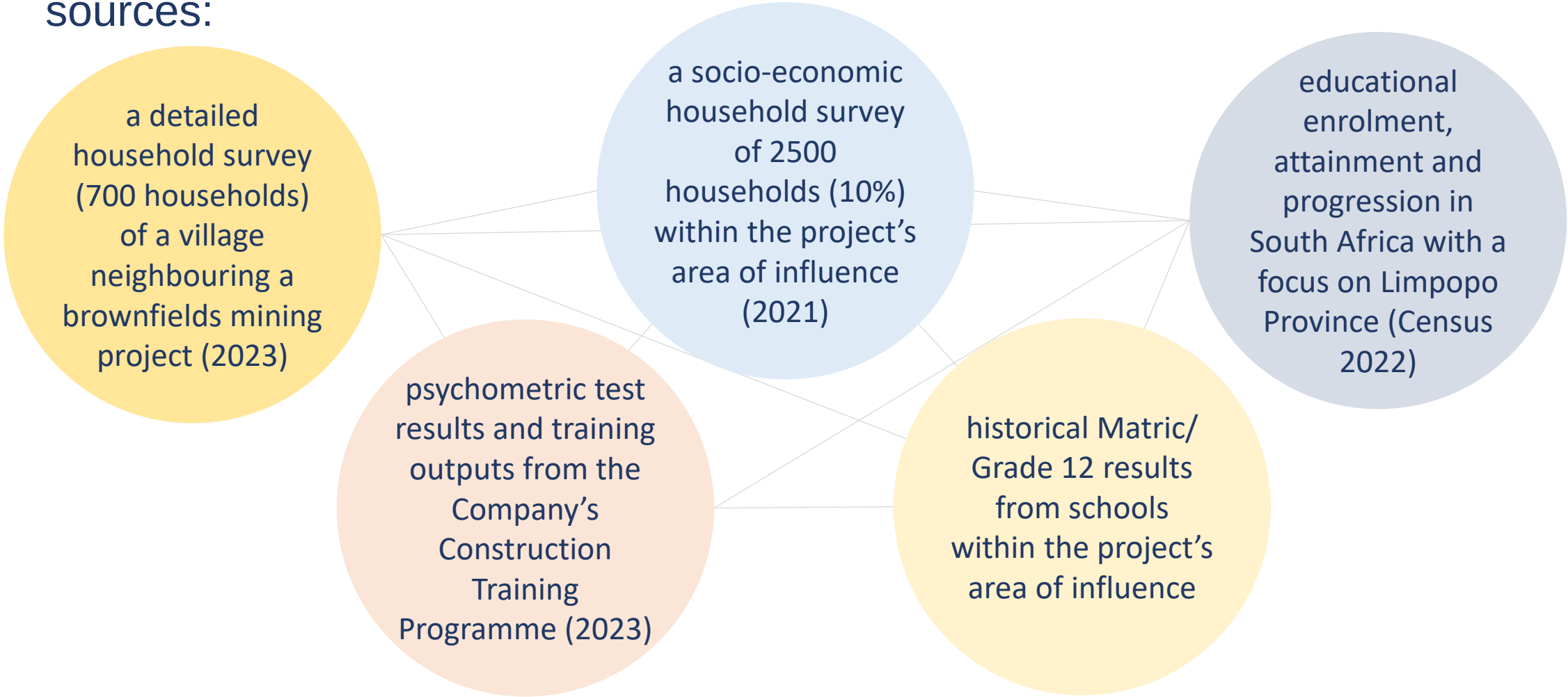
A fundamental reality is, that within a typical rural South African mining area, a variety of factors are undermining efforts to source, train and develop local people for increasingly more highly skilled and mechanized underground work. This is evidenced by:

- low progression through school and high dropout rates,
- poor educational performance in mathematics and physical science, in particular,
- limited understanding of mechanical and technical concepts,
- limited interest by male youths in training opportunities, and
- tertiary educated candidates favouring work in non-mining sectors and urban centres.

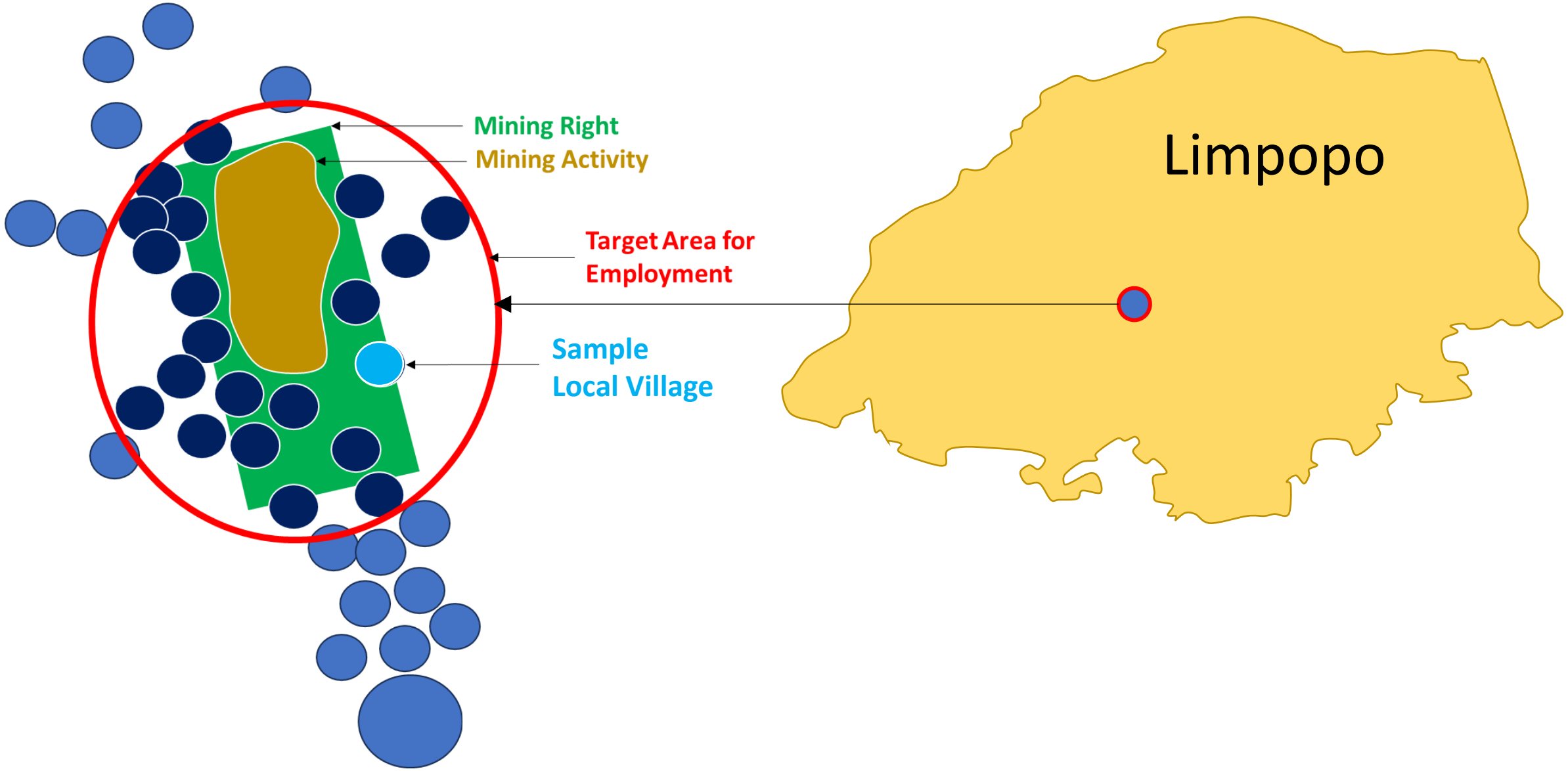
These factors are influenced and exacerbated by the harmful effects of scarcity, societal ills and trauma on early cognitive, emotional, and social development; thus, potentially hindering their ability to reach their full potential. The problem is compounded by significant influx creating competition for jobs.

Methodology

This Mining Project case study aggregates statistical data from a variety of sources:

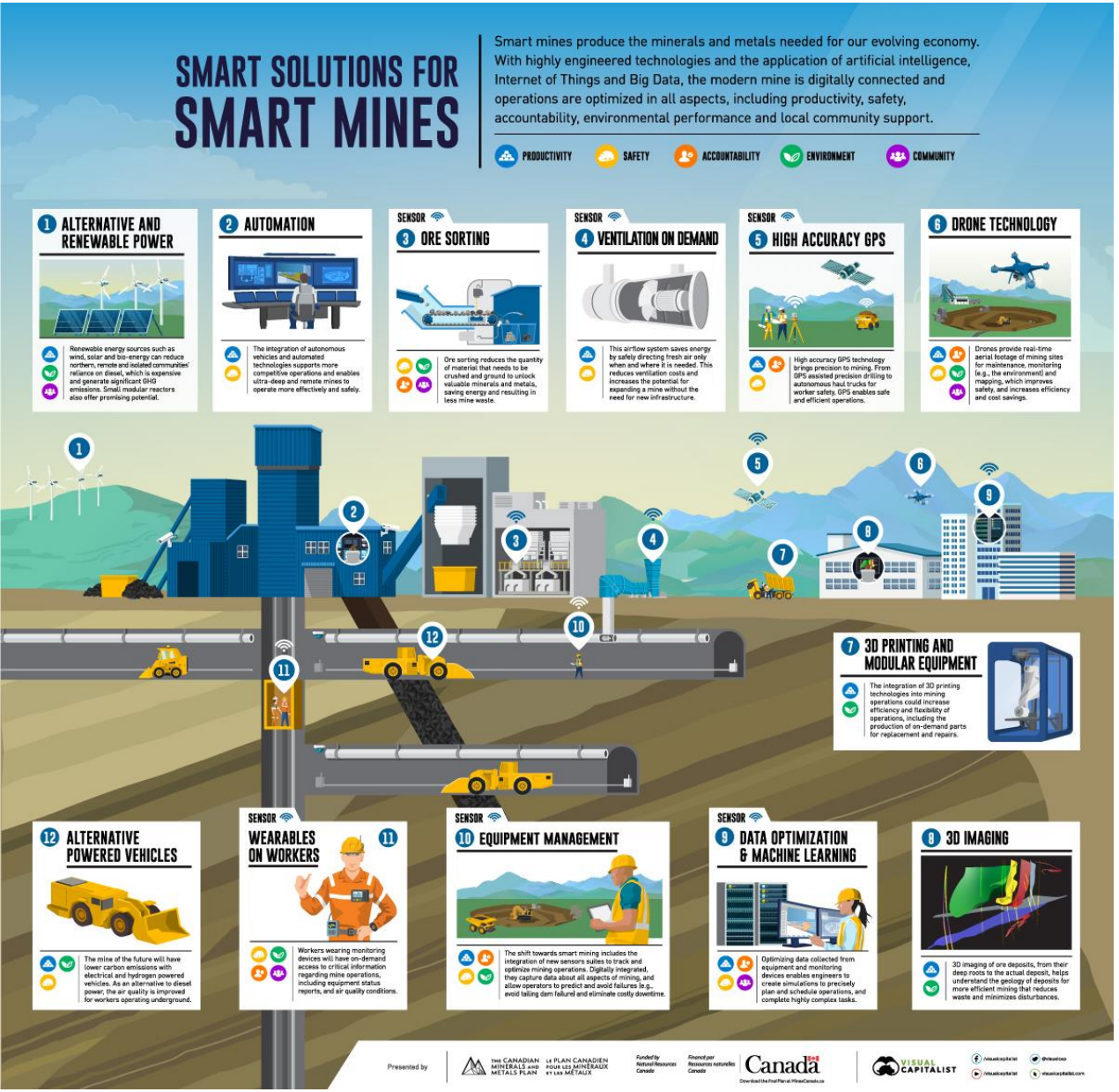


Locality of Case Study Area



Shift towards modernisation / mechanization

Disruptions from a new wave of technological marvels



The emergence of advanced automation, machine learning and artificial intelligence, to name a few, present challenges and opportunities that heighten competition for talent and investment.

In mining, timing is everything. How do we balance the incredible speed of progress with the long-term nature of mines and the sustainability of its neighbouring communities, to capture the dividends that technology can deliver?

Modernised / Mechanised UG Mining require higher skills levels

Changing technology leads to changes in both the number of people employed directly in support of the production process, but **also in their required skills** and in the manner that work teams operate internally and interact with other teams and mine management.

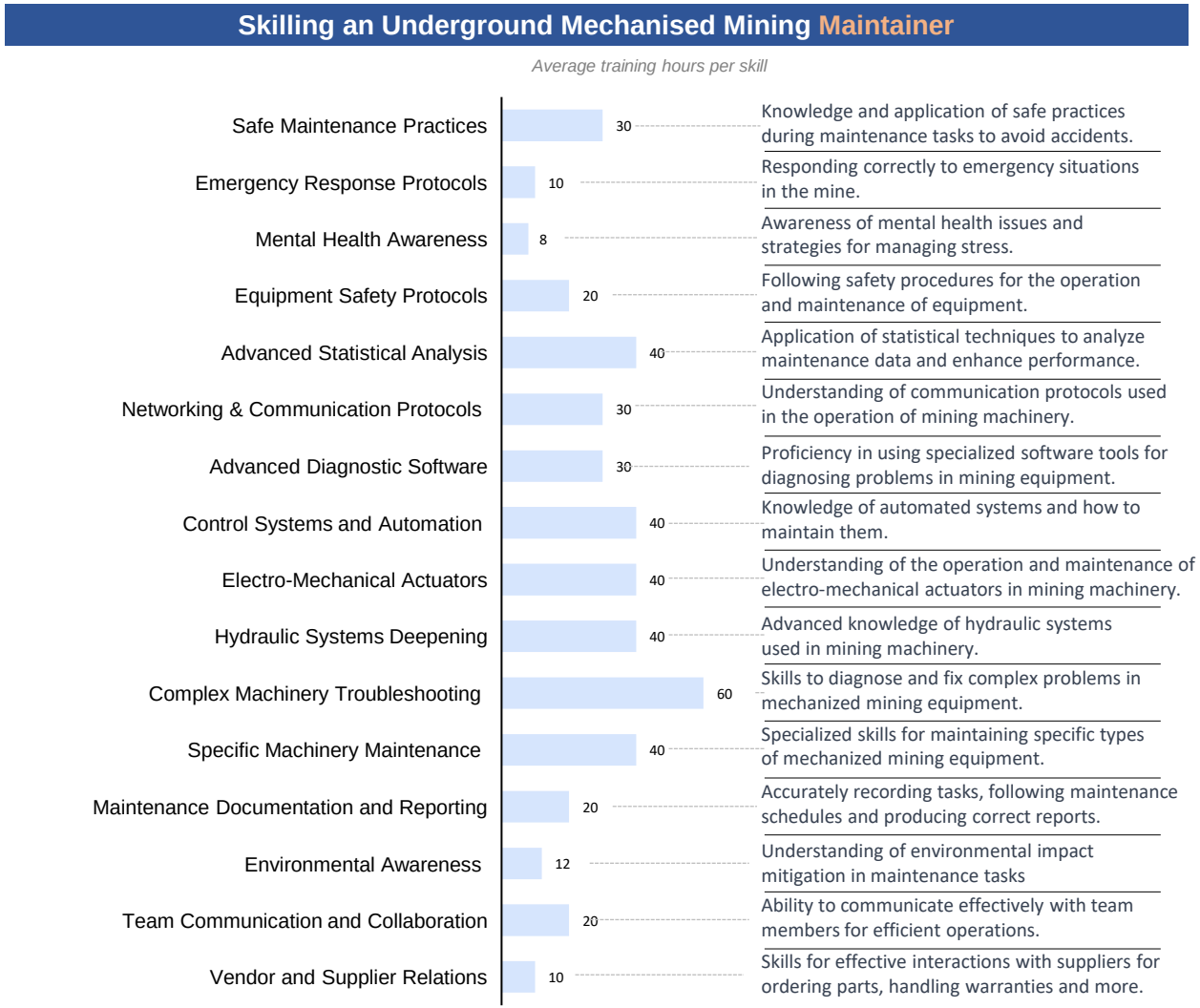
Greater number of people who have a **higher degree of knowledge and skills** would need to enter the industry to catalyse a new wave of industrial growth, which would seemingly also require the mining industry to follow suit in terms of employing such people and upskilling existing personnel to ensure a new prosperous, more efficient and safer local mining industry.

It is proposed that mechanization results **in fewer, higher skilled workers being employed underground**, higher face advance rates, fewer faces, improved supervision and control, improved communications, and improved environmental conditions.

Advanced planning is required to ensure that **people with the appropriate skills are recruited and trained for mechanization projects**. Once the project has begun, active learning becomes a real issue for operators and supervisors.

https://www.engineeringnews.co.za/article/sa-mines-relying-heavily-on-unskilled-workers-despite-industry-40-gaining-traction-2018-07-13
http://saimm.org.za/Conferences/Pt2010/255-258_Hattingh.pdf

Underground operations will drive large skilling efforts



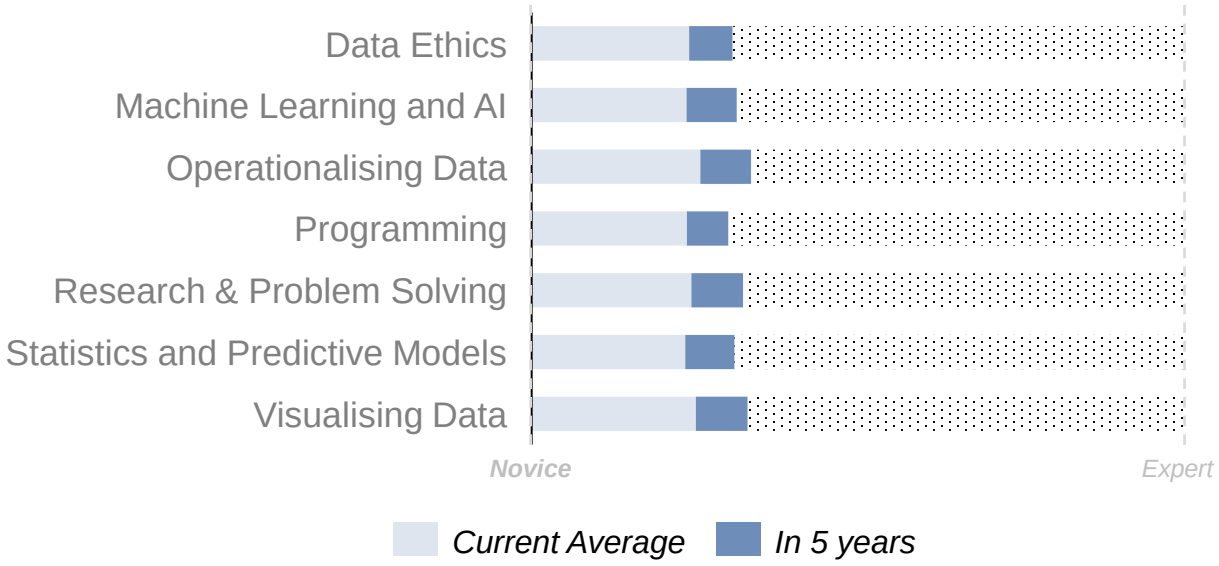
GENERAL REQUIREMENTS:

- Social processing
- Complex concepts
- Sound knowledge base
- High levels of awareness
- Proficiency in specialised software
- Specialised skills
- Accuracy
- Effective communication

More proficiency required across a range of data & digital skills

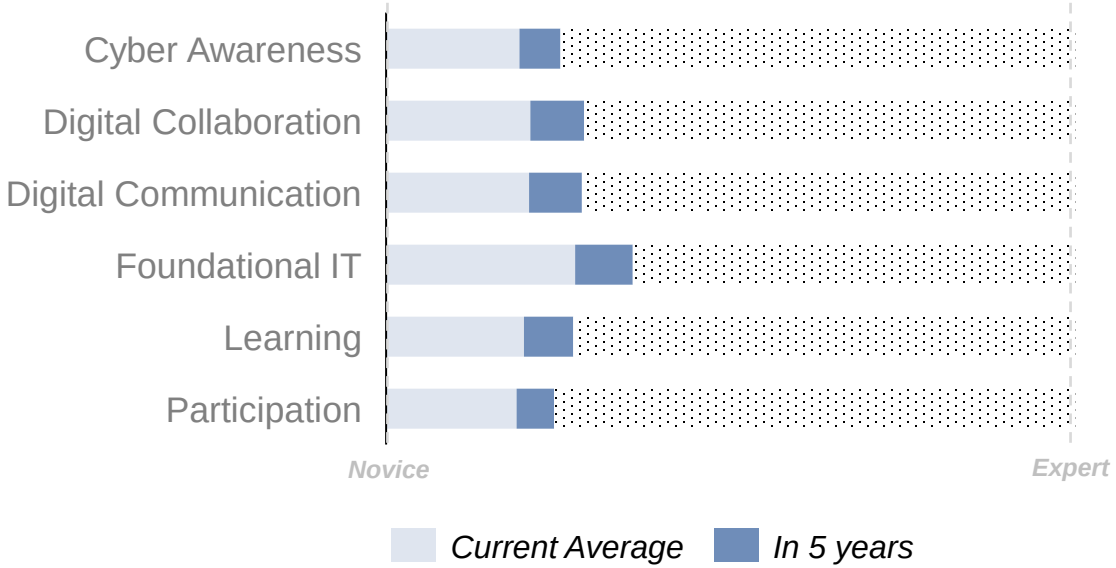
The deployment of technology will result in data and digital literacy skills becoming increasingly important for employees and the sector. More proficiency will be required across the full range of D&D skills

Average Data Literacy Requirements



The ability to identify, locate, interpret and evaluate information. In particular, understanding concepts of statistics to fully utilise and action insights from data.

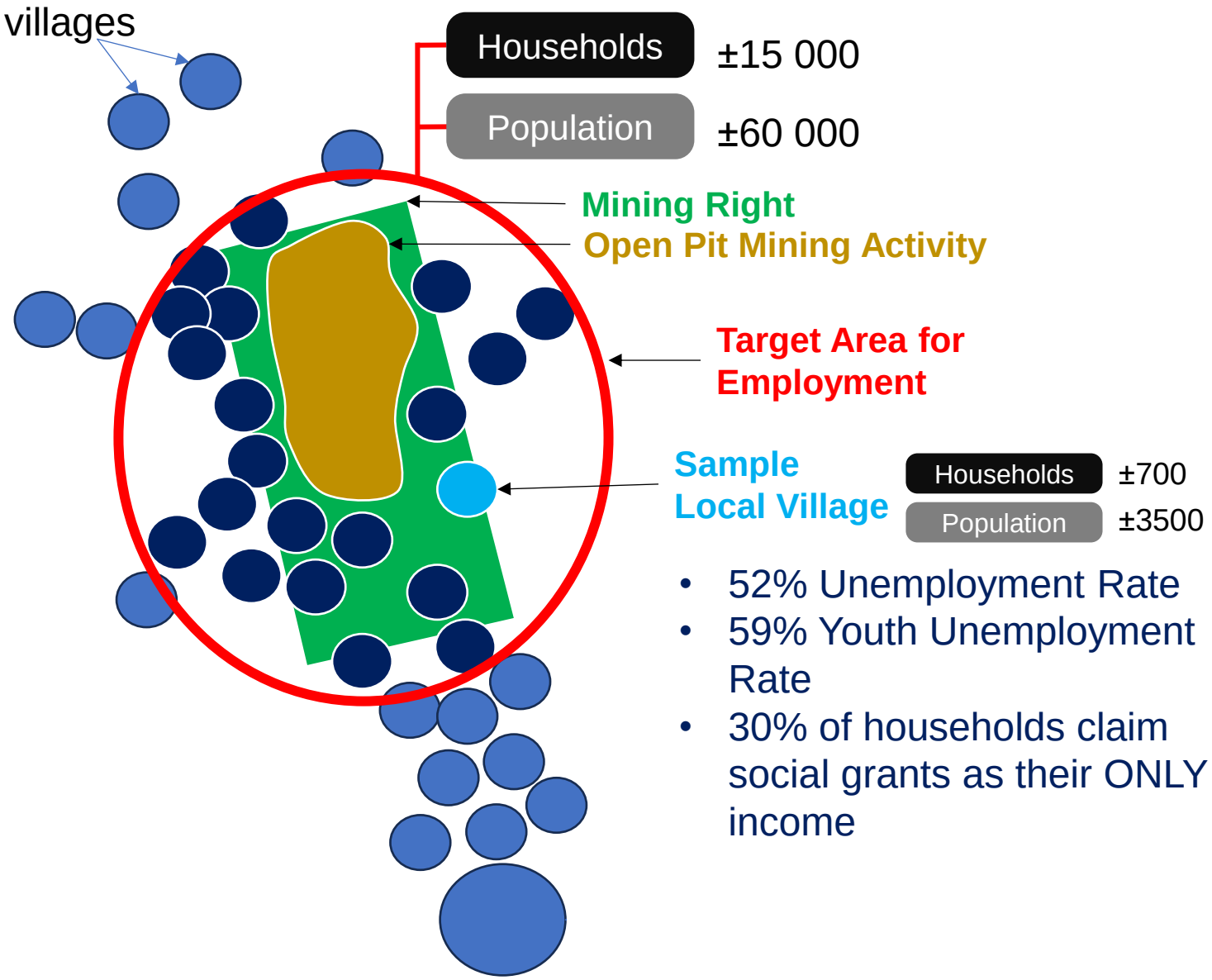
Average Digital Literacy Requirements



The literacies that are required in the future workforce to enable employees to access information, communicate, solve problems, learn, innovate and work collaboratively with others.

Demographics of a local community

Socio-economic data for local village (sample)



- 52% Unemployment Rate
- 59% Youth Unemployment Rate
- 30% of households claim social grants as their ONLY income

JOBS

JOBS

JOBS !

JOBS

JOBS

General demographics of Sample Village

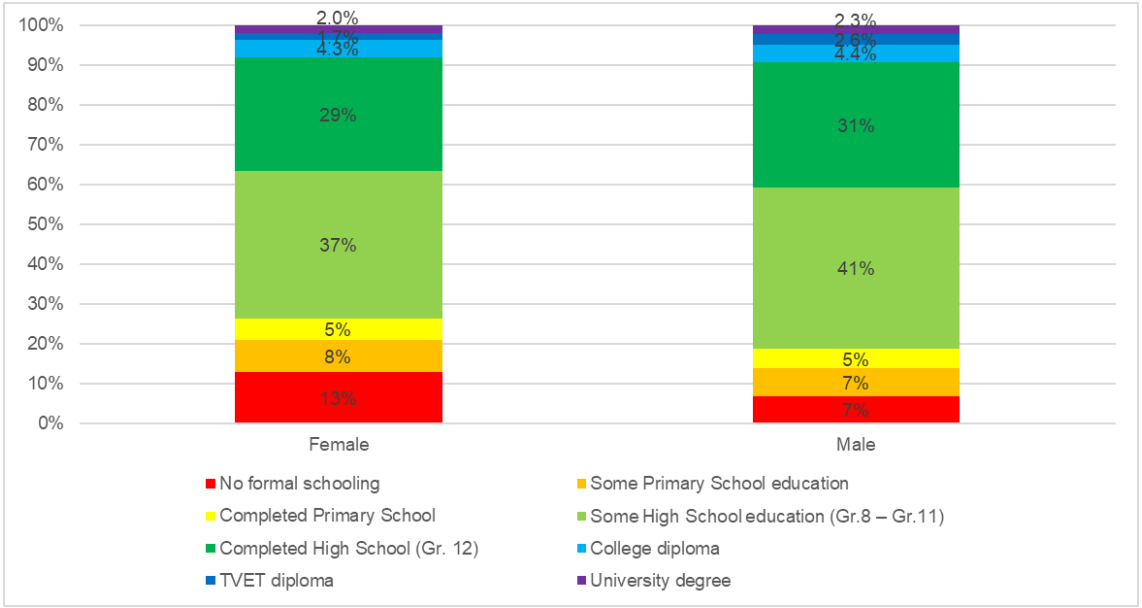
# of Village Households	700
Village Population	3500
Household (HH) Size	5
Gender of Person	48 | 52
Household Head Gender	55 | 45
Avg. Age of Person	30
#HH 0 - 10 years in village	55%
#HH > 50 years in village	18%

Age Groups

5	>65 yrs
30%	36-65 yrs
30%	18-35 yrs
35%	<18 yrs

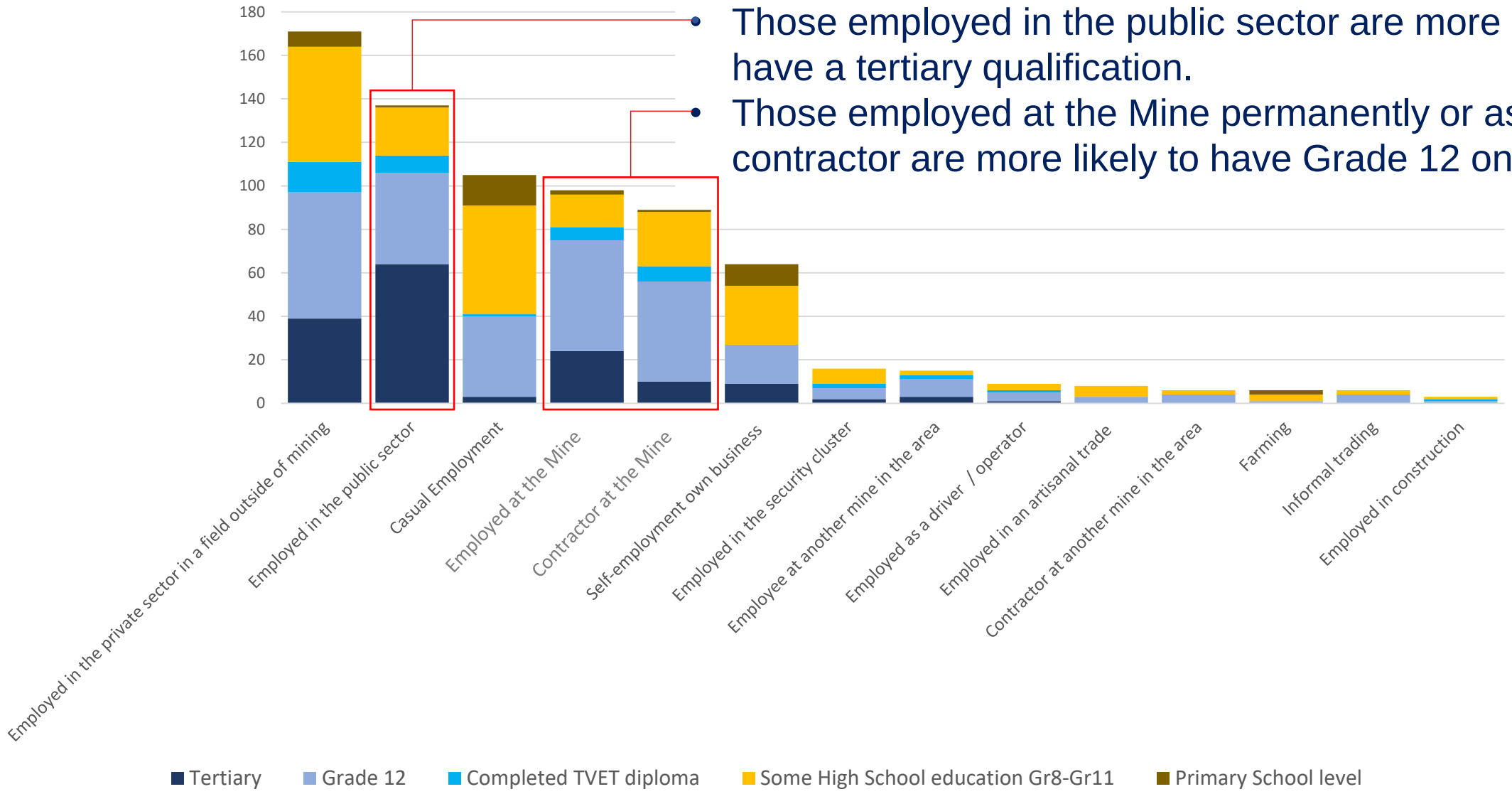
+18 Highest Education

Tertiary	15%
Gr12	50%
Gr1 – Gr11	33%
No Schooling	2%



- Youthful community with females trailing males in educational performance
- Up to 65% of those above 18 years old have Matric

Highest educational levels of those employed in the village



- Those employed in the public sector are more likely to have a tertiary qualification.
- Those employed at the Mine permanently or as a contractor are more likely to have Grade 12 only.

Most graduates working in the Public Sector

Employed in village 750

Sectors with Highest Employment		80 Contractors of the Mine	100 Employees of the Mine			Employment per Highest Education Level	
Public Sector	54%	3%	10%	39%	40|60%	12%	Degree
Private sector in a field outside of mining	35%	12%	19%	49%	49|51%	15%	Diploma
Private sector in a field outside of mining	22%	15%	18%	49%	61|39%	39%	Gr12
Day labourer / pieceworker (casual)	22%	11%	7%	35%	65|35%	30%	Gr8 – Gr11
Day labourer / pieceworker (casual)	50%			3 only	79|21%	2%	Gr7
Day labourer / pieceworker (casual)	35%			1 only	41|59%	2%	Gr1 - Gr6
					Only 1 person employed		No Schooling

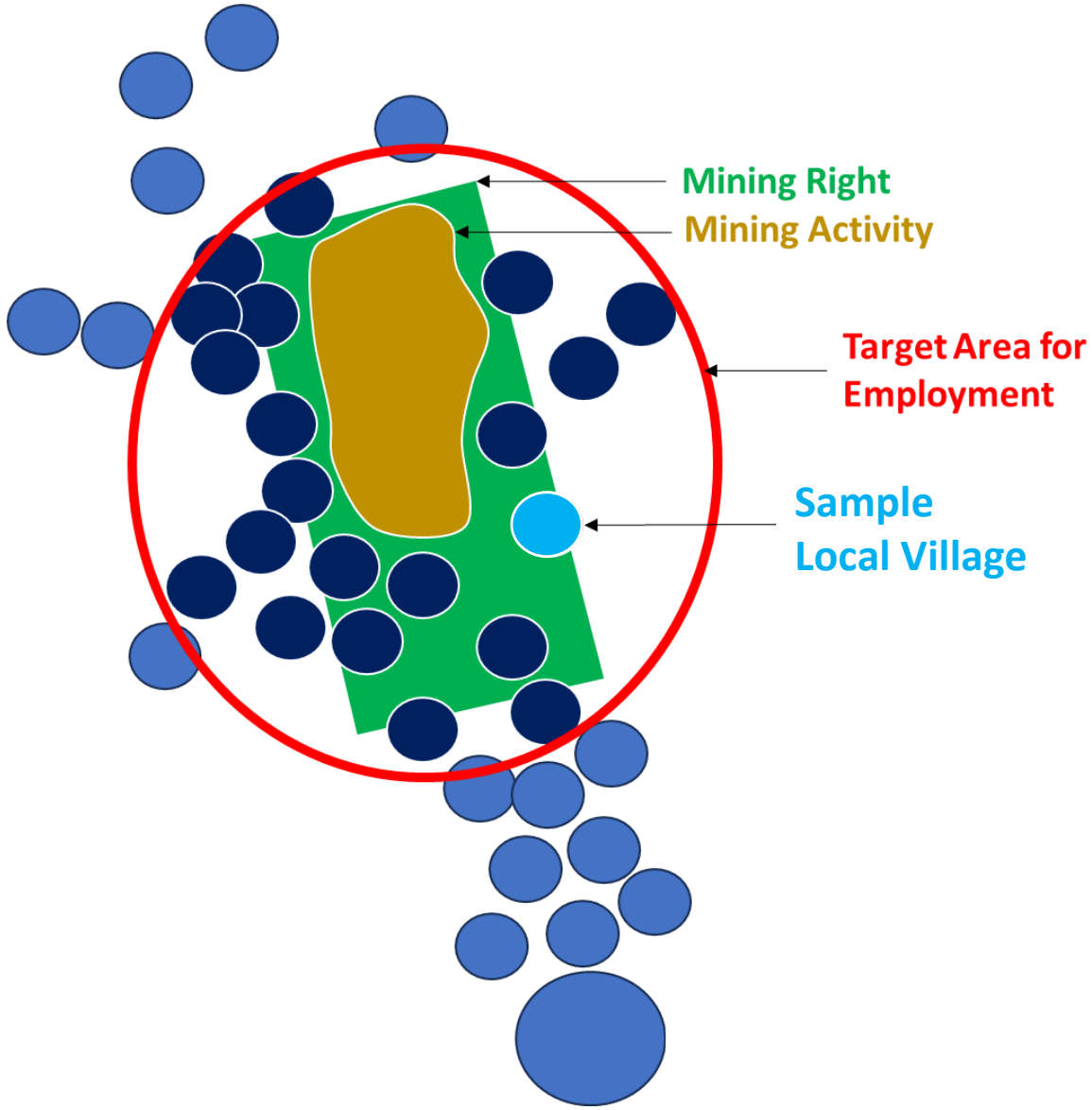
More than half of those University Graduates working in the Public Sector, work outside the Local Municipality. 35% work in Gauteng

12% of the 750 employed in the village have a University Degree. Of those 90 graduates, 60% are female and 39% falls within the Youth category. 10% are employed at the Mine while 3% as contractors at the Mine.

The Public Sector is the biggest employer of graduates from the village (54% / 49 graduates).

Analysis of local trainees in Construction Training Programme

Training 1 000 unemployed community members



- Trained **1500 unemployed** community members in 2021-2023 to empower them with various skill sets (semi-skilled level) related to:
  - SMEIPP,
  - Construction,
  - Earthworks, and
  - Civil trades.
- The ultimate goal was to enhance their employability in both the Company's capital projects environment and the broader construction and engineering sectors within the region.
- **50 members of Sample Village participated.**

Training Outcomes

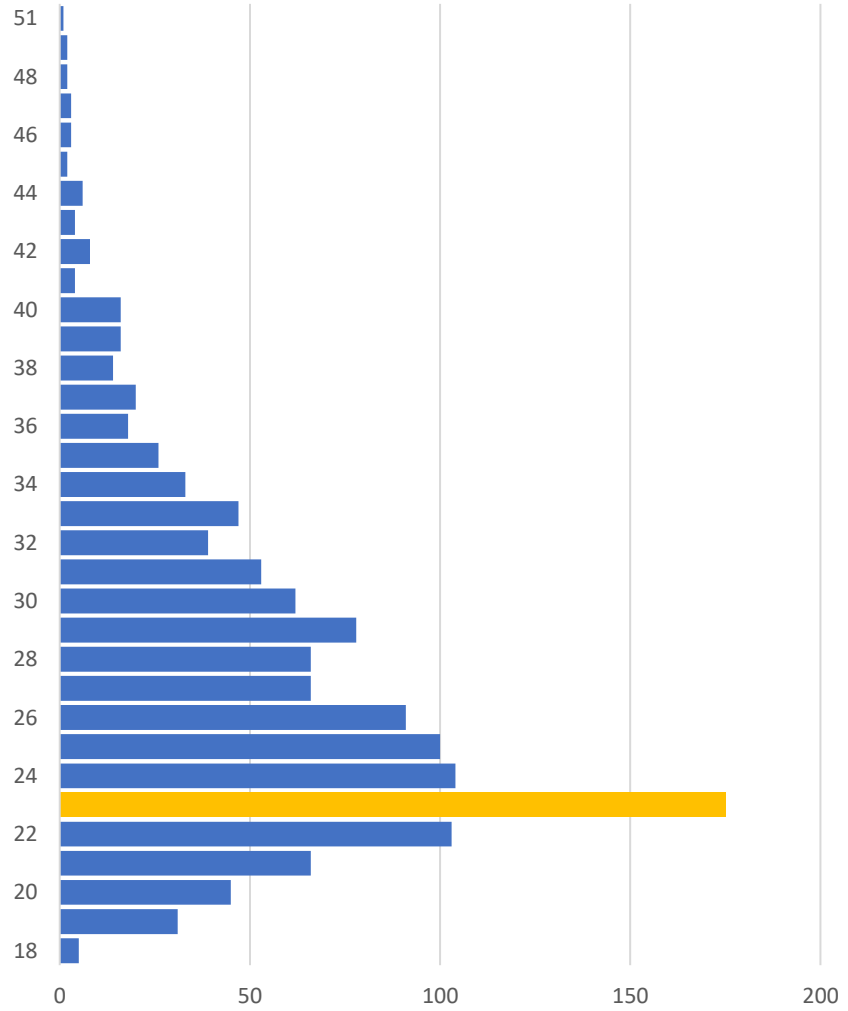
Category	Total		Female		Male	
Dropouts	**155**	**10%**	106	68%	50	32%
No Shows	**16**	**1%**	12	75%	4	25%
Complete	**1372**	**89%**	896	65%	476	35%
Grand Total	**1543**					

Gender Category	Mathematics	Physical Science
Female	48%	24%
Male	58%	32%

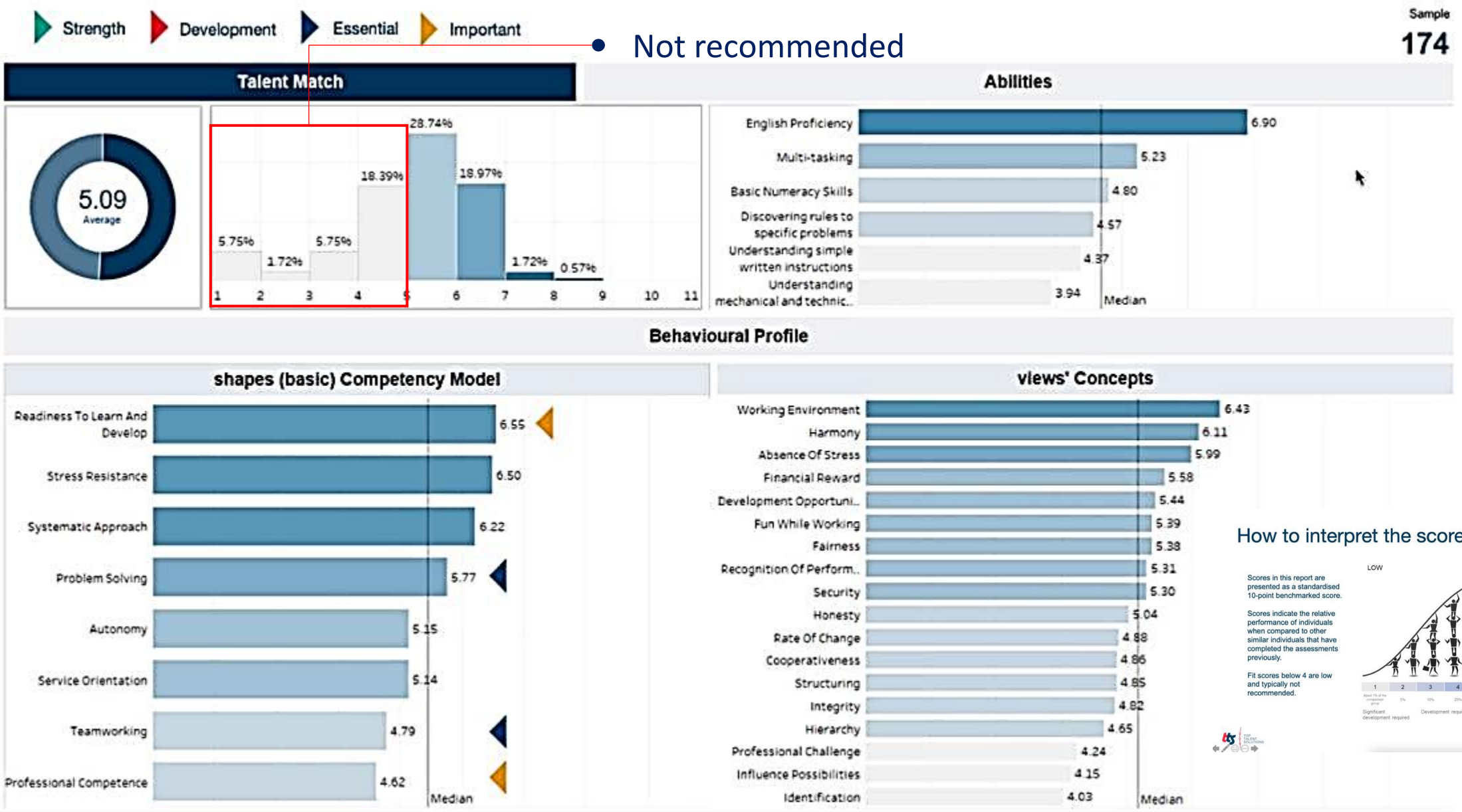
Gender Category	Below Grade 12	Grade 12	Certificate	Tertiary
Female	14%	73%	12%	1%
Male	14%	76%	9%	1%
Grand Total	**14%**	**74%**	**11%**	**1%**

- More females than males completed the training courses – dropouts and no shows proportionally aligned
- Low maths uptake and very low uptake of physical sciences at school
- +75% with Grade 12

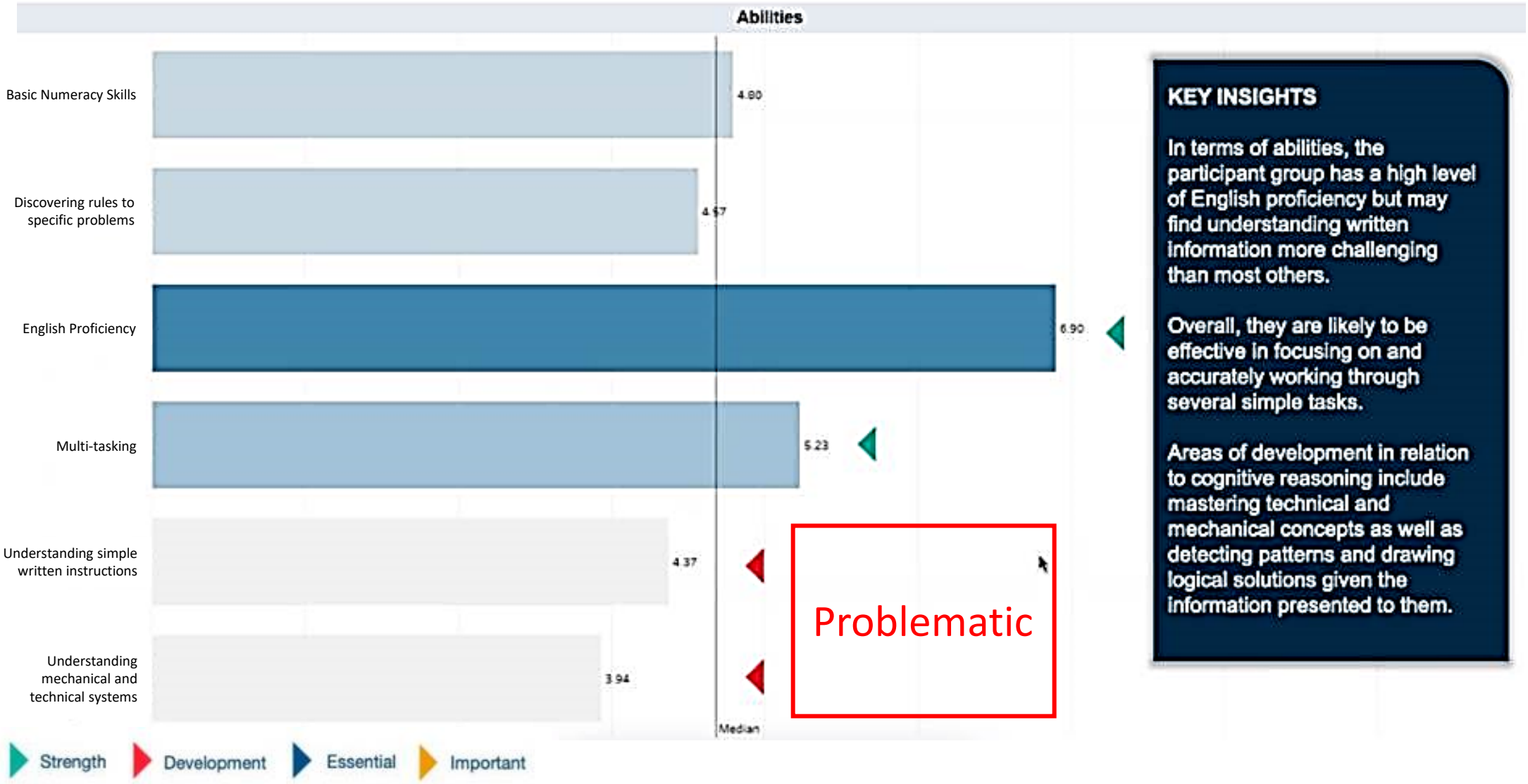
Age of trainees that completed the courses



Psychometric scores – behaviour profile



Psychometric scores - abilities



Problematic

KEY INSIGHTS

In terms of abilities, the participant group has a high level of English proficiency but may find understanding written information more challenging than most others.

Overall, they are likely to be effective in focusing on and accurately working through several simple tasks.

Areas of development in relation to cognitive reasoning include mastering technical and mechanical concepts as well as detecting patterns and drawing logical solutions given the information presented to them.

Educational Outcomes in Limpopo and SA

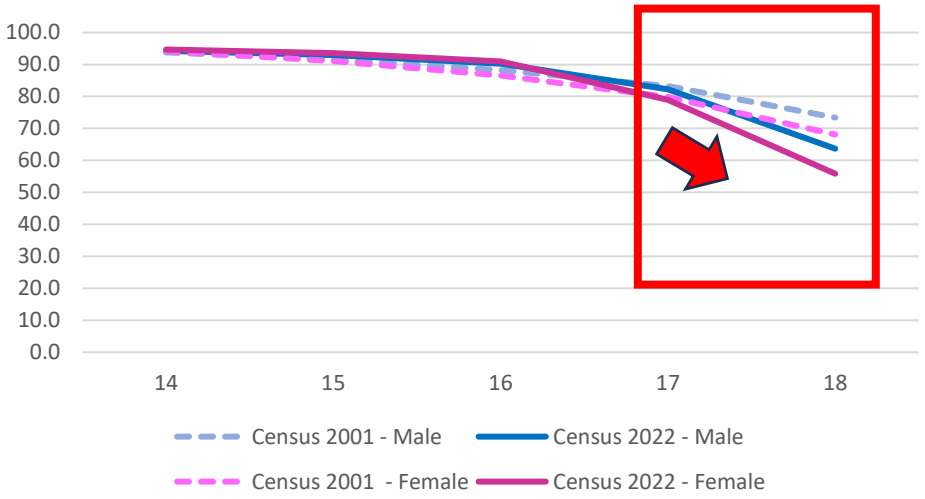
Provincial stats on school attendance

Percentage of children aged 0–4 who attended ECD by province

		Limpopo	RSA
Attending ECD	2001	9.4%	12.2%
	2022	61.3% ✓	60.2%

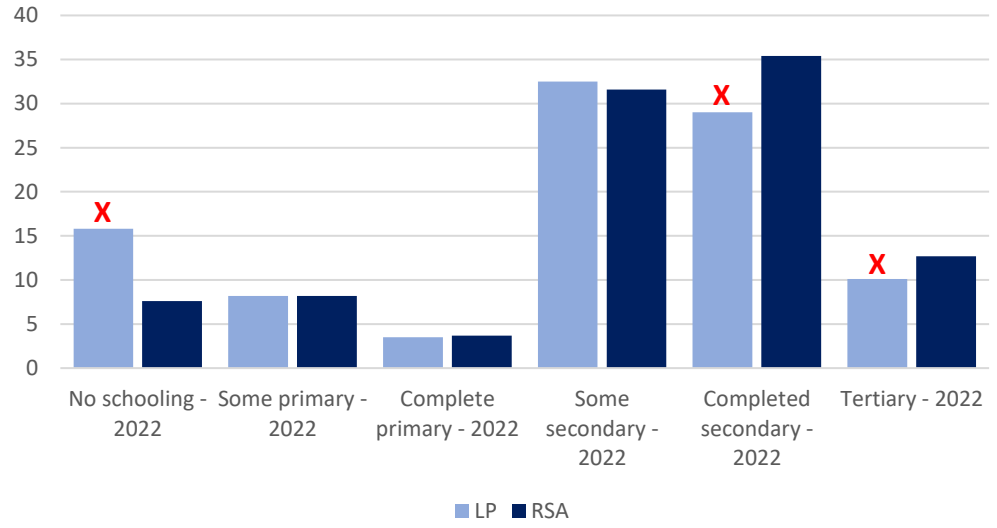
Census 2022: A profile of education enrolment, attainment and progression in South Africa

School drop out rates

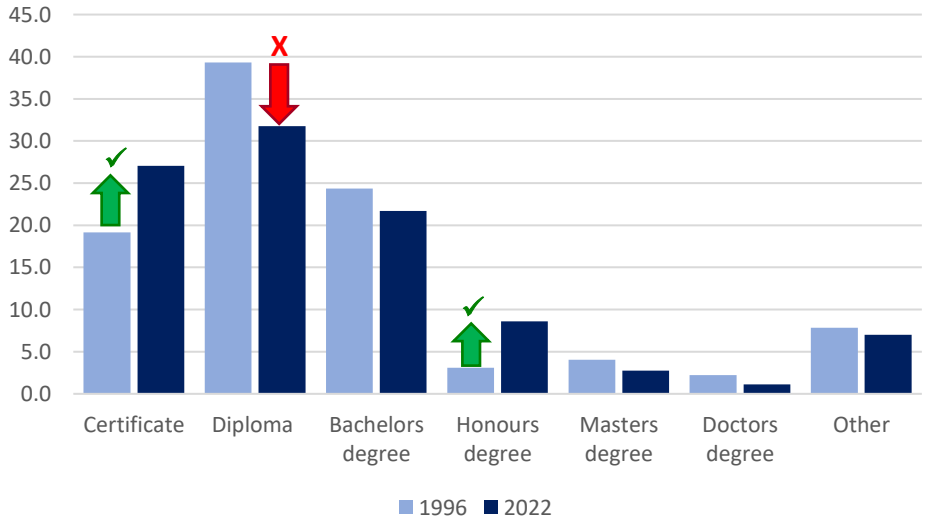


Increase in both male and female high school dropouts since 2001

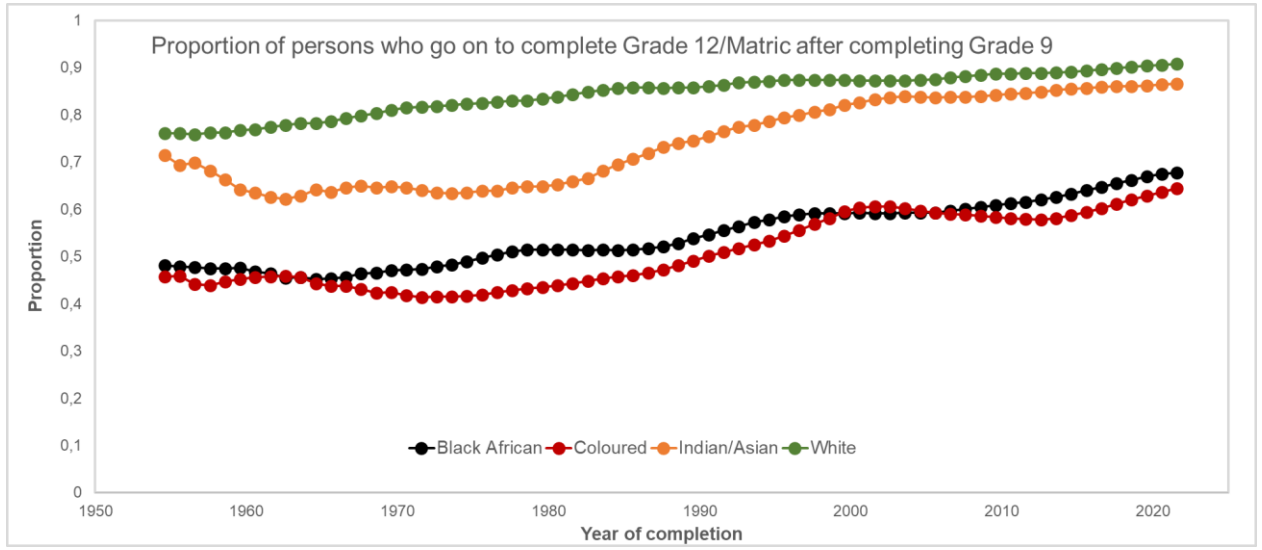
Highest **level of education** by individuals aged 25 years and older in 2022

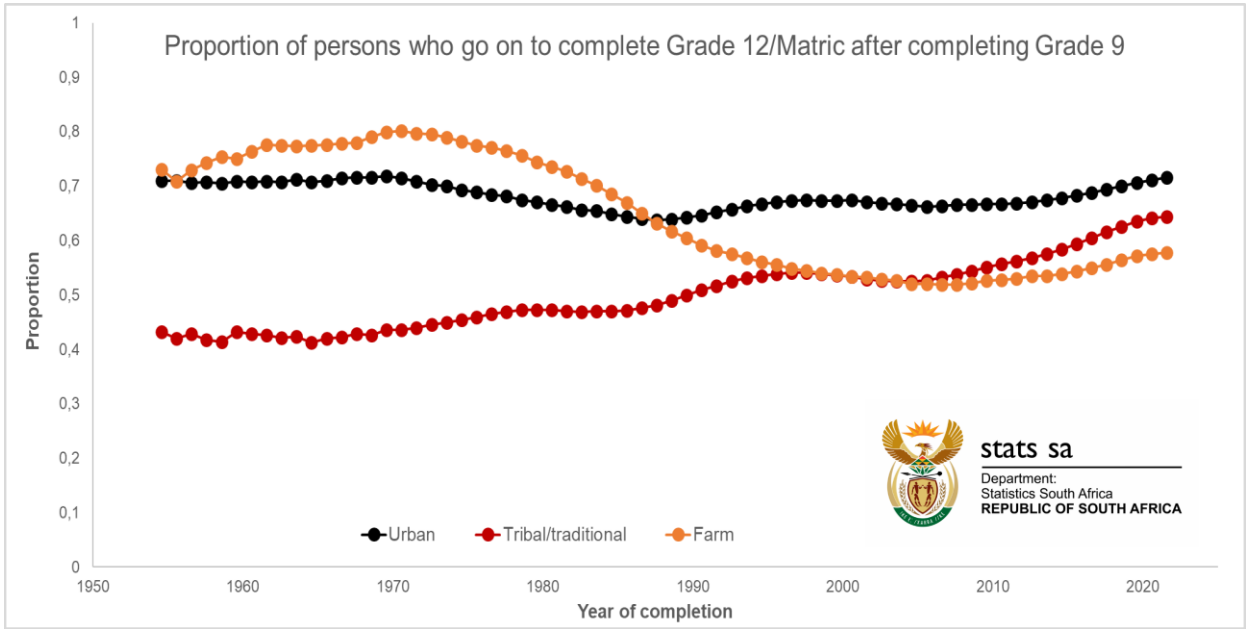


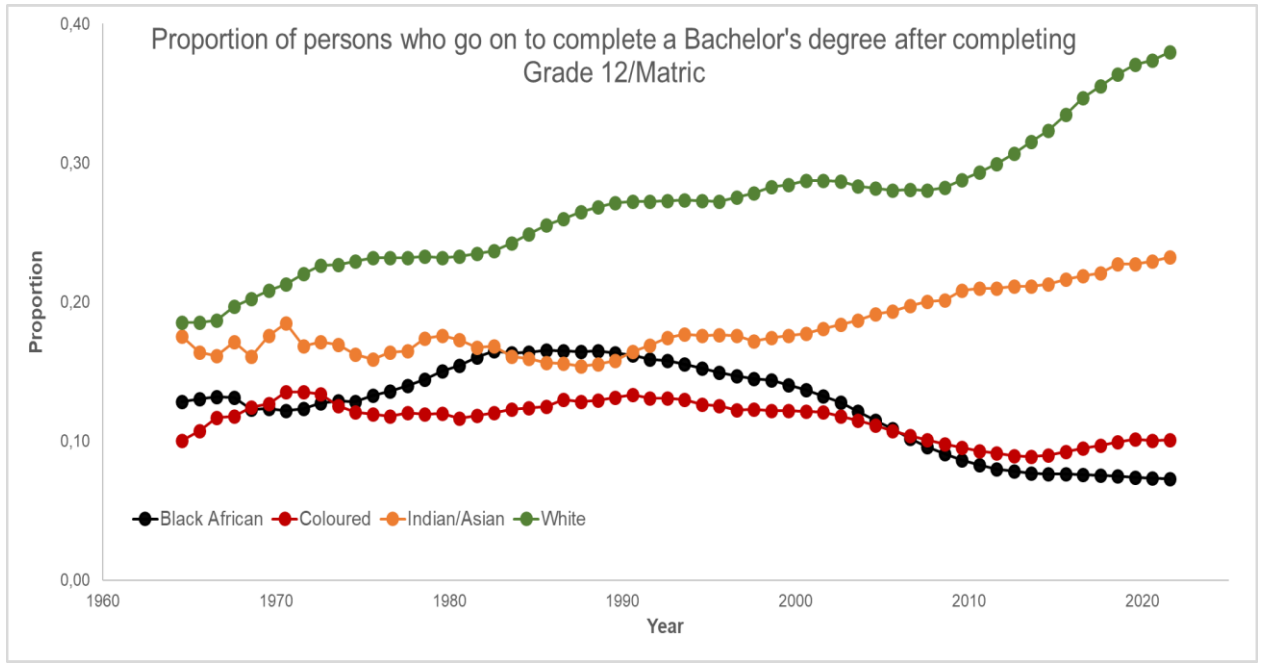
Highest **post-school qualification** level by individuals aged 25 years and older in Limpopo Province

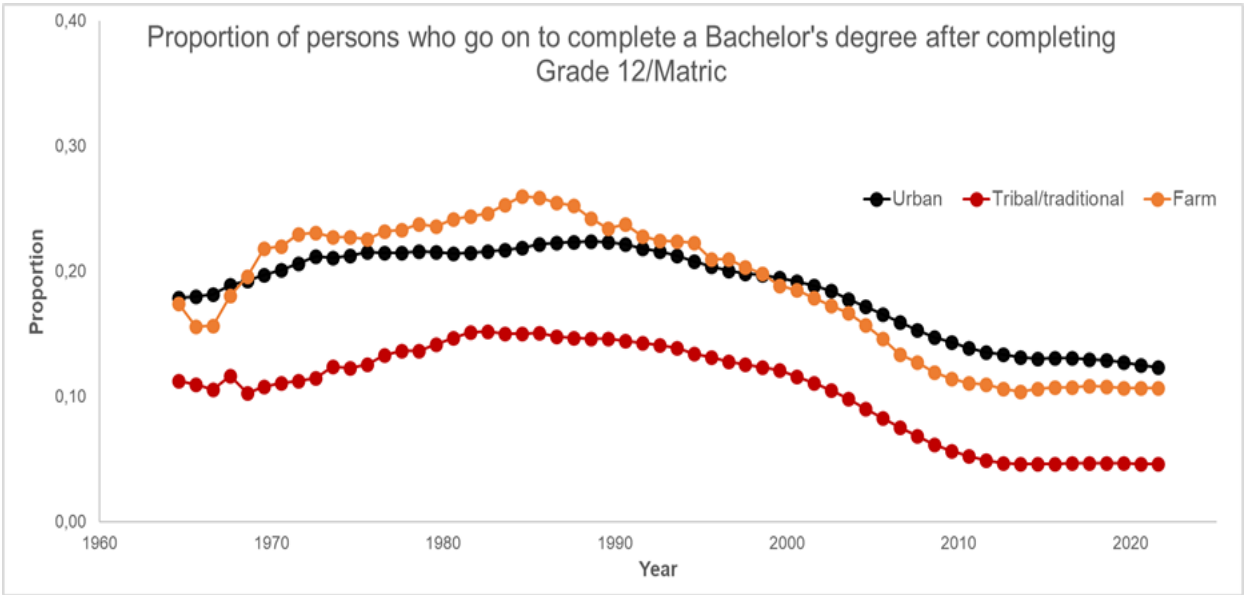


Socio-economic status and geographic location influence educational progression









Factors driving people's development for the **'Future of Work'**

Typical challenges and social ills within local villages

- Participants of focus groups stated that alcohol abuse result in accidents, violence, and is one of the main causes of GBV.
- Alcohol abuse was one of the most frequently-cited problem in the sample village, sited by 55% of the survey respondents.
- High number of child-headed households / absence of parents.
- High levels of domestic violence, child abuse and neglect reported by local social workers.
- 37% of respondents from the Sample Village survey feel that malnutrition is a problem in their community.
- Teenage pregnancies.
- Transactional sex was a noted issue - about 30% of male respondents reported that they had been involved with someone to whom they have given gifts/cash, or promised gifts, or cash.

Scenario	Percent of male respondents that believe GBV is an acceptable response
If she goes out without telling him	27%
If she neglects the children	24%
If she argues with him	22%
If she refuses to have sexual intercourse with him	21%
If she burns the food	19%

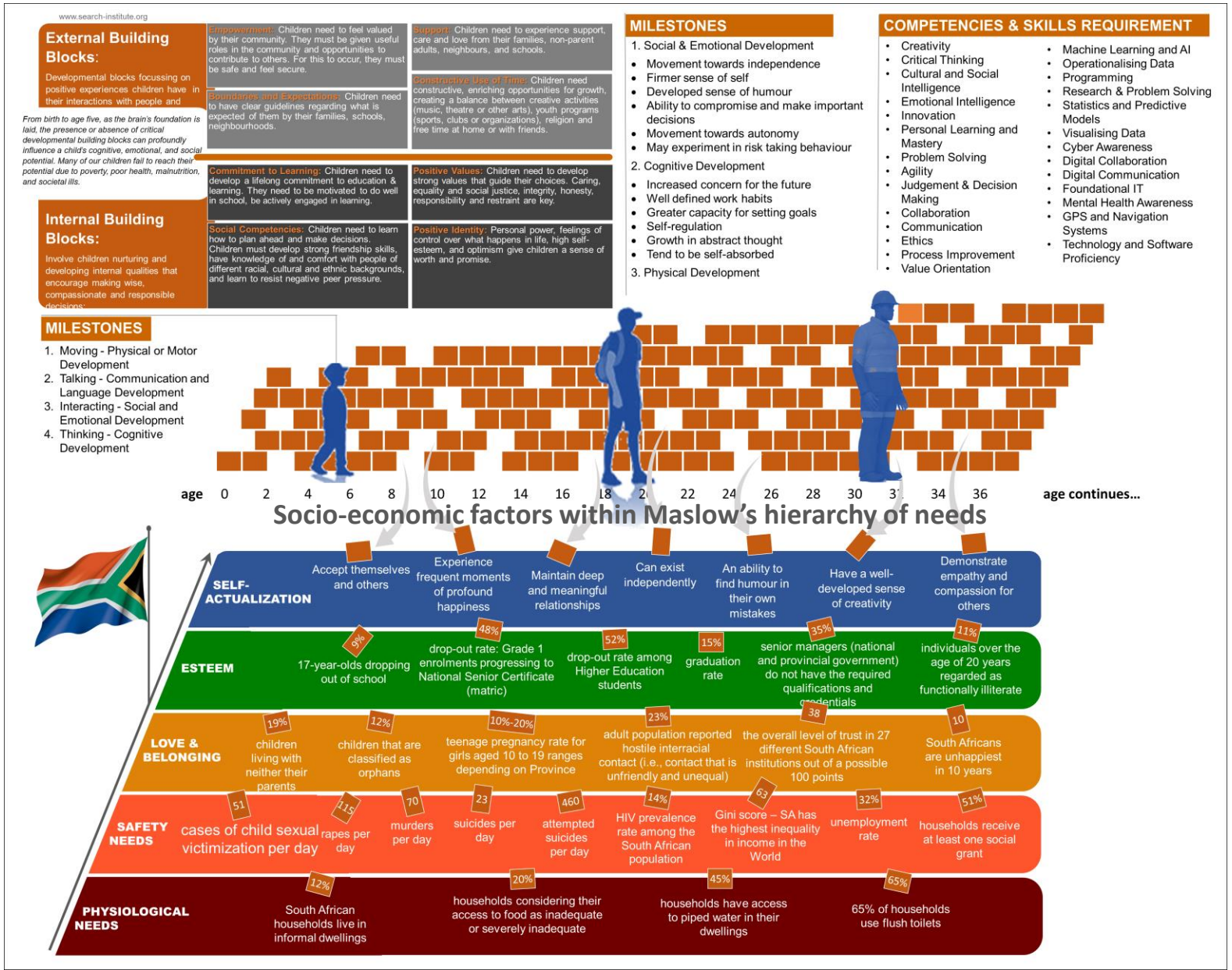
Orphans and Child-headed Households in the Sample Village

The vulnerability of this group stems from a lack of parental guidance, social support, and necessities. This forces children to take on parental responsibilities while they are still young. Children and child-headed households are at high risk of dropping out of school, becoming addicted to drugs, suicide due to stress and depression, becoming victims of abuse, and opting for transactional sex – which, in turn, places them at risk of contracting HIV. Such households are entirely reliant on social grants for survival, but they are not always able to access these grants.

Increase in the transmission of STIs (including HIV) leading to a localised increase in the burden of disease (non-local contractors and migrant job seekers)

Causing high morbidity and mortality from the direct effects of the infections and indirect effects of STIs (e.g. miscarriage, congenital diseases with spread from mother to baby). Inappropriate sexual activities may lead to an increase in teenage pregnancies, with these potentially originating from trans-generational relationships. The social ills that may be associated with activities including substance misuse and sexual transactions originating from taverns, the economic transaction and the vulnerable position of women related to this and culturally, may give rise to incidents of gender-based violence.

Developmental building blocks are potentially impacted by socio-economic factors



- Developmental building blocks influence cognitive, emotional, and social potential. To what extent?
- It is the author's view that **social ills coupled with intergenerational poverty and trauma** (historical and current) may have impacted and may continue to impact individuals' developmental building blocks, thereby **restricting the local workforce's ability** to participate in a highly technological mechanized underground mining operation.

Summary / Conclusion

- Even though the data does not represent the same sample of community members, and it roughly and potentially erroneously assumes consistency between the data sets presented, the data does offer a scenario of the potential challenges to source, train and develop local people for an increasingly more highly skilled mechanized underground work environment.
- Data aggregation has the power to inform better decision making and the next step will be to develop solutions that will ensure that local communities can benefit from employment opportunities at a future underground mining operation.