EFFECTIVE EDUCATION THAT WILL BE RELEVANT IN THE 4IR ERA: A CASE STUDY FOR SOUTH AFRICAN SECONDARY SCHOOLS
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Background and Introduction

- The 21st century has been characterised by major changes in the technological space. The world has gone "digital", which is more evident in the way that organisations and consumers alike use some sort of digital gadgets or devices to conduct business. This new era is referred to as the Industry 4.0, also called the Fourth Industrial Revolution(4IR).

- 4IR does not only affect business but education too, and as a result, education 4.0 came into existence to respond to the needs of 4IR.

Background and Introduction

- Education 4.0 in school curricula is fast becoming a critical need.

- To keep up with the worldwide digital technology advancement, school curricula must be changed in accordance with 4IR adaptations as soon as possible

- Schools can play an integral role in preparing learners for this era by incorporating the skills such as coding, robotics, and data analysis needed for 4IR in the curriculum.

Background and Introduction

- Schools must establish learning environments that allow students to practise their curiosity, problem-solving abilities, and inquisitiveness as this can help learners to develop a passion for learning, allowing them to make sense of their surroundings through hands-on activities that promote teamwork and creativity.

Research Problem

- Digitisation has had a major impact on South African secondary school education, especially in the context of high levels of inequality, exclusion, inadequate funding, and the absence of a clear integrative national strategy by the Department of Basic Education and inadequate 4IR skills .

- The problem focus on this study is whether the current South African secondary schools curriculum is relevant and effective in light of the current practices and skills that were brought by the Fourth Industrial Revolution (4IR) era

Research Objective

- The study maps the challenges faced by South African secondary schools regarding the relevancy of the current education curriculum as well as its effectiveness on current practices focusing on the skills that were brought by the Fourth Industrial Revolution (4IR) era

Research Methodology

- Data collection is an ongoing and follows a mixed-methods approach

- This part of the study will follow a qualitative approach

- The study uses content analysis to convert the qualitative data into data suitable to answer the research questions using ATLAS.ti 8™.

- The secondary data was collected from all the Grade 12 curriculum documents (which consist of 38 subjects), from the DBE website.

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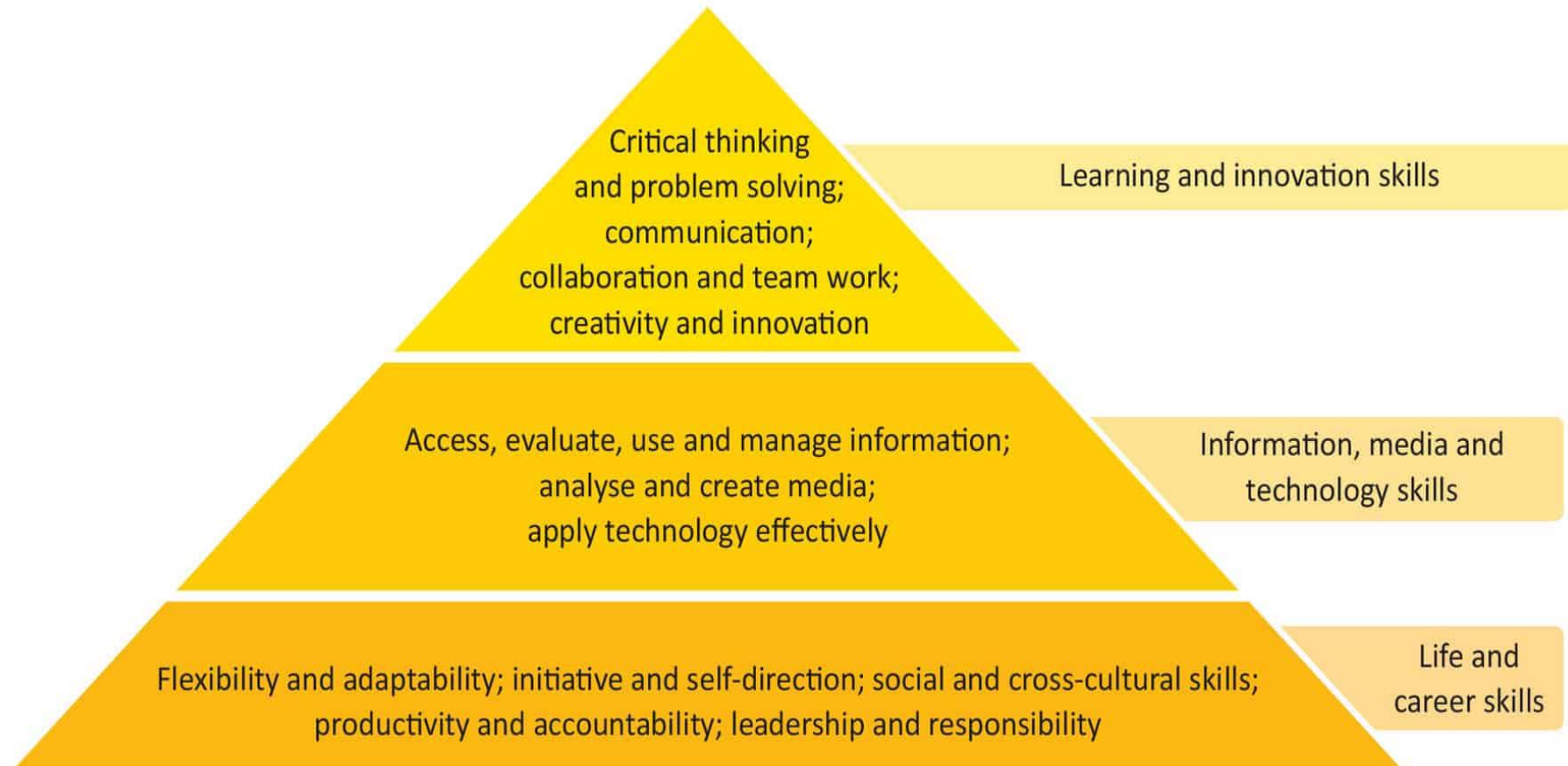JOHANNESBURG

Research Methodology

- Deductive coding, the codes were deduced from an existing theory set of 4IR skills .

- Codebook using the 4IR skills

- The codes were used to label the 4IR skills in the Grade 12 subject curriculum documents.

- ATLAS.ti 8™ reports were used to analyse the data

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Research Methodology

Data Codes

Skills for the 21st Century

Critical thinking and problem solving; communication; collaboration and team work; creativity and innovation — Learning and innovation skills

Access, evaluate, use and manage information; analyse and create media; apply technology effectively — Information, media and technology skills

Flexibility and adaptability; initiative and self-direction; social and cross-cultural skills; productivity and accountability; leadership and responsibility — Life and career skills

Source (Own work)

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Presentation of Results

Data Codes

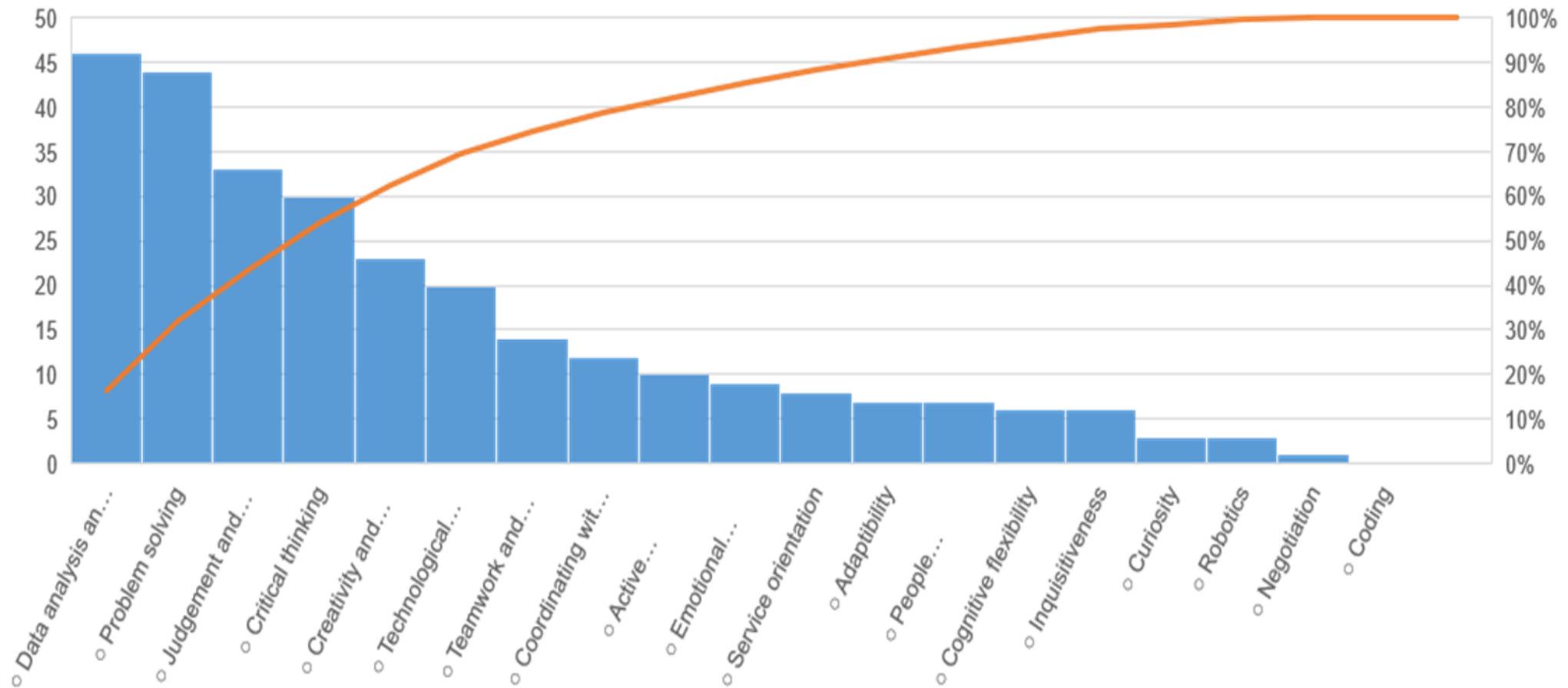| Table 1.1 4IR skills in SA secondary school curriculum	
4IR skills	Code/skills counts in curriculum documents
○ Data analysis and analytical skills	46
○ Problem solving	44
○ Judgement and decision making	33
○ Critical thinking	30
○ Creativity and innovation	23
○ Technological skills	20
○ Teamwork and collaboration	14
○ Coordinating with others	12
○ Active learning (growth mindset)	10
○ Emotional intelligence	9
○ Service orientation	8
○ Adaptibility	7
○ People management	7
○ Cognitive flexibility	6
○ Inquisitiveness	6
○ Curiosity	3
○ Robotics	3
○ Negotiation	1
○ Coding	0

Source (Own work)

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Presentation of Results – Relational Analysis

Figure 1.1 4IR skills SA secondary school curriculum

Source (Own work)

Discussion

- The results show that the South African secondary school curriculum already include some 4IR skills.

- However, other skills, such as curiosity, robotics, negotiating, and coding, have yet to be adequately integrated into the curriculum in accordance with 4IR.

- Although some of the skills are obvious in the curriculum, there is still a gap in the transition to a 4IR-relevant curriculum.

Conclusions and Recommendation

- SA's DBE announced that coding and robotics would be introduced in Grades R to 9 in all schools in light of the country's policy commitment to the 4IR and to ensure that its learners do not fall behind, but nothing has been said about doing the same for FET phase.

- The curriculum that has been introduced in the Foundation Phase(Grades R-3), which includes coding and robotics, should also be introduced in secondary schools as these skills are a central function in a digital and information-driven world , which requires the application of digital ICT skills to solve everyday problems.