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Assessing the Relationship between Digital Skills and the Labour Sector: A Case Study of Mankweng School Educators in the Polokwane Local Municipality, South Africa

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ABSTRACT

Our current world is entering a phase of digital revolution, fundamentally altering various aspects of society. Staying abreast of these transformations is crucial for all economies. The internet, the globalising forces, and evolving modes of work and communication present fresh and formidable challenges. The purpose of the study was to assess the effects of socio-economic factors on the interconnection between the digital skills of Mankweng school educators and their positioning within the labour market in the Polokwane Local Municipality, South Africa, whereby the data was drawn from the Limpopo CoLab Training Programme. The study considered data drawn from student teachers under the PGCE programme and (primary and secondary) educators (ICT) from various schools in Mankweng. The study applied a positivist paradigm, thereby it utilised quantitative data analysis through which the data was analysed using statistical packages such as SPSS. Employing the multiple linear regression model, the study identified that socio-economic factors such as, age, education level, teaching experience, access to digital resources and level of income are statistically significant to the study, as they have an influence on the relationship between digital skills and the labour market. The results further indicate that educators between the ages of 25-35, completed the digital literacy course within a period of 5 days and less, whereas older educators (>35) required a period of 2 weeks. The results further indicate that, individuals with higher education level are most likely to adapt easily to the digital era, as most educators with a hons, MSc, and Doctoral degrees have access to digital resources and completed the digital course within a period of 5 days or less. The study further identified that, digital skills such as use of white boards, Microsoft skills (e.g., using Excel Spreadsheets) and use of the internet to assist with classroom activities are the most imperative skills in the apparent digital era, within the educational sector. Furthermore, skills such as, use of computers, mobiles and tablets are categorised as ‘basic skills’ for individuals within the evolving job market. Therefore, the

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enhancement of digital skills in the labour market improves overall performance and competitiveness, thus establishing comprehensive digital skills training initiatives which will help ensure the workforce remains competitive and adaptable to the digital age's demands.

Keywords: Digital Skills, Digital Revolution, Labour Sector, Socio-economic factors, Multiple Linear Regression

1 Introduction

1.1 Background of the study

The rapid advancement of digital technology has revolutionised the way individuals work and interact in the job market. Information empowerment has changed individuals' perspectives, which has led to a significant and growing impact in the labour market (Riyadi,2021). Human aspects of life have had a profound change because of continued advancements of digital technology, whereby the internet has changed the definition of interactivity. Various studies indicate that society has experienced and is still undergoing digital revolution in a way and form of utilisation of digital resources and information virtualization. The advent of digitalization has significantly influenced the labour market, leading to shifts in work conditions, job dynamics, and the requisite skills and knowledge necessary for the contemporary work environment. Digital media and e-learning dynamics are now activated through incorporation in the emerging technologies under the educational settings and everyday life (Riyadi,2021). The adoption of digital literacy makes it easier to develop teacher-student relationships, which can develop a learning environment where students have access to different teaching methods and have a learning experience which meets their needs. Educators and students must be able to leverage technological advancements in the fourth industrial revolution, or Revolution 4.0, which requires the expansion of digital literacy in the world of education, particularly among educators and students. According to (Helaluddin, 2019), the impact of Information and Communication Technology (ICT) cannot be ignored as we enter the twenty-first century. Digital literacy abilities are the most essential and necessary for dealing with current technological breakthroughs (Kholid, 2020). Digital literacy is a crucial key qualification that is required for individuals to thrive in the apparent digital era, due to the changing content and organisation structure of many occupations.

According to Paltridge (2020), when society enters the fourth industry evolution, it will encounter several issues and impediments that will not alter as conditions change and technology and its application expand. Despite the positive effects of digitalization, there is a significant lack of digital literacy skills in both the old and young generations that hinder the adoption to the apparent digital era. According to Sherly (2022), there are several factors that contribute to the development and effective use of digital literacy skills, such as socioeconomics like age, gender, educational level and internet use, these characteristics may have a negative impact on how individuals effectively and productively use online learning. According to Sherly (2022), enhancing proficiency in digital literacy can enhance the competence of both educators and students, consequently improving the overall quality of national education. This can be achieved through several means: firstly, by empowering educators and educational staff to understand the concept of digital literacy and serve as exemplary figures; secondly, by diversifying and increasing the availability of learning resources to ensure wider access to valuable educational materials; thirdly, by facilitating students' access to a broad range of information and online resources; fourthly, by promoting public engagement with individuals possessing digital literacy skills and incorporating aspects of digital literacy into educational programs, fostering responsible and creative use of digital devices; and lastly, by strengthening school governance through the implementation of an electronic administration system, enabling convenient access for students and staff regardless of location or time constraints.

The effects of digitization on the labour market and employment are many and interconnected, with an elevated level of mutual reinforcement. This paper aims to assess the relationship between digital literacy and the labour market in the Polokwane Local Municipality, with a focus on the socioeconomic factors of schoolteachers, whereby it accentuates the importance of acquiring relevant digital literacy within the educational sector.

1.2 Problem statement

In today's world, information, and communication technology (ICT) are ubiquitous, permeating every aspect of our everyday lives, including the workplace, education, public services, business, administration, healthcare, entertainment, and culture. The rapid development of new technological settings is seen as a driving force in our planet's evolution into a global, universal society. ICT influences our lives and daily contacts in a variety of ways, including accessing information and connecting with public services, working from home, collaborating with colleagues, conversing with friends, acquiring education from a distance, and participating in politics. The constant change in digital technology outlines how imperative it is to continuously modernise digital skills and competencies, to avoid or minimise the risk of digital exclusion. The risk of digital exclusion reinforces social exclusion that is mostly noticeable in individuals and schools situated in rural areas. With the emergence of digitalization in the job market, there is a growing concern regarding the effect of digital skills on employment and job prospects. The rise of automation and artificial intelligence puts a risk to individuals who do not have relevant skills that are required in the evolving job market, as new sets of skills are becoming increasingly important.

Thus, it is crucial to understand how digital literacy affects the nature of work and employment opportunities to adequately prepare individuals for the demands of the modern job market. The noticeable digital gap in the education sector has led to insufficient provision of digitally advanced individuals in the labour market (both educators and students). This outlines how imperative it is for the government to strongly advocate and develop digital skills in education and the workplace to foster innovation (Ecorys UK, 2016). According to Ecorys UK (2016), there is a reported deficit of digitally skilled individuals between industry demand and qualified employees, thus indicating that there is a sufficient lack of digitally skilled employees and graduates in the labour market.

1.3 Aim of the study

To assess the effects of socio-economic factors on the interconnection between the digital skills of Mankweng school educators in the Polokwane Local Municipality, South Africa.

1.4 Research questions

How do socio-economic factors, such as income levels and access to technology, influence the current level of digital skills among Mankweng school educators in the Polokwane Local Municipality, South Africa?

What is the impact of digital skills possessed by Mankweng school educators on their employment opportunities within the Polokwane Local Municipality's labour market?

1. 5 Objectives of the study

To identify and describe the socio-economic factors of Mankweng school educators in the Polokwane Local Municipality, South Africa, and

To determine and assess the effect of socio-economic factors on the current level of digital skills among Mankweng school educators in the Polokwane Local Municipality, South Africa.

2 Literature Review

2.1 Definition of Concepts

Digital skills

Digital skills are the competent, critical, and responsible use of digital technology for learning, work, and social involvement, covering many aspects such as information literacy, communication, media literacy, and problem-solving (European Commission, 2019). Assessing digital competency is crucial for all citizens, and frameworks like the European Digital Competence Framework for Citizens outline incremental levels of development (Ferrari, 2013; Carretero et al., 2017). However, challenges persist in hiring and developing employees with digital competence, a priority for the European Union (Karacay, 2018). As of 2022, a sizable portion of the EU population lacks basic digital skills, with Hungary ranking 22nd in the DESI 2022 index (European Commission, 2019).

Digital literacy

The term "digital literacy" has been defined in various ways, with distinctions between technical abilities and a broader understanding of ideas. Gilster (1997) and Pool (1997) initially emphasised technical skills related to deriving useful information from the internet and adapting to new media. In contrast, Martin (2006) and Chan (2017) focused on the grasp of ideas, highlighting the ability, attitude, and awareness to use digital devices for handling resources, creating knowledge, and engaging in meaningful social actions. The diversity in definitions underscores the importance of both basic digital skills and a multidimensional understanding of online content (Spante, 2018; Marti, 2006; Chan, 2017).

Digital Revolution

The Digital Revolution refers to the transition of technology from analogy electronic and mechanical equipment to the digital technology that exists today. The era began in the 1980s and is still underway. The Digital Revolution also signals the start of the Information Era (Rouse,2017). The digital revolution has greatly influenced this sector, affecting teaching methods, the nature of educational content, and administrative processes. The labour market's adaptation to digital advancements has been a critical factor in the efficient and effective delivery of education.

Educational Sector Labour Market

The educational labour market pertains to the demand and supply of labour within the field of education. This market includes teachers, professors, administrators, curriculum developers, and educational technology specialists. The labour market's adaptation to digital advancements has been a critical factor in the efficient and effective delivery of education.

2.2 Socio-Economic Factors of School Educators on Digital Skills.

Socio economic factors include the social, economic, level of education and ethnic background. Socioeconomic factors are key elements that influence and shape the economic and social status of individuals, families, and communities. They play a crucial role in determining one's quality of life, access to resources, and opportunities. In this paper, the socioeconomic characteristics of the sampled educators are identified as follows:

Age

Age is often a key determinant that can influence an individual's digital skills, their ability to adapt to modern technologies, and their overall employability within the educational sector. Previous research into whether age was a significant factor influencing kids' digital literacy yielded inconclusive results. Age was not a statistically significant factor influencing students' digital literacy since, when compared to experience, age was not as important in enhancing students' digital literacy (Monterio,2021). Another study found that age was an essential driver of digital literacy, but it was not the sole one, and it was

not relevant enough to be included when developing educational policy (Nasah, 2010). Younger individuals often have more exposure to digital technologies from an early age, giving them a head start in acquiring digital skills. As a result, age can directly impact the level and diversity of digital skills an individual possesses. Age can also highlight disparities in digital access and skill development. Older individuals may face barriers in accessing and utilising technology, leading to a potential digital divide. This divide can have implications for their participation in the educational labour market.

Gender

Gender, as a socioeconomic factor, refers to the social and cultural roles, expectations, and norms associated with being male, female in each society. A study conducted by Yu, has shown that there are gender disparities in digital skills acquisition, with men and women often having different levels of access to and proficiency in technology (Yu, 2022). Investigating these disparities can help identify potential barriers to digital skill development and employment opportunities. There are gender disparities in the digital platform. Certain studies have indicated that girls enjoyed a higher level of digital literacy than boys (Monerio,2021; Aesaert,2015; Kim,2014) Other results revealed that boys were more digitally literate than girls (Hatlevik,2013; Umar,2012) However, some studies demonstrated that there was no statistically significant difference between gender and digital literacy (Hatlevik,2013; Umar,2012). A study illustrated that the only difference existed in the grasp of general knowledge. Male students had a better mastery of it than female ones, which may be caused by the male students' preferences for digital devices (Kara, 2021). Gender-based occupational segregation is a prevalent issue in many labour markets, including the educational sector. Certain digital skills may be more relevant or valued in specific fields, and this can contribute to gender disparities in job opportunities and wage gaps. Thus, understanding how digital skills affect the gender wage gap within the educational labour market is essential.

Educational level

Education is the most important part of intellectual labour and its basis on quality of which the general level of economic development and the intellectual labour is dependent (Miethlich,2020). Education has been identified as the detriment of technological usage, as it plays a significant role in increasing the adoption of digital technologies (Pick, 2015). The high levels of education are correlated with the high usage of the internet, and the educational sector plays a significant role in promoting the progress of adoption of ICT.

Role of digital skills for school educators

The question for the use of modern technologies within the education system has increasingly been raised, in the current era accompanied by the lack of new technical means to carry these new forms and methods of teaching (Biletska,2021). It is impera677tive for educators to acquire skills that are necessary for development and further professional activities, and knowledge on the use of digital technology. The use of technology in today's 21st century classroom plays a vital role in preparing elementary students and equipping them with skills that enable them to thrive as citizens within the ever-evolving digital environment. Therefore, it is essential for teachers to have the technical know-how, to project and transfer their knowledge to students. However, there are barriers to technology integration in schools which contribute to the digital divide. Barriers such as, lack of digital skills, which is a vital impediment to the use of technology in classrooms, hinder the students' opportunities to develop critical modern skills, which can contribute to the betterment of their personal and academic lives.

3 Methodology

The research was conducted in the Limpopo Province within the Polokwane Local Municipality. The study considered educators who are mostly located within Mankweng Community Area and student teachers (PGCE Graduates) from the University of Limpopo. The study area was chosen due to its high population density and the high accessibility of schools within the municipality. The study area was considered in this research due to its proximity to CoLab and the University of Limpopo. The area is commonly referred to as "Turfloop" and is a hub for the neighbouring villages, thus is populated with people of different ages.

Figure 3.1: Map of Mankweng, Polokwane Municipality, Limpopo Province
Source: Mapcarta, Google Maps (Turfloop Limpopo), TN to Santa Rosa Beach, FL]. (23 August 2018). Google Maps. Google.

3.1 Sample Size

Random sampling was used to select a sample of educators who took the NEMISA (Limpopo CoLab) digital course. A total of 100 educators who started and completed the digital course within the anticipated period, whereby the sample size was further divided into, 50 permanent educators and 50 student teachers (PGCE Students).

3.2 Paradigm

The study followed a positivist perspective. Positivism uses the hypothetic deductive technique to test a priori assumptions, which are frequently articulated quantitatively. Functional correlations can be derived between causal and explanatory elements (independent variables) and outcomes (dependent variables). Positivism generally focuses on identifying explanatory associations or causal relationships using quantitative approaches, with an emphasis on empirically based findings from large sample sizes—in this regard, generalizable inferences, replication of findings, and controlled experimentation have been guiding principles of positivist science (Park,2020). Secondary data was employed in the

study, from the digital course that was conducted by Limpopo CoLab (NEMISA), called Educators ICT, wherein the data was collected using a quantitative approach whereby educators answered structured questionnaires through digital course, which was carried both online and face-to-face.

4 Theoretical Framework

The study adapted the human capital theory, developed by Gary S Becker, which is a classic and influential framework that views education and training as investments in human beings, like investments in physical capital such as machinery or equipment (Becker,2009). Becker's groundbreaking work laid the foundation for understanding how individuals accumulate skills and knowledge, and how these investments in human capital contribute to economic and social development. Human Capital Theory posits that individuals' skills, knowledge, and education contribute to their economic productivity and success in the labour market. It emphasises the role of education, training, and other investments in human capital as determinants of individual economic outcomes. In relation to this research study's first objective, the Human Capital Theory suggests that socio-economic factors, such as income levels and access to technology, can impact the acquisition of human capital, including digital skills. The theory predicts that individuals with higher socio-economic status may have more resources to invest in education and technology, potentially leading to higher levels of digital skills. The theory also addresses the second objective of the study, the Human Capital Theory also implies that possessing valuable skills, in this case, digital skills, enhances an individual's employability and professional development.

The theory would predict that educators with advanced digital skills may have increased opportunities for employment within the local labour market, aligning with the idea that higher human capital leads to better economic outcomes.

5 Research Methods/ Analytical Techniques

5.1 Descriptive Statistics

The study used the descriptive statistics to address the first objective of the study, which is to: To identify and describe the socio-economic factors of Mankweng school educators in the Polokwane Local Municipality, South Africa. The descriptive statistics can be used to provide data in form of measures of frequency, central tendency (includes means), measures of variation, standard deviation, standard error, and pie charts, etc (Mishra, 2019). Both IBM SPSS version 26.0 and Microsoft Excel computer programs were used to process the data. Two types of analysis, namely: descriptive and econometric were used for analysing the collected data.

5.2 Multiple Linear Regression Model

For this study, the multiple linear regression (MLR) equation was used to explain the relationship between the socio-economic factors of educators and digital literacy within the education sector.

The formula for the multiple linear regression (General formula):

$Y=\beta 0+\beta 1x1+\ldots. +\beta Xn +e$

Model specification:

$Y=\beta 0+ \beta 1AGE+ \beta 2GEND + \beta 3\ TEACH\_EXP + \beta 4\ EDUC\_LVEL + \beta 5\ MARR\_STTS + \beta 6\ SMART\_ACC +e$

$Y= DS$

The above model indicates that six variables were used in this study to determine and assess the influence of socioeconomic factors on digital skills. The independent variables in the study are socio-economic factors, such as Age, Educational Level, Gender etc. the explanatory variables were chosen based on the demographic questions asked in the digital course that participants took part in for this study and digital literacy literature. Table 1 below presents the variables that were considered in this analysis and therein expected signs of the estimated coefficients based on past literature and digital literacy literature.

Dependent variable	Description		
Digital skills (DS)	The educator has relevant digital skills in the labour market. Y= 1 if the educator has relevant digital skills in the labour market.		
Variable	Description and unit of measurement	Units	Expected signs
Age (AGE)	Age of the educator (Years)	Years	+\-
Gender (GEND)	Dummy: 1 if educator is male, 0 if female	Dummy	+\-
Teaching Experience (TEACH_EXP)	Number of years the educator has worked (years)	Numbers	+
Education Level (EDUC_LVEL)	Number of years taken to get a teaching degree (Years)	Numbers	++
Marital Status (MARR_STTS)	Dummy: 1 if educator is married, 0 if Otherwise	Dummy	+\-
Smartphone Accessibility (SMART_ACC)	Dummy: 1 if the educator has access to a smartphone, 0 otherwise	Dummy	+

Table 1: Description of model variables for the outcome of the multiple linear regression model.

The multiple linear regression was used to address the second objective of the study which is to: To determine and assess the effect of socio-economic factors on current level of digital skills among Mankweng school educators in the Polokwane Local Municipality. The empirical model adopted the statistical technique of multiple linear regression (Cohen and Cohen, 1983). The MLR was used to estimate the relationship between the explanatory variables and the dependent variables (Digital Skills). The value of the dependent variable is influenced by the value of the independent variable (Bevans, 2022).

6 Results and Discussions

6.1 Descriptive statistics

To accomplish the first objective, descriptive statistics including means, minimum and maximum values, frequencies, percentages, and standard deviations were employed. These descriptive statistics facilitated the portrayal of the socio-economic attributes of the selected educators. Utilising IBM SPSS version 26.0, an analysis was conducted to examine the socio-economic characteristics of educators.

Discussion Of the Significant Variables.

Age (AGE)

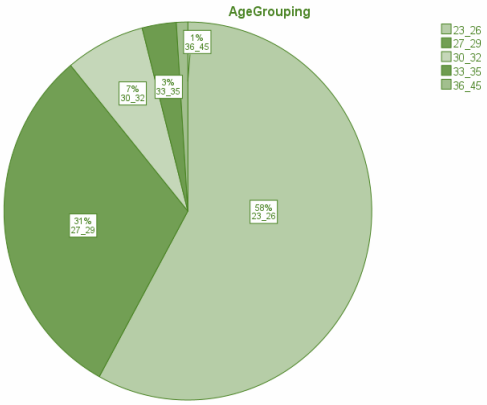

Figure 1: Age (AGE) distribution among the student teachers from the PGCE programme and (primary and secondary) educators (ICT), n=100.

The provided figure illustrates the distribution of educators' ages sampled from Mankweng. Out of the 100 educators included in the study, 56% fall within the age group of 21-26, while 31% belong to the 27-29 age bracket. A smaller percentage of educators participated in the study from the age groups 30-32 (7%), 33-35 (3%), and 36-45 (1%). These findings offer insights into the age demographics of the educators involved in the research.

Gender (GEND)

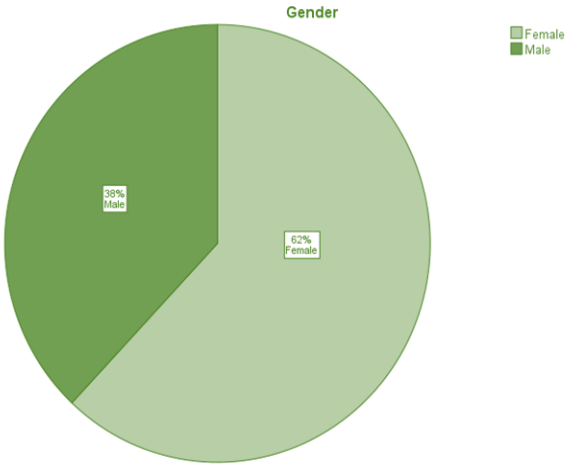

Figure 2: Gender distribution of the student teachers from the PGCE programme and (primary and secondary) educators (ICT), n=100.

The figure indicates that in the research study, 38% of the participants are male and 62% are female from the sampled 100 educators. Thus, indicating that, a larger percentage of the participants are females.

Educational level (EDUC_LVL)

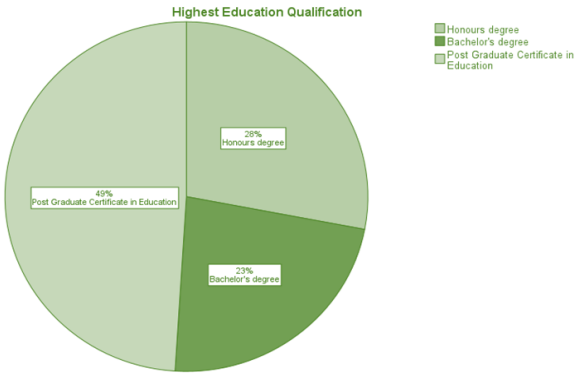

Figure 3: Educational level (EDUC_LVL) of the student teachers from the PGCE programme and (primary and secondary) educators (ICT), n=100.

The presented figure outlines the educational attainment of educators sampled from Mankweng. Among the sampled educators, 23% hold a bachelor's degree, while 28% possess an honours degree. A majority of 49% indicated having a postgraduate degree certificate in education. These findings provide an overview of the diverse educational levels among the sampled educators in Mankweng.

Smartphone accessibility (SMART_ACC)

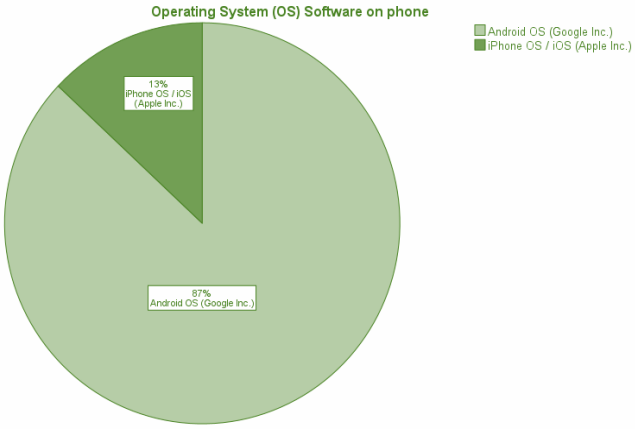

Figure 4: Smartphone accessibility (SMART_ACC) of the student teachers from the PGCE programme and (primary and secondary) educators (ICT), n=100

The above figure indicates educators' accessibility to smart phones, whereby 87% of the educators have access to android cell phones and 13% have access to iPhones.

6.2 Empirical Model Results

Dependent Variable	Digital Skills (DS)		
Explanatory Variables	Coefficient (Std. error)	Marginal effects	
		dy/dx	P-value
CONSTANT	4.457***		0.0001
AGE	0.712 (0.224)	0.012	0.001
GENDER	0.709** (0.3105)	-0.237	0.058
TEACH_EXP	-1.238 (1.502)	-0.030	0.023
EDUC_LVEL	19.863** (8.332)	0.412	0.025
MARR_STTS	0.450 (0.418)	-0.046	0.282
SMART_ACC	1.179** (0.563)	0.061	0.036
Diagnostics Number of observations=100 dy/dx is a discrete change of dummy variable from 0 to 1. standard errors are in parentheses. Notes: *, **, *** means statistically significant at the 10%, 5% and 1% levels, respectively			

Table 2: Multiple Linear Regression of the sampled educators under the Polokwane Local Municipality (n=100)

6.3 Empirical Result Discussion

1. AGE: The coefficient for AGE is 0.712 with a standard error of 0.224. The marginal effect (dy/dx) of AGE on Digital Skills is 0.012, and the p-value is 0.001. This suggests that age is statistically significant at the 1% level. The positive coefficient indicates that as individuals get older, their digital skills tend to increase.

2. GENDER: The coefficient for GENDER is 0.709 with a standard error of 0.3105. The marginal effect of GENDER on Digital Skills is -0.237, and the p-value is 0.058. This suggests that gender is statistically significant at the 10% level. The positive coefficient indicates that being a certain gender is associated with higher digital skills, while the negative marginal effect suggests that being male (the reference category) is associated with a decrease in digital skills compared to being female.

3. TEACH_EXP: The coefficient for TEACH_EXP is -1.238 with a standard error of 1.502. The marginal effect of TEACH_EXP on Digital Skills is -0.030, and the p-value is 0.023. This suggests that teaching experience is statistically significant at the 5% level. The negative coefficient implies that as teaching experience increases, digital skills tend to decrease.

4. EDUC_LVEL: The coefficient for EDUC_LVEL is 19.863 with a standard error of 8.332. The marginal effect of EDUC_LVEL on Digital Skills is 0.412, and the p-value is 0.025. This suggests that

education level is statistically significant at the 5% level. The positive coefficient indicates that individuals with higher education levels tend to have higher digital skills.

5. MARR_STTS: The coefficient for MARR_STTS is 0.450 with a standard error of 0.418. The marginal effect of MARR_STTS on Digital Skills is -0.046, and the p-value is 0.282. This suggests that marital status is not statistically significant at conventional significance levels (the p-value is greater than 0.10).

6. SMART_ACC: The coefficient for SMART_ACC is 1.179 with a standard error of 0.563. The marginal effect of SMART_ACC on Digital Skills is 0.061, and the p-value is 0.036. This suggests that having access to a smartphone is statistically significant at the 5% level. The positive coefficient indicates that individuals with access to a smartphone tend to have higher digital skills.

In summary, in this model, age, gender, teaching experience, education level, and smartphone access are statistically significant variables in explaining digital skills. Marital status, on the other hand, does not appear to be a significant factor.

7 Conclusion and Recommendation

7.1 Conclusion

The findings of this research shed light on various factors influencing digital skills among educators in the Polokwane Local Municipality, South Africa. Age emerged as a positive factor, indicating that older individuals tend to possess higher digital skills, a crucial consideration for workforce planning in the educational sector. The significant gender difference in digital skills suggests the need for gender-inclusive policies and initiatives to encourage male participation in skill development programs. Notably, the negative correlation between teaching experience and digital skills underscores the necessity of targeted training programs for more experienced educators. Higher education levels positively influence digital skills, emphasising the pivotal role of education and qualifications in the labour market, while marital status appears less impactful. Access to smartphones is highlighted as a key factor positively associated with digital skills, emphasising the importance of personal technology access.

7.2 Recommendations

The development of tailored training programs, gender-inclusive policies, an emphasis on education, acknowledgment of personal technology access, further research into gender disparities, and policy impact assessment. In essence, implementing these recommendations can contribute to a more digitally proficient and well-equipped workforce in the educational sector, thereby enhancing the quality of education and employability of educators in the Polokwane Local Municipality, South Africa. Further studies should consider these recommendations to ensure a comprehensive understanding of the relationship between digital skills and the educational sector labour market in the region.

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