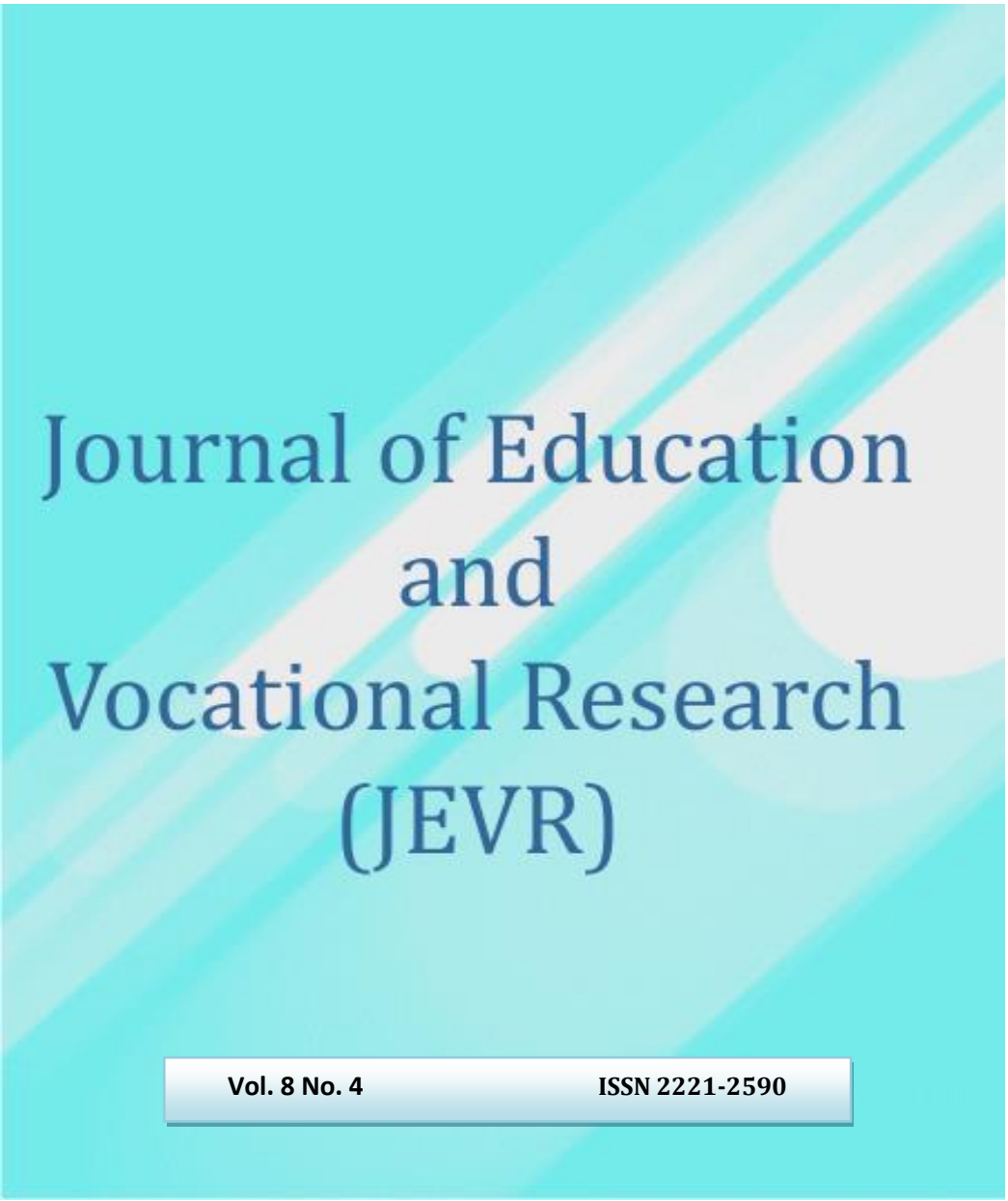


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Journal of Education and Vocational Research (JEVR) provides avenue for quality research in the ever-changing fields of Education and Vocational Research and related disciplines. Work submitted for publication consideration should not be limited by any narrow conceptualisation of educaton and vocational research, but comprises interdisciplinary and multi-facet approaches to education and vocational theories and practices as well as general transformations in the fileds. Scope of the JEVR includes: subjects of educational technology, educational administration, educational planning, measurement and evaluation in education, developmental psychology, special education, distance learning, vocational education, technology-based learning, environmental education, business education, educational psychology, physical education, innovation, vocational training, knowledge management. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal, and that all listed authors approve its submission to JEVR. It is JEVR policy to welcome submissions for consideration, which are original, and not under consideration for publication by another journal at the same time. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. The current issue of JEVR comprises of papers of scholars from Pakistan, Thailand, United Kingdom, Austria, South Africa and India. Impact of service quality on loyalty & mediating role of trust, understanding corporate life-cycles, the effect of mathematics and physical science on matriculants' overall performances, skill development policies in india: implications and challenges and the provision of free higher education in South Africa: a proper concept or a parable are some of the major practices and concepts examined in these studies. Journal received research submission related to all aspects of major themes and tracks. All the submitted papers were first assessed by the editorial team for relevance and originality of the work and blindly peer reviewed by the external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance, and clarity for the purpose. Current issue will therefore be a unique offer, where scholars will be able to appreciate the latest results in their field of expertise, and to acquire additional knowledge in other relevant fields.

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## Table of Contents


| Description | Pages |
|---|---|
| Title | 1 |
| Editorial | 2 |
| Editorial Board | 3 |
| Table of Contents | 4 |
| Papers | 5 |
| Impact of service quality on Loyalty & Mediating role of Trust: An empirical investigation of Restaurants<br>Fiza Amjad, Sajjad Ahmad Baig, Khalid Jamil, Asma Amjad | 6 |
| Understanding Corporate Life-Cycles<br>Ousanee Sawagvudcharee, Maurice Yolles, Gerhard Fink, Paul Iles, Chanchai Bunchapattanasakda, Buncha Limpabandhu | 15 |
| The Effect of Mathematics and Physical Science on Matriculants' Overall Performances: Analysis Using Multilevel Model<br>ME Letsoalo | 28 |
| Skill Development Policies in India: Implications and Challenges<br>Harshil Sharma | 43 |
| The Provision of Free Higher Education in South Africa: A Proper Concept or a Parable?<br>Halalisani Victor Mlambo, Mduduzi Hlongwa, Mandla Mubecua | 51 |

# PAPERS

**Journal of Education and Vocational Research (JEVR)**
**Vol. 8, No. 4, December 2017 (ISSN 2221-2590)**

# Impact of Service Quality on Loyalty & Mediating role of Trust: An Empirical Investigation of Restaurants

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**Abstract: S**tudy was conducted to investigate the relationship between service quality, trust and loyalty. The trust is mediating between service quality and loyalty. Service quality provided to the customer is responsibility of the restaurants. Using a convenient sampling data was collected from consumers. Service quality positively associated with trust and loyalty and trust is also positively linked with loyalty and mediates the relationship between service quality and loyalty according to our finding. This article helps the organizations to understand the importance of service quality provide and how consumers become loyal to the organization. Customer retention is higher and profitability is greater for the business over the long period of time.

**Keywords:** *Service Quality, Loyalty, Trust, Restaurants*

## 1. Introduction

In the present era where marketing conditions are changing constantly organizations must realize that the growing economic system with ever growing market not faced by them. So the end result is that every customer gained a new value. So the customer satisfaction is an element that encourage the use of services again and again but there is no guaranty that a satisfied customer make a purchase (Ribeiro Soriano, 2002). Marketers just focus on customer satisfaction not on increased customer satisfaction during 1980s and 1990s, but marketers realize with the passage of time that many customers who satisfies with the services not repurchase or reuse the products. When customer make repurchases with the same brands profitability raises so to maintain the position of the organizations loyalty of the customers is very important. Brand loyalty is a prerequisite for a firm's competitiveness and profitability (Reichheld, Markey Jr, & Hopton, 2000). The importance of brand loyalty has been recognized in the marketing literature for at least three decades (Sheth & Parvatiyar, 2002). In this connection, Aaker and Jacobson (1994) has discussed the role of loyalty in the brand equity process and has specifically noted that brand loyalty leads to certain marketing advantages like new customer, marketing cost reduce and grater trade leverage. Mostly organizations hold their customer as a competitive asset suggested by many investigations. At current time due to increase employment of women's outside the home and life style is being changed the restaurant industry is growing rapidly in Pakistan. On the other hand, increasing competition among the restaurant. Customer loyalty determine the important part in restaurant financial growth and competing the other organization and they keep their place in the market, Reichheld and Sasser (1990) study show the strong relation within customer and desertion to increasing the growth of the organization. Many researchers concluded that they keep their loyal customer as an aggressive asset. In reality the customer has many choices in the current competitive environment. This is the reason that customer chose their favorite options from available alternatives. The loyalty is considered as an important factor for the success of any restaurant in the present competitive environment. Another way we say that as the loyal customer increases the profitability also increases. Emerging a new chain of restaurant including sardines, Bandu khan, Khayyam etc. and their dedications to opening new branches in different cities is an indication of the problem. With increasing number of customer in the competitive environment there is no guarantee of profit rather than retaining the existing customers is most important than creating new ones. The aim of this study is to find the factors that contribute in the customer loyalty in the restaurant industry and provide guidelines to increase the loyalty build relationships with customers and enhance customer commitment.

**Significance of the study:** For the economic stability and development and growth of a country or nation loyalty is the important part this research study describe the importance of the loyalty and help the people to know the importance of the loyalty in different articles the loyalty is an important factor for developing, economic stability of a country or nation we analyze different sources and conclude these research describe

the factor effecting on the loyalty and this research describe the importance of the loyalty and benefit of the build long term relationship with the customer and this research helps the marketer to develop and attract the loyal consumer and how they marketer develop the habit of loyalty in consumer.

## 2. Literature Review

**Loyalty:** Brand loyalty is a prerequisite for a firm's profitability and competitiveness (Reichheld et al., 2000). Desires every firms to have its brands with high customer loyalty. Unfortunately, all brands cannot attract loyalty is high. development and maintenance of consumer brand loyalty is placed at the heart of company brand loyalty place in the heart of companies plans in the highly competitive environment with high uncertainty and more product differentiations (Fournier & Yao, 1997). The importance of brand loyalty has been recognized in the marketing literature for at least three decades (Sheth & Parvatiyar, 2002). In this connection, Aaker and Jacobson (1994) has discussed the role of loyalty in the brand equity process and has specifically noted that brand loyalty leads to certain marketing advantages like marketing expense are decreasing, increased customers and high leverage of trade. Dick and Basu (1994) suggest other loyalty-related marketing advantages, such as favorable word of mouth and greater resistance among loyal consumers to competitive strategies. Yet despite the clear managerial relevance of brand loyalty, conceptual and empirical gaps remain. Specifically, with some exceptions (Zeithaml, Berry, & Parasuraman, 1996), our conceptualizations of brand loyalty emphasize only the behavioral dimension of that concept and not considering its behavioral dimensions and its relationship with other variables at the consumer and market levels. Brand loyalty is a consumer's preference to buy a single brand name in a product class; it is a result of the perceived quality of the brand and not its price (Zehir, Şahin, Kitapçı, & Özşahin, 2011). Brand loyalty may be indicated by brand attitudes and habit (Rauyruen & Miller, 2007), it is also differentiate from either attitudes. Customer Satisfaction with the Brand performance can be expressed in term of brand loyalty.

**Service quality:** The service quality examines carefully that perception of consumer about the service elements like physical environment, interaction quality and the quality of outcome. Service quality dimensions (reliability, assurance, responsiveness, empathy) are basses to evaluate the service elements and tangibles. Zeithaml, Berry, and Parasuraman (1988) define service quality *as global judgment or attitude relation to the overall excellence or superiority of the service* 'it has been also defining the service quality as "*the degree of discrepancy between customers' normative expectations for the service and their perceptions of the service performance*". Grönroos (2001) perceived judgment of service quality of any organization and resulting evaluation process is start where customer compares *their expectations with the service they perceive to have received*. Cronin Jr and Taylor (1992) suggested that the implication and conceptualization of service quality was not sufficient and cited adequate marketing literature (Bolton & Drew, 1991) supporting performance-based simple measures of service quality. Zeithaml et al. (1996) the customers' behavioral intention in service develop the comprehensive, and multi-dimensional framework. Initially this framework adjusting four main types like purchase intention, price sensitivity word of mouth and complaining behavior.

**Trust:** Gundlach and Murphy (1993) contend that *"the variable most universally accepted trust as a basis of any human interaction". Moorman, Deshpande, and Zaltman (1993), give a Definition of trust that the degree of willingness that the consumer trust on the ability of brand that it perform its stated function* ".This definition has two general approaches to trust in the literature (Kennedy, Ferrell, & LeClair, 2001). First, dimension as the trust viewed as a belief, sentiment, or expectation relate to the partner's trustworthiness that are concluded from the other partner expertise, reliability, or expectation about an exchange partner's trustworthiness that results from the partner's expertise, reliability, or intentionality. Second aspect of trust Viewed as behavioral dimension indicate that rely on a partner and unreliability on the part of trustee. Doney and Cannon (1997) also focus that the notion of trust is related only in condition of uncertainty when small difference are n brands. Especially in environment of criticism they can rely on trusted brands and reduce uncertainty. Doney and Cannon (1997) argue that the trust construction involves a "calculation process" depend on the brand ability of an object to continue to fulfill its responsibility and the estimate of a reward against the estimated cost stay along in relationship. On the other hand, Doney and Cannon (1997) argue that the trust influence the firm to act in the best interest of their customers based on share values and goals. Thus, beliefs about important facets of trust like reliability, safety, and honesty that people incorporate in their operationalization of trust, as we discuss latter. So, we consciously consider of any brand trust as it

involves process. Customer Trust generally develops through the following five stages: *(1) enlargement, (2) suspension, (3) responsiveness, (4) commitment, and (5) investigation, (Roberts, Varki, & Brodie, 2003).* Customer trust on a certain brand is the determinant of the future purchase intentions of a customer and it is an important factor to maintain a profitable relationship with customer (Lagace & Marshall, 1994).

**Service quality and trust:** According to Delgado-Ballester and Luis Munuera-Alemán (2001) usually customer choose a brand that they believes more reliable and more trustworthiness. Another researcher Auka (2012) argue that consumer perceive service quality of the brand in term of the appraisal of overall service quality. He argues that the service quality as it is a difference between the expectation of consumer about the service quality and how customer perceive the performance of service quality. Some other researcher like McQuitty, Finn, and Wiley (2000) explain that there is some differences between expectations and perceived performance that is the best indicator of customer satisfaction that results in level of trust among customers, He give an example that when consumer makes purchase occasionally different brands they may be switch these brands because they are not completely satisfied with the brand and have more expectations with other brands. Auka (2012) suggested that service quality is sufficient when the consumer perception about brands equal or exceed the consumer perception. Service quality means judgment of the service superiority at certain attribute level of service quality.

**Trust and Loyalty:** *"It is no longer sufficient to concentrate only on customer satisfaction; the next step is loyalty"* a definition given by (Anderson, Rungtusanatham, & Schroeder, 1994). It has been found that trust has positive effect on loyalty of customer means if consumers have trust on company product and services in return they will be more loyal toward that organization research was conducted in Bangladesh among the consumers of telecommunication sectors they argued that if consumers will be more confident they will be more loyal (Hafeez & Muhammad, 2012). Horppu, Kuivalainen, Tarkiainen, and Ellonen (2008) The research results supported the hypothesis and suggesting that trust on the web site level are bases of web site loyalty. Yet, results also indicated that brand-level experiences affect online trust and loyalty differently relies on the customer's connection with the brand. Van Vuuren, Roberts-Lombard, and Van Tonder (2012) research study reveals in an optometric practice environments consumer trust has significant high correlation with consumer loyalty if service providers provide their maximum efforts and intentions toward consumers they have more confident about an organization services and more loyal. Another researcher found the positive relationship between trust and loyalty they claimed that trust has positive influence on loyalty of consumers regard to organizations if one organizations developed their trust to engaged in Corporate Social responsibility (Social Identity) that will results in consumers loyalty about organization (Nguyen, Leclerc, & LeBlanc, 2013). Morgan and Hunt (1994) explain trust as if the exchange partner had reliability and the other party has confidence on the exchange partner.

According to Sharma and Patterson (1999) the willingness of one partner to rely on the exchange partner is that the one party has confidence. The activities of the exchanging partner will beneficial for one partner carefully argued by Akbar and Parvez (2009). According to Doney and Cannon (1997) the related parties that have using the cost-benefit relationship concerned with customer meet the responsibilities toward the customer. Attitude and Customer behavior two things contribute in customer loyalty. Intention to purchase or Purchase additional services and products and the repurchase intention of customer to purchase the products of the same company represent this notion represent the customer attitude, the willingness of customer to recommend the others to company that demonstrate the customer commitment to the company by showing the resistance to switching behavior towards the competitors and agreed to pay higher prices for products (Zeithaml et al., 1996). Other side the loyalty of customer represents the actual and repeat purchases of same or different goods and services from the same company advice other customers to purchase he products if the same company and give the probability of choice for the brand for a long time (Mokhtar, Maiyaki, & Mohd Noor, 2011). Grönroos (1984) conducted an empirical investigation which state that customer trust enhances the customer loyalty, by testing he found that customer trust has directly influence loyalty. The customers have trust on organization that results in loyalty.

Oliver, Rust, and Varki (1997) in future defined loyalty as a "deeply held commitment to rebury or patronize a preferred product or service consistently, in which causing repetitive same product or same brand-set purchasing, but some instead situation effect on the market efforts and switching behavior due to this despite

influence. Many studies describe the advantages of the loyalty. Zeithaml et al. (1996) *service quality describes as "increased repurchase volume, better acquisition rates from positive word-of-mouth communication and lower sensitivity* when the price is increases .in which conceder the effect of service quality on loyalty. Some previous research indicates that service quality impact on the consumer loyalty. Through the corporate and reliability on the brand (Hu, Kandampully, & Juwaheer, 2009). Some other studies indicate that service quality directly impact customer loyalty due to the presence of customer image or the reliability of the customer. Defining loyalty is a challenging job for researchers, because there is no precise conceptualization and there is verification exist in contract. Study suggest that frequent use and satisfaction with a product or service are usually linked with loyalty. Zeithaml et al. (1996) describe service quality as "*increased repurchase volume, better acquisition rates to increases the positive word of mouth related this restaurant and price sensitivity is higher.* Some past researches shows that loyalty effected by service quality (Cheng, Lai, & Yeung, 2008). Some other studies indicate that service quality directly impact customer loyalty due to the presence of customer image or customer satisfaction. Defining loyalty is a challenging job for researchers, because there is no precise conceptualization and there is verification exist in contract. Study suggests that frequent use and satisfaction with a product or service are usually associated with loyalty.

**Mediating Role of Trust:** After review prior studies on service quality loyalty and trust is can be seen as mediator between service quality and loyalty with respect to mediating role of trust, they insist the trust play role as mediator or interviewing if restaurant retain the five characteristic of service quality Parasuraman and Grewal (2000) identified five elements of service quality (viz. reliability, responsiveness, assurance, empathy, and tangibles)Consequent result of these five elements of service quality in loyalty social identity in loyalty on performing essential part of mediating variable trust Furthermore loyalty is not only effected by integral assessment of company they outside power of customer can also influence on organization like outside activities advertisement promotions personnel selling publicity public rationing word of mouth etc. Trust level is somewhat mediate of customer due to service quality attribution on the support aim and agreement consumer purchase decision influence by company side as a result of loyalty. the loyalty in which mediated by trust. Organizations side to influence the consumers purchase decisions as results of loyalty that is mediated by trust eventually if customer trust on the loyalty generate in form of repurchasing positive word of mouth etc. Stakeholder-driven attributions effect customer repurchasing and spared the positive word of mouth an indirectly the effect of trust as mediator trust is direct effect on customer commitment and loyalty then indirectly effect on price tolerance. Louis and Lombart (2010) explored the influence of service quality of a product on consumer's trust on the restaurant which leads to the development of consumer 'loyalty with the restaurant so, they studied the trust is meditating on restaurant service quality and loyalty relationship. And this service quality is the base to generate trust on the restaurant and this trust and satisfaction develops a consumer loyalty with the restaurant. Service quality of restaurant has strong influence on consumer's mind.

## 3. Methodology

**Measures and Sampling Procedure:** A self-administered questionnaire was chosen as a research instrument to gather the primary data of service quality, trust, loyalty in restaurant. Constructs in our study developed by using measurement scale adopted from prior studies.

**Service quality:** In which we use the 22 items of service quality and this items is measure using seven point Likert scale with anchors strongly disagree (=1) strongly agree (=7).

**Loyalty:** we use the 7 items of loyalty and these items is measure using seven point Likert scale with anchors strongly disagree (=1) strongly agree (=7).

**Trust:** Trust is used 4 items and this items is measured using five Likert scale with anchors strongly disagree (=1) strongly agree (=5) and this items is used by Morgan and Hunt (1994), 'The Commitment-Trust Theory of Relationship Marketing , Journal of Marketing 58, 20–38) from previous studies.

**Sample:** A total of 150 questionnaires were distributed to use restaurant in Faisalabad. Convenient sampling technique increase the reliability of the data was adopted convenient sampling. In this research study, the

questionnaires were distributed directly to the respondents and the research collected completed questionnaires. And the data was collected for this research from the student of National Textile University Faisalabad different department (MBA, Textile, IT, Applied Sciences, Fashion Designing).

**Sample Characteristics:** Respondents sample selected for this study was individual customers of restaurant sector in Faisalabad. There are some demographic characteristics of these individual respondents, in which included statistical values such as frequency and percentages of different demographic characteristics of respondents. Percentages: 1) Gender, 2) Occupation, 2) Age, 4) income 5) Education, 6) restaurant.

## 4. Results

**Table 1: Data analysis**

| Demographic variables | Frequency | Percentage % | Demographic Variables | Frequency | Percentage % |
|---|---|---|---|---|---|
| **1. Gender** | | | Bachelor | 44 | 29.9 |
| Male | 63 | 42.9 | Masters | 68 | 46.3 |
| Female | 84 | 57.1 | Other | 34 | 23.1 |
| **2.Income** | | | **5.Occopation** | | |
| Less than 10,000 | 31 | 21.1 | Student | 61 | 41.5 |
| 10,000-30,000 | 28 | 19.0 | Job holder | 85 | 57.8 |
| 31,000-50,000 | 40 | 27.2 | Other | 1 | .7 |
| 51,000-80,000 | 29 | 19.7 | **6.Brands** | | |
| Above 80,000 | 19 | 12.9 | the dynasty | 23 | 15.6 |
| **3.Age** | | | Lasania | 10 | 6.8 |
| 10-20 | 5 | .7 | Sardines | 11 | 7.5 |
| 21-25 | 85 | 57.8 | Quilim | 12 | 8.2 |
| 26-30 | 40 | 27.2 | silver spoon | 21 | 14.3 |
| 31-35 | 16 | 10.9 | Tabbaq | 15 | 10.2 |
| 36-40 | 5 | 3.4 | al-nakhal | 18 | 12.2 |
| Above 40 | 0 | 0 | Khayyam | 14 | 9.5 |
| **4.Qualification** | | | Bandu khan | 12 | 8.2 |
| Intermediate | 1 | .7 | Others | 11 | 7.5 |

According this statistical value 42.9% male and remaining 57.1% is female in this sample .in occupation 42.5% is student and 57.5% is job holder. As for as age related .7% fall under age 10-20 years and 57.8% fall under age group 21-25 years and 27.2% under age 26-30years and 10% fall the age 31-35 and 3%in the age of 36-40 .intermediate are .7% in this sample, bachelor degree holder are up to 29.9%, large number of respondent 46.3% holds master degree in this sample and other degree holder are only 23.1%, most of the respondent 27.2% income is 31000-50000 and 40% respondent below the income 31000-50000 and 31% above the income 31000-50000 at the end 15.6%respondent in dynasty restaurant 6.8%in Lasania 7.5%sardines 8.2%quilim and 14.3% silver spoon 10.2% in Tabbaq 12.2% in al nakhal 9.5% Khayyam 8.2%bandu khan 7.5%include the other restaurant response.

**Table 2: Regression analysis**

| Service | R square | Loyalty Significance | Beta |
|---|---|---|---|
| quality | .058 | .003 | .241 |

Regression results of loyalty as dependent variable and service quality as independent variable shows positive and significant relation between these two variables at (p<.001) significance.
A. Predictor: (constant) service quality
B. Dependent Variable: loyalty
C. Significance at <0.01
D. N=150

Results show that the model significant at (p <0.01). In which the value of R-Square show the positive rate of changed by independent variable (0.058) to dependent variable appropriate at (.241, 0.00). R-Square value shows the variation in loyalty (5.8%) due to change in service quality.

**Table 3: Summary**

| Service | R square | Trust Significance | Beta |
|---|---|---|---|
| Quality | .027 | .049 | .163 |

A. Predictor: (constant) service quality
B. Dependent Variable: Trust
C. Significance at <0.01 D. N=150
Table-1.4 indications model tested significant at (p <0.01). this results show that the value of R-Square show they positive rate of change by independent variable (0.027) to dependent veritable at (0.163) in which the R-Square values describe and show the variation in trust (2.7%)due to change in service quality. o

**Summary**

| Loyalty | R square | Significance | Beta |
|---|---|---|---|
| Trust | .367 | .000 | .606 |

Regression results of brand trust as independent variable and loyalty as dependent variable shows significant relation between these two variables at (p<.001) significance.
A. Predictor: (constant) Trust
B. Dependent Variable: Loyalty
C. Significance at <0.01
D. N=150

Table 1.5 significant at (p <0.01) tested the show the modal .in which this table the value of R-Square show the positive rate of change in dependent variable appropriate at (0.606) by independent variable (0.367) and the value of R- Square show the variation in loyalty (36.7%) due to change in trust.

**Table 4: Regression analysis**

| | Trust | | Loyalty | |
|---|---|---|---|---|
| Predictors | B | $R^2$ | B | $R^2$ |
| Service quality | .163* | .027 | .241** | .058 |

**Mediation Analysis:** This study is a first attempt to examine the mediating effect trust between service quality and loyalty in restaurant. Part of this study the four hypothesis show that H4: trust mediates the relationship of service quality and loyalty. Regression technique was used to test this hypothesis which was

recommended by Baron and Kenny (1986). According to Baron and Kenny (1986), following condition should be fulfilled. (1) The relationship between independent variable and mediating variable should be significant; (2) the relationship between mediating variable and dependent variable should also be significant. (3) The relationship between independent and dependent variables should also be significant. When these three conditions are fulfilled then researcher goes for further analysis. Perfect mediation is when the independent variable has direct effect on dependent variable i.e. ($\Delta R^2 = .00$) and independent variable should also have (β≠ sig).

**Table 5: Mediation analysis**

| Predictors | B | Loyalty $R^2$ | $\Delta R^2$ |
|---|---|---|---|
| Mediation Analysis | | | |
| Step 1 | | | |
| Trust | | .367 | |
| Step 2 | | | |
| Service quality | .146 | .388 | .021* |

A. Predictor: (Constant), Trust
B. Predictors: (Constant), Trust, service quality
C. Dependent Variable: Loyalty
D. Significance at <0.01
N=150

The table describe the trust as mediates the relationship between service quality and loyalty in which they fulfill the both condition of mediation which (β≠ sig) and ($\Delta R^2 = .00$) so trust play the mediate role between service quality and loyalty .in which ( $\Delta R^2 = .021$, $p < 0.01$) and (β = .146 , $p < 0.01$) as explained by (Baron & Kenny, 1986). The value of R- Square describe that (14.6%) change in dependent variables due to independent variables. The H4: trust mediates the relationship of service quality and loyalty.

## 5. Conclusion

This research study examined the impact of service quality on loyalty: the mediating role of trust. This is a study of restaurant industry in Faisalabad. The main objectives of this study are to discover the mediating role of trust between service quality and loyalty. For this study, researcher was considered only about restaurant industry. Following categories of restaurant were selected:

1) the dynasty 2) Lasania B 3) Quilim, 4) silver spoon 5) Tabbaq 6) Al-nakhal 7) Khayyam 8) Bandu khan and others. The restaurant industry in Pakistan is contributing a lot in economy, it is a highly important segment that plays a pivotal role in financial sector of Pakistan. Due to high level of competition in restaurant sector, restaurants have to be more innovative and more aggressive in developing their product in order to meet the demand of target customer, and to develop trust and customer's attachment with restaurants. The primary data collection method was used questionnaire used this is self-administered questionnaire used for collecting data from 150 customers of different restaurant uses. Convenient sampling technique used for sample size. Independent variable is service quality, loyalty is a dependent variable, and trust is mediating variable according to theoretical framework of this study. All these variables were measured by using different point Likert scale which was adopted from previous literature. The Statistical techniques descriptive analysis, Cronbach alpha, correlation analysis, and regression analysis had been used to explore the relationship between variables. Significant results show that the positive and linear relationship among all study variables, the significant level of (p <value) for all study variables is significant at (p=0.01) ** level 2 tailed. Results explore that service quality have positive and significant impact on trust and customer loyalty. When we provide the good service quality to customer developed the trust related this product and then loyal to the restaurant. When the trust is developing they restaurant take advantage over there competitor in which all relation between variables is significant and positive relation with each other.

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**Journal of Education and Vocational Research (JEVR)**
**Vol. 8, No. 4, December 2017 (ISSN 2221-2590)**

# Understanding Corporate Life-Cycles

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**Abstract:** This paper considers the nature of the dominant corporate paradigm, its change, failures or successes, and its relationship with the homeostatic organization. There is a popular way of understanding the dynamics of organizational change and that is through the pre-configured sequence of stages in a corporate life-cycle. Through there are a number of competing models for this kind of analysis. In all of them, the sequence of stages is defined by that which configures the life-cycle deterministically. However, there is little discussion given for how these models of organizations shift between stages, and none appear to dominate in the literature. A major criticism of these models is that they do not represent complex organizational processes of change. Therefore, this paper represents an alternative model, called "the paradigm life-cycle", which is connected to the homeostatic processes that maintain an organization, and which is, in principle, capable of generating corporate life-cycles under conditions of complexity.

**Keywords:** *Corporate paradigms, paradigm change, paradigm life-cycle, corporate life-cycle*

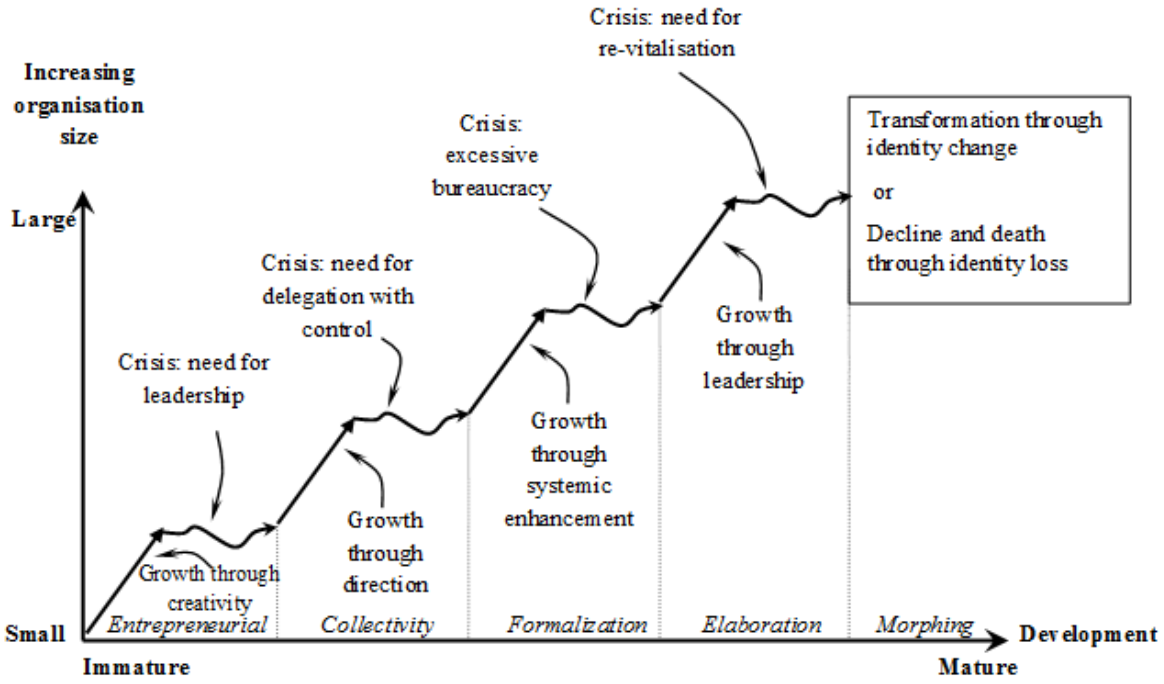
## 1. Introduction

The idea of corporate bodies passing through processes of change goes back at least 100 years, to 1912, with Ludwig von Mises's work on the theory of money. A more modern development of this envisages that every organization goes through predictable and repetitive patterns of behavior as it grows and develops through stages of transition and that it may, or may not, end well (Adizes, 1999). If such changes can be understood and tracked, it can hopefully lead to improved strategic control and corporate viability. This can be enhanced if it is possible to assign a pattern to the change process. A typical illustration of a preconfigured stage model for a corporate life-cycle is given in Figure 1. This is an adaptation of a model by Daft (2008), itself an adaptation from the considerations of Quinn and Cameron (1983), who undertook a comparative examination of approaches to life-cycle studies. In our adaptation, we include in the last stage *morphing*, which occurs when corporate identity is either lost (with decline or death) or changed (transformed). Life-cycles can only develop for a durable collective, and this requires that people come together and develop a dominant culture from which collective identity arises and, in doing -so drive normative processes and operative behavior. It is this collective identity that may shift during the morphing stage with transformation. The revitalisation crisis for Figure 1 may also become an identity crisis when the corporate manager finds all old assumptions challenged (Tofler, 1980), and this occurs together with the need to redefine core purposes (Stone & Heaney, 1984).

There are criticisms of such life-cycles (Stubbart & Smalley, 1999; Phelps, Adams & Bessant, 2007), but for Levie & Lichtenstein (2008), these are not founded on a sufficiently broad study of the literature. So they undertake a larger, more comprehensive study, performing an in-depth analysis of 104 scholarly papers on the life-cycle, published over a 45-year period. Consistent with Yan (2006), their conclusion was that there has been no consensus on specific models, nor have they found a dominant model. Deterministic models work well under conditions of equilibrium, where homeostatic action for organizational control can be predetermined and problems predicted. However, change can also occur under non-equilibrium conditions when the organization is said to be dissipative (Sundarasaradula & Hasan, 2004). In concert with this, Levie & Lichtenstein (2008) argued that organizations grow as though they are organisms, and pass through dynamic processes of complexity (that involve non-equilibrium conditions). This facilitates their entry into different life-cycle configurations, but not ones necessarily set to any order. Levie & Lichtenstein (2008) noted that Miller & Friesen (1984) undertook an empirical test of a configuration life-cycle model that arose as a

composite from a number of other models, and tested it on longitudinal data from 36 firms. It was uncovered that much organizational growth and change was discontinuous in nature, with varying periods of organizational "momentum," in which were there were quantum leaps in organizational form. Also detected was a tendency for firms to adopt a limited number of organizational forms, which differed from one another in multi-faceted ways. These different forms were not necessarily connected to each other in any deterministic sequence. Levie & Lichtenstein (2008) also noted that Raffa, Zollo & Caponi (1996) found the growth paths of 32 young, Italian software firms were quite complex, with the firms moving between seven different identifiable configurations, but not in any set order. Overall, a number of empirical studies have been undertaken on the predictive utility of corporate life-cycles, (e.g., Drazin & Kazanjian,1990; Birch, Haggerty & Parsons, 1995; McCann, 1991; Yolles, Sawagvudcharee & Fink, 2010).

**Figure 1: Pre-Configured Stages in the corporate life - cycle (adapted from Daft, 2008)**




Following on from the Levie & Lichtenstein (2008) studied, as well as Perényi, Selvarajah & Muthaly (2011) iterated four major points of criticism of corporate life-cycle theory: (1) the lack of empirical validation; (2) a focus on symptoms and not explanations; (3) configuration problems (such as a one-way progression through the cycle sequence, where regression is not considered); and(4)a linear developmental pathway, where branching-off is not considered (Lester, Parnell & Carraher 2003; Massey et al., 2006; McMahon 2001). Perényi, Selvarajah & Muthaly (2011) also noted that for Small to Medium-Sized Enterprises (SMEs), rather than turning into decline, they grow out of the size category, though this is explained through a change in identity as indicated in Figure 1. In this paper, our interest will be to create a paradigm cycle for an organization that is connected with the homeostatic processes that underpin and drive it, and we shall explain how a sequence of corporate life-cycle stages can be configured, over time and according to circumstances. The frame of reference that will be used to examine paradigmatic change is that of the meta-theory of Knowledge Cybernetics (KC), where the human activity systems that are responsible for the development of paradigms, are seen to be themselves "living systems".

## 2. The Corporate Paradigm

The ideas of paradigmatic change proposed by Kuhn (1970) have led to not only some criticism, connected, for instance, with the way paradigmatic incommensurability is dealt with (Budd & Hill, 2007), but also to the

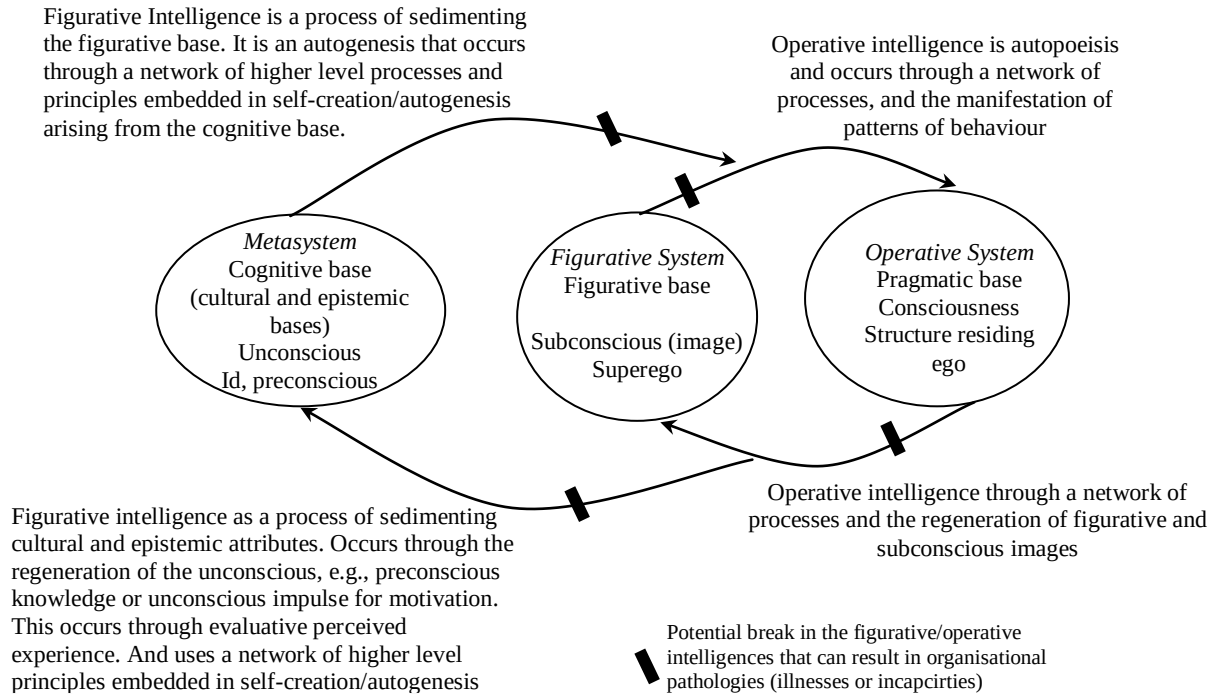
elaboration of notions about paradigm change through the cognitive properties and functioning of the human groups who socially carry them (e.g., Fischer, 1992). Developing on Yolles (1999), a paradigm can be defined as being composed of three ontologically distinct components within the portfolio of beliefs and knowledge that defines it: (1) a group-based *cognitive base* that constitutes the "truths" that form its *epistemic base* (patterns of analytic knowledge) and its *cultural base* (normative standards of conduct), and both are connected with assumptions, beliefs and trusted propositions that arise within cultural development; (2) a *figurative base* that is composed of relationships that can be construed as information rich conceptual models, constructed from its cognitive base; and (3) a *pragmatic base* that is constituted by its normative modes of practice that respond to standards of validity that constitute evidence. A paradigm, far from being a disembodied entity, is carried by dynamic autonomous human activity groups who are responsible for its cognitive, figurative, and pragmatic bases and their developments. The paradigm is a cognitive map for autonomous durable human activity groups that are purposeful, adaptive, survive through homeostasis, and have a culture and normative operative processes that can be applied in complex situations (Yolles, 2000). Such a group can be represented as a living system with three ontologically distinct domains, as indicated in Figure 2, in which homeostatic processes are represented. Here, Yolles, Fink & Dauber (2011, 2011a) developed a model of the durable organization as a social collective that operates through a socio-cognitive normative personality, and is a function of the immanent dynamics of the organization. It operates through traits that control the organization and determine its states of being, and hence by implication, has an influence on the configuration of its stages of development. Traits are variables that create generic characteristics for the organization, and regulate the importance attributed to different classes of information. They do this through *type values* (that constitute a specific score levels of a trait) and define a collective personality style that creates an expected behavioural orientation.

In developing the model, we adopt notions supported by Kets de Vries (1991), in which organizations may be seen to have an unconscious as part of its controlling meta-system, subconscious as part of its figurative system, and conscious as part of its operative system. These components are also interconnected through operative and figurative intelligences, terms that are an adaptation from the work of Piaget (1950). Figurative intelligence provides a copy of states of reality or precise information about them, and involves any means of representation used to keep in mind the states that intervene between transformations, i.e., it involves perception, drawing, mental imagery, language and imitation. Hence, figurative intelligence will be a reflection of patterns of knowledge, and will exist through visual imagery and information. In terms of the paradigm there is a figurative base that is composed of models, which entail structured relationships and epistemological and information properties. The capacity of the figurative base to adequately reflect the cognitive base of the paradigm and maintain pragmatic interpretations constitutes its *figurative intelligence* (Piaget, 1950**;** Piaget & Inhelder, 1969; Montangero & Maurice-Naville, 1997). In contrast, *operative intelligence* is dynamic and intimately connected to understanding. It is responsible for the representation and manipulation of the transformational aspects of reality. It involves all actions that are undertaken so as to anticipate, follow or recover the transformations of the objects or persons of interest. Within the context of the paradigm, operative intelligence provides an indication of the ability of its holders to map its figurative base pragmatically. So, figurative intelligence involves experiential reflections from operative intelligence. Since states cannot exist independently from the transformations that interconnect them, figurative intelligence derives its meaning from operative intelligence. Strategies 'for sense making' in detection of 'patterns in processes or their driving mechanisms', as well as with respect to 'prediction' or 'detection of meaning of processes for people involved' (Langley, 1999) are related to figurative and operative intelligence. Figurative and operative intelligence have central importance to the homeostatic nature of the organization, and in this modelling approach they are representative of the cybernetic autogenesis (Schwarz, 1997 & 2009) which is an indicator of a self-creating system, and autopoeis (Maturana, 1975) which is an indicator of a living system.

There are implications for the paradigm when we can include these Piagian concepts in a model of the organization. Embedded within the paradigm there is a transformative potential that can be manifested as these two forms of intelligence. Figurative intelligence provides core relational explanations of reality, while operative intelligence provides an organization with the capacity to evidence its figurative base. Paradigms with a potential to manifest only poor figurative intelligence do not enable the maintenance of goods representation in their figurative base of elements of their cognitive base. Those with a potential for poor

operative intelligence cannot adequately manifest elements of their figurative base pragmatically, so that it has limited capacity to evidence models. Since figurative and operative intelligence are closely connected, understanding the developmental process of paradigms is central to understanding development, especially when normative epistemologies constitute a central cause for paradigmatic failure (Yolles & Sawagvudcharee, 2017).

**Figure 2: Conceptual Model of an organization in three connected ontologically distinct but homeostatic connected parts**

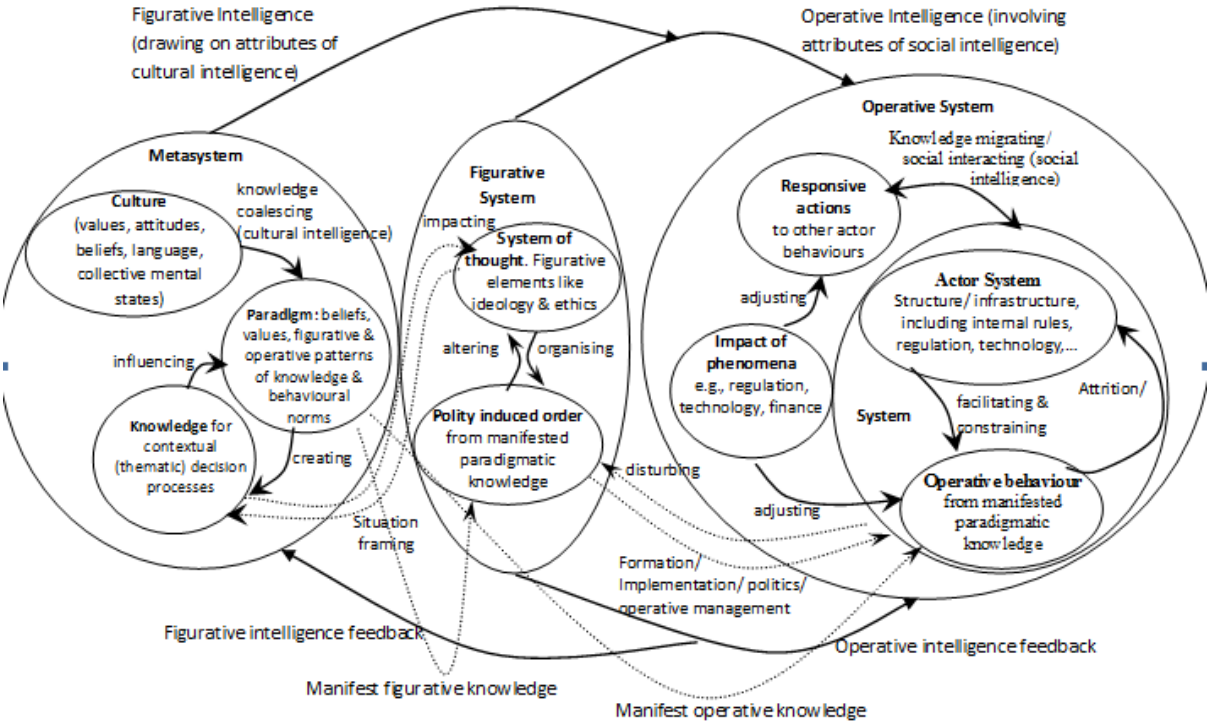



A more detailed representation of Figure 2 can be provided through Figure 3. This illustrates that the nature of the corporate paradigms is a cultural phenomenon, and it upholds the notion that they operate as vehicles from which corporate figurative and operative attributes develop. Though the paradigm resides in the meta-system, it has figurative and operative system drivers that are manifested in each of those system components. Hence, the strategic perspectives, ideology, ethics of the figurative system and modes of practice of the operative system arise in the paradigm. The Figure also posits two additional forms of intelligence than have so far been introduced, cultural and social. Cultural intelligence can be most simply defined as the ability to successfully adapt to a change in cultural settings attributable to cultural context (Earley & Ang, 2003). Social intelligence may be defined, following Thorndike in 1920, as the ability to understand and manage other people, and to engage in adaptive social interactions (Kihlstrom & Cantor, 2000**).**

Consequently, just as corporate ideology and ethics derive from the knowledge embedded within the paradigm, operative behavioural norms are additionally subject to figurative regulations. While regulation is implicit in the couple that links the operational and figurative systems, this couple itself is a function that is also controlled at a higher level by the cultural attributes of the paradigm. It can be elaborated further on Figure 3 in relation to the connection between the paradigm and the transitive systems (i.e., meta, figurative and operative systems). In the meta-system interaction occurs between the paradigm and cultural knowledge. Here the corporate paradigm identifies desired characteristics (elements) from culture and available knowledge. This may be referred to as the *parsimony* of the corporate paradigm in comparison to the complexity and richness of a societal value system. Instead of numerous values that arise from the dominant culture, only a few may count in relation to the corporate paradigm. Similarly, instead of reflecting on all available knowledge, only a selection from available knowledge is defined as being appropriate for the corporation. In the figurative system, the system of thoughts is defined by the corporate paradigm as a

manifested selection from the cultural domain of the meta-system. The polity induced order is also defined by the corporate paradigm as a selection from the knowledge domain of the meta-system. Finally, in the operative system, the actor system follows more or less from the system of thought. It contains two sub domains: rules of interaction within the corporation, and rules of interaction with the external environment of the corporation. The actor system interacts with operative behavior, which becomes manifested as paradigmatic knowledge and observable action within the corporation and with the external environment. The "impact of phenomena" arises as a *relativistic internal manifestation* that derives from feedback (or more correctly a "structural coupling" (Maturana, 1975)) with the external environment, not represented in the diagram.

**Figure 3: More detailed explanation of the systemic dimensionality of the organize**




## 3. Paradigms under Change

The paradigmatic development process that crosses both equilibrium and non-equilibrium processes of paradigm change was first explored by Kuhn (1970), who argues that science passes from a *normal* mode through one of *crisis* and then to one of *revolution*. Indeed, it is as part of the normal mode that a "normal" corporate life-cycle develops, while revolutions are beyond this life-cycle occurring at its tail. The normal mode is realist in nature (Rauterberg, 2000), and has its history in the ideas of Descartes who believed that foundational concepts are known intuitively through reason, and that truths can be deduced with absolute certainty from our innate ideas. In essence, the development of normal science embraces processes of continuous change in theory when the implications of its logical base pass through a morphogenesis. It operates in a thematic application domain that supports a dominant epistemology that allows for only a unitary perspective for the construction of knowledge. It also assumes certainty, and the possibility of making predictions. The term *normal* mode refers to the routine work of those who operate within a paradigm, slowly accumulating knowledge in accord with established theoretical assumptions. For Kuhn, it involves puzzle-solving, through which it becomes enlarged as its frontiers of knowledge and techniques are pushed forward (Yolles, Sawagvudcharee & Fink, 2010).

The revolutionary mode is transformative, and refers to a prerequisite condition of paradigmatic crisis. The transformative mode arises when paradigms, with a normative epistemology, have poor operative intelligence, with inadequacy in their ability to support their figurative base through the normal inquiry process. The revolutionary period results in confusion within a framework of presuppositions about what constitutes a problem or its resolution, a method, and where the rationality of issues is replaced by emotionality, and are settled not by logic, syllogism, and appeals to reason, but by irrational factors like group affiliation and majority or 'mob rule' (Casti, 1989: 40). Beyond Kuhn (1970; Ravetz (1999) and Funtowicz & Ravetz (1993) introduced the notion of the *post-normal* mode, indicating a condition where situational facts are uncertain, values in dispute, stakes high and decisions urgent. This definition arises because of the realization that post-normal science; "lies at the contested interfaces of science and policy" (Ravetz, 1999). The idea that decisions are urgent comes from the specific context that Ravetz adopts, in the field of ecology and the political urgency, for decisions that might address the possibility of environmental disaster. Hessels &van Lente (2008) in their discussion of the post-normal mode, recognized that it refers to the limitations of rational decision-making, and engages with value plurality and public participation in attempts to facilitate outcomes to complex public policy decision. In a broader sense than that posited by Ravetz, the post-normal mode engages with uncertainty for complex situations in which there exist plural relativist political processes. So, more generally the post-normal mode arises at the dissipative edge of cultural crisis, involving competing values, uncertainty and relativism. When referring to the dissipative edge, we are suggesting that normal modes of science operate through homeostatic processes of inquiry. Systems that maintain homeostasis tend not to be able to deal with fundamental change since the feedback processes that maintain their equilibrium can overwhelm their capacities to respond. In stable situations, the creation of new approaches is difficult. Structures, rules, procedures and plans need to be changed when shocks are encountered; but this is problematic because of the norms and cultural attributes of a given system. In contrast, post-normal modes involve a competitive plurality that operates in an essentially dissipative environment in the sense of Prigogine & Stengers (1984). Thus, they manifest interactive processes that are non-equilibrium, are dynamically and inherently unstable, absorb energy so that outside resources are required to maintain order, and their behavior is subject to fluctuation. In such situations, defenders of challenged paradigms usually refer to 'paradox', i.e. a false dichotomy that can be supported by the dominant paradigm, and thus, should serve to silence the critics who apparently are incapable of logical thinking.

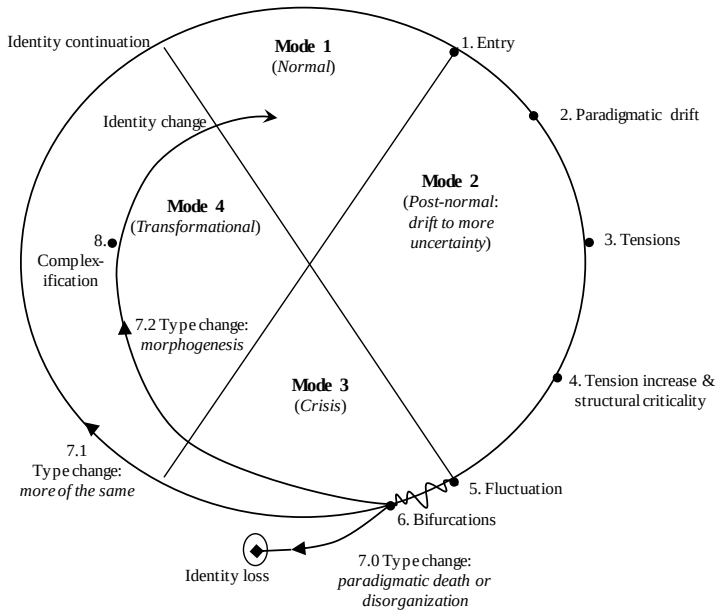
Since paradigms are subject to change in their knowledge structures, and are thus dynamic, it should be possible to track them, and their ability to survive reflects on the organization's durability itself. The idea that paradigms may survive different modes of existence, from normal to post-normal and through crisis to transformation, raises the question whether paradigms can, and if so how, they may be able to survive shifts in their stages of existence. To begin to respond to this, one really needs to appreciate the distinction between the processes of change that a paradigm goes through when it is in normal and post-normal mode. For Kluver et al. (2003), their distinction can be highlighted by the realization that in normal mode there is the tendency for paradigms to change incrementally, beginning with rather simple system of thought and developing complexity. In contrast, a post-normal mode is often transformative, embracing the early capture of as much of the complexity that a conceptual framework is capable of. Paradigms that survive the trials and tribulations that its holders experience over time (and are thus durable) are said to be *viable*. Viable paradigms are able to survive both normal and post-normal situations. To understand how this may occur, paradigms should be seen as autonomous systems which define, create and manage their own futures. Through their holders, they are also able to self-organize and hence alter their own logical base. They produce the laws that rule them (Schwarz, 1997), and they do this because they are logically closed, a condition that occurs, according to Parsons (1937) when all its propositions are interdependent, in that each has implications for the others, and each of these implications finds its statement in another proposition of the same system.

While paradigms may be logically closed, they are also open systems in that they take in data from their environment which comes both from measurement, knowledge and narratives from experiences and other paradigms. Their outputs are knowledge and narrative. If the paradigm is to be able to provide a narrative, through its advocates who adequately explain all of the inputs that relate to their interests and purposes, then its propositions must be able to conceptually respond to the inputs. Where it cannot do this, the paradigm fails. In normal mode, paradigms operate as homeostatic systems that are controlled and deterministic, and hence certain in their patterns of knowledge. Over time paradigms change deterministically and reversibly

(Prigogine & Stengers, 1984). Processes of change involving randomness or irreversibility are exceptional. However, when uncertainty occurs within the paradigm, it shifts to a far-from-equilibrium state. Here the paradigm's logical structure, defined by its propositions and principles; becomes dissipative and subject to fluctuation, and it is unable to provide a stable narrative that adequately explains its environment. Demand for phenomena driven research is emerging (Cheng, 2007). New types of structures may originate spontaneously as the paradigm moves from organizational chaos to greater order. A viable paradigm that is able to survive this experience can become classed as part of *post-normal* mode.

Paradigms only exist through their holders who define and maintain them. As such, durable paradigms may be seen as viable human activity systems that are both complex, adaptive, and are able to maintain a self-organizing separate existence within the confines of their existential or other constraints. Their existential nature consists of the belief system and patterns of knowledge that arises through the coherent group of people who maintain them. They have an at least potential independence in their "self-processes" for regulation, organization, production, and cognition. According to Schwarz (1999), viable systems can pass through processes of emergence and evolution towards complexity and autonomy, though autonomy does not mean that there is no interactive influence from its environment. The passage occurs through the development of patterns of self-organization that accommodate phenomenal change in the paradigmatic practices and behaviors that paradigm holders pursue. This occurs through morphogenesis and new forms of complexity; patterns for long-term evolution towards autonomy; and patterns that lead to systems functioning viably through their capacity to create variety, and indeed respond to, environmental situations with the matching *requisite variety* (Ashby, 1956), which is required to maintain balance and enable a paradigm (through its carriers) to respond adequately to its environment. The dynamic processes that are associated with autonomous self-organizing systems, and their viable paradigms, are illustrated in Figure 4 (adapted from Schwarz, 1997). It explains the cycle of change for viable paradigms that are able to survive by transforming their natures, initially by developing through normal mode, experiencing uncertainty, and moving into post-normal mode and hence to metamorphosis. During this process, non-viable paradigms decease, while a viable paradigm will become complexities as it develops more attributes and explanatory power in its theory.

**Figure 4: Cycle of Paradigmatic Change and the Relationship between Four Modes**




While Figure 3 shows which sub-domains and internal processes operate in each domain, and how sub-domains have homeostatic linkages with each other, Figure 4 shows the actual life-cycle processes. The core logic is that without challenges and crises there is no change. The direction of change is always subject to

discussion, condition and countervailing forces. There are always three ways that events may go: one after a crisis the situation may remain more or less the same as before the crisis when it retains its identity and core purposes, or, the organization may cease to exist when its identity ceases, or there will be change through metamorphosis and a new paradigm may emerge, accompanied by a new identity and core purposes. Figure 4 does not show the causes of a crises, and the domains which are affected, because a crisis may become visible or felt in all domains simultaneously, or it may also be felt only in one domain, e.g. then the tasks delivered by the organization are not perceived as adequate by prospective users or consumers of the services provided.

It should be noted at this point that the paradigm life-cycle given in Figure 4 is a generic model that, under the right conditions, it is able to generate other corporate life-cycle configurations, like that of Figure 1. Here the pre-configured stages are; Entrepreneurial, Collectivity, Formalization, Elaboration, and Morphing, and each has its own growth activity (creativity, direction, systemic enhancement, leadership, and identity change or loss). How such configurations develop is, according to Levie & Lichtenstein (2008), a function of the immanency of the organization, with influences by the interaction with its environments. The paradigm cycle embraces this by generating a single cycle of change, and the named stages have to emerge from an explanation of the homeostatic organization. Each paradigmatic stage passes through its normal mode of existence, and then enters a post-normal mode with the development of a paradigm drift and then tensions. It is at the point of fluctuation that the crisis mode develops, and in Figure 1 these crises are described as: the need for leadership; the need for delegation with control; excessive bureaucracy; and the need for re-vitalisation -- which may become an identity crisis. The conditions for the development of morphology in Figure 1 are quite special in that it concludes with an identity change -- this relating to the state of the culture of an organization in relation to its environment- and an understanding of this might be discerned from the cultural dynamic studies of Sorokin (e.g., Yolles, Frieden & Kemp, 2008). It is also worth noting that there is a connection between the modes of Figure 4 that arise from the circumstances as depicted in Figure 3, and the stages of Figure 1. In Figure 1, the entrepreneurial stage engages involves the growth of *creativity* that is part of the Entrepreneurial stage, and this is a function of the cognitive meta-system of the organization from, which arises figurative intelligence, which is itself influenced by cultural intelligence. Given that knowledge exists in the meta-system, the network of principles that constitute figurative intelligence map that knowledge into new strategic contexts in the figurative system, where strategic models develop in the figurative base. In this way the meta-system can provide the climate for invention and innovation, given that it has such an implicit capacity.

The stage of Collectivity demands direction and this is provided by leadership. This is not necessarily the personality-based leadership that is traditional to management studies, but it may refer to knowledge-related distributed leadership (Iles, Feng & Hao, 2011). The mechanisms that are involved here are outside the brief of this paper, and are part of the strategic cognitions of the normative personality (Yolles, Fink& Dauber, 2011). However, in the figurative system there is a recursive model of Figure 3 with its own lower-level figurative and operative intelligences; and, to avoid confusion here, we shall refer to these as "*local*" figurative and operative intelligences. Good *local* figurative intelligence provides clear direction. However, clear direction does not suffice if *local* operative intelligence is not well-developed or does not fit figurative intelligence. The need is to develop an adequate operative system that can result in appropriate structures and rules that guide behavior. If the system becomes too rigid, it moves towards bureaucracy as part of the Formalization stage, however, it also could be too flexible, i.e. it may lack coherence with the strategy. This may occur because there is a leadership ideas problem, where organizational culture has moved to an *instrumental*, as opposed to *ideas*, orientation (Yolles, Frieden & Kemp, 2008). In this context, Daft (2008) suggested that teamwork is the remedy, but perhaps other workable operational systems may exist, too. The direction it develops in necessarily is a function of the organizational traits that create a penchant for organizational processes and behaviors, and hence determine what might be possible in given situations. Therefore, traits are relevant, not only to organizational conduct, but to the potential stage of conduct in a configuration of stages.

Finally, the Elaboration stage may arise here, though a crisis that demands *revitalization* is not a logical consequence of team work. Apparently, Daft (2008) intuitively reflected on a lack of fit with the market, i.e. what we call "social intelligence" in other contexts. The crisis need for revitalization emerges, because the services offered by the corporation to its task environment (i.e. to the market) do not suffice. The needs of the

task environment are not satisfied. Therefore, the organization goes through a crisis. What it has to offer does not fit the requirements. There is some ignorance about the actual needs. The organization cannot create legitimacy through its activities. Thus, crises in organizations may emerge if:

- Traits take value assignments which while determining the penchants of the organization, may limit its contextual capacity to perform to its capability potential.
- Cultural intelligence is weak, i.e. if the organization does not permit creativity to emerge or if no coordination between forms of cultural knowledge can be achieved.
- Figurative intelligence is weak, i.e. if there is lack of clear direction (the leadership issue), particularly if knowledge and knowledge processes are confused.
- Operative intelligence is weak, i.e. if structures and rules are too rigid (the issue of bureaucracy) or if they are too loose (the issue of control) and if, in both cases, motivation for task achievement is poor, or if there is a lack of strategic coordination or cooperation among the groups that participate in the network of processes that constitute this intelligence.
- Social intelligence is weak, i.e. if the services of the organization do not meet the requirements of the task environment and/or are not considered as legitimate, or if the means by which the organization interacts its environment is not competent.

The notion of immanence will now be set within a cultural context as part of the theory of paradigmatic change.

**4. Paradigmatic Transformation and Immanent Change**

The rise of paradigms is intimately connected with the rise of culture, which is influenced by the immanent micro-actions of individuals, and which becomes symbolized and hence normatively anchored into the paradigm (Staw, 1991). As a result, it develops a cognitive base, which is both culture and knowledge centred, and is hence sensitive both to knowledge and cultural challenges, the two necessarily being related. The normal mode of a paradigm exists through its adoption of a normative epistemology, which lies at the basis of its formalized patterns of knowledge. This may be challenged with the development of doubt about its veracity (e.g., Meehl, 1997). Such challenges can result in structural changes that lead to pragmatic adjustment when modes and mechanisms of practice alter. When a paradigm exists in normal mode, and is challenged in this way, the result can be a shift into a post-normal mode. We can adapt an argument from Rummel (1979) to explain how this can happen in one of two ways. Firstly, change can occur more rapidly than the ability of a culture has to adjust. This creates a *cultural lag* that leads to instability and conflict. It occurs when the realization of values fails, and values disparity develops. Now, cultural lag is constituted as the difference between what is and what some segments of a culture consider *ought to be*. Interestingly, this engages with ideology and ethics, since both involve a coalescence of values. In the case of ideology, the values are orientations towards action, but this is constrained by ethics, which identifies what *ought to happen* and involves processes of judgment. New modes and means of practice create the means to satisfy certain values, even while existing norms, attitudes, or institutions inhibit or block such satisfaction.

Secondly, the effect of new modes and means of practice can also be considered through the idea that, within periods of normal mode, paradigms under homeostasis fall into an equilibrium of values that relates to the complex of desires and attitudes. Values in a culture may be seen here to ultimately balance out, and a general equilibrium emerges between wants and costs, investments and rewards, capabilities and power. Among possible states of a system, it is the balance of power that Rummel (1979) saw as such equilibriums. This explanation can be elaborated on through the notion of *culture shock* (Dahl, 2000). Culture shock is normally taken to mean the anxiety and related feelings that arise when people are faced by a sudden change in their socio-cultural environment, and it grows out of an inability to assimilate new elements within it. Thinking beyond the initial shock, Adler (1987) considered that culture shock is the opportunity of a "profound learning experience that leads to a high degree of self-awareness and personal growth" as adaptation to new situations arise. So, when a paradigm resides in normal mode, its gradual development occurs through homeostatic processes that many consider to represent its "advancement." The rise of challenge to the use of a particular normative epistemology results in cultural uncertainty, when predominant values become challenged. This leads to the onset of culture shock and cultural instability, and the eventual development of

new modes and means of practice. During this process, conflicts and relativisms are likely to arise, and the paradigm shifts into post-normal mode. This process may not be inevitable, particularly when the holders of a paradigm are imbued with cultural intelligence.

There is another quite distinct issue in corporate paradigmatic change when one realizes that corporate paradigms do not develop in isolation, but rather are responsive to their ambient host culture. Through the human activity groups that carry their paradigm, an individual corporate culture is created which determines its orientation and possibilities. This culture, however, is influenced by the ambient cultural environment into which corporate culture is embedded (e.g., Sørnes et al., 2004, Sagiv & Schwartz 2007). Following Rummel (1979), when a culture shifts from one stable state to another, it first becomes unstable since opposing interests arise. In terms of Sorokin's theory (1939-1942), this leads to a loss of ideological and ethical stability, affecting the dominant paradigm and its development. Previously, dominant corporate paradigms may not have the potential to survive, while a new dominant paradigm has yet to emerge.

## 5. Conclusion

Corporate life-cycles are popular, but there are clear indications that deterministic stage configurations are problematic. Drawing on notions of complexity, it has been argued that a generic model referred to as the paradigm cycle can be formulated that is able to generate corporate life cycles. Paradigms exist under a number of frames of reference. Kuhn was interested in the scientific frame, while our interest lies in the corporate frame. Predominant paradigms may go through a cycle from *normal* mode to *post-normal* mode, fall into *crisis* and finally to one of *revolution*. Paradigms change normally as part of the business cycle, and as they do this, they pass from normal equilibrium conditions to post-normal and then through to crisis. Under the normal business cycle that then simply moves into a "more of the same". This latter outcome simply suggests that the organization has not passed through an identity crisis and maintains it core purposes. When the organization instead passes through a transformational change, its identity and core purposes change. As a paradigm enters its post-normal mode, the normal prevailing confirmatory mode approaches to theory must be considered to have lost their capability to make useful predications - something that is not always recognized by researchers. This leads to crisis and may result in a paradigm revolution that would be needed to transform or replace extant theories. New sets and systems of classifications, emphasis on relations between events and occurrences rather than on substances, and new motivation oriented theories, might emerge that emphasize motivational aspects and address the concerns of individuals with newly emphasized shared needs and desires. A meta-view of phenomena, and the ability to identify redundancies and variety in a system, create views of patterns of change and capabilities to adapt to new challenges by self-organization. The emerging frames of thought are then considered to be post-normal and value-laden. In this sense post-normal mode is concerned with complexity and has interests in aspects which relate to uncertainty, assigned values, and a plurality of legitimately argued perspectives. The paradigm life-cycle has the capacity to explain dissipative processes that cross both normal and transformational modes of being and can, in principle, through its underlying homeostatic organizational model, explain how any configuration of stages in a corporate life-cycle can develop. The need now is to demonstrate the practical utility of this through detailed case studies.

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Journal of Education and Vocational Research (JEVR)
Vol. 8, No. 4, December 2017 (ISSN 2221-2590)

# The Effect of Mathematics and Physical Science on Matriculants' Overall Performances: Analysis Using Multilevel Model

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**Abstract:** This comparative, cross-sectional, quantitative and ex-post-facto designed study used secondary and correlated data to compare the likelihood of passing matric between learners from Gauteng and Western Cape provinces, even after adjusting for subject-type. This study attempted to assess the relation between school resources input, subject offered, learner's gender and learners' academic achievements. The data used in this study were supplied by the Umalusi Council. The dataset contained 145783 matric learners (65245 [44.75%] males and 80538 [55.25%] females) who wrote the matric examinations in Gauteng and Western Cape provinces in November 2009. The unadjusted model indicated that learners in Western Cape were significantly 1.193 more likely to pass matric than learners in Gauteng province ($p < 0.001$, OR = 1.193, 95%CI: 1.164 - 1.223). The adjusted model results indicated that learners in the Western Cape province were 1.5122 more likely to pass matric when compared to learners in Gauteng province ($p < 0.001$, OR = 1.512, 95%CI: 1.471 - 1.555). These results indicate that the odds of passing matric, after adjusting for science subjects, increased in favour of learners in the Western Cape Province. It can be concluded that the Western Cape Province provides more enabling conditions to ensure matriculants' superior performance. It is suggested the strategies to improve the quality of mathematics and science educators need to be implemented, especially in Gauteng province. Also, the policy that advocates for the differentiation approach should be adopted, as opposed to the current policy that advocates for a more general, rigid approach that does not recognise the inherent differences in the provinces.

**Keywords**: *Adjusted model, matric, Odds ratio, Academic performance, School quintile*

## 1. Introduction

Prior to 1994, South Africa had four provinces, as presented in Figure 1: the Transvaal and Orange Free State, formerly Boer republics, and Natal and the Cape provinces, former British colonies. Scattered in between these were "homelands" or Bantustans, some form of states in which black South Africans were forced to have citizenship.

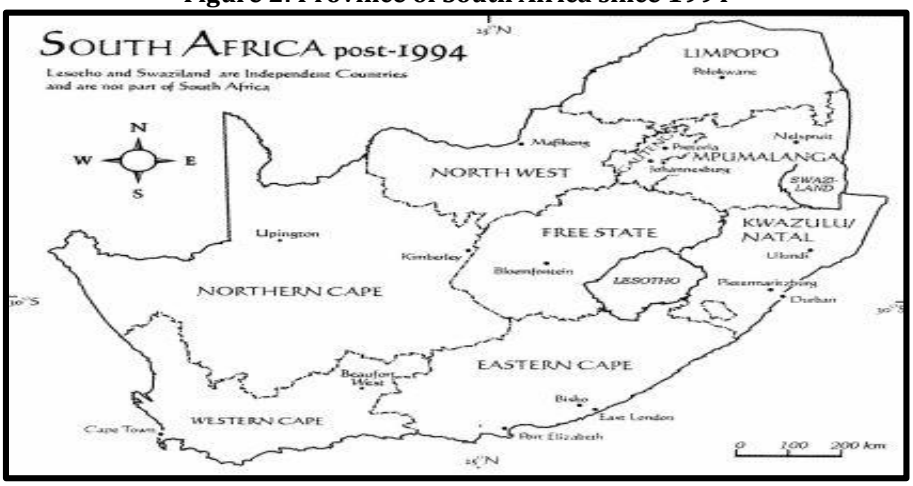
**Figure 1: Province of South Africa before 1994**

The Bantu Education Act, 1953 (Act No. 47 of 1953, later renamed the Black Education Act, 1953) was a South African segregation law. Its major focus was provision of racially segregated educational facilities. This meant that all citizens did not have equal opportunities to education. In particular, the majority of black South African citizens were denied the right to quality education. The Minister of Native Affairs at the time, the

"Architect of Apartheid", stated his opinion, that resonated with many Afrikaners, that (Clark & Worger, 2004)*"...there is no place for [the Bantu] in the European community above the level of certain forms of labour ... What is the use of teaching the Bantu child mathematics when it cannot use it in practice?*". The European community is referred to as White South Africans that included the Afrikaners while the black people were Bantu. Bansilal, James & Naidoo (2010)quoting the Department of Education (1997) states that education reform in South Africa was heralded by the introduction of the new curriculum framework called Curriculum 2005 and later the National Curriculum Statement in 2003 (Department of Education, 2003). The aim of these documents was to address the poor quality of education that many South African learners had been exposed to. While mathematics and physical science are (generally) thought of as or perceived to be difficult subjects by many in South Africa this type of folly, fallacy (Letsoalo, Maoto, Masha, & Lesaoana, 2016; Letsoalo, 2017b) or myth was mainly perpetuated by the political system.

In 1994 - under South Africa's new democratic dispensation, the country was demarcated into nine provinces – each with its own provincial government, with legislative power vested in provincial legislature, as presented in Figure 2. The Western Cape Province, situated in the former Cape Province, and Gauteng province, situated in the former Transvaal, are metropolitan provinces. In other words, most of their municipalities are metropolitan. A language spoken by majority of citizens in the Western Cape Province is Afrikaans, while Gauteng province has a reasonable distribution of all 11 South African official languages. Prior to 1994 quality service delivery was on racial lines. Currently, the focus seems to have shifted to gender differences and the discrepancies among provinces.

**Figure 2: Province of South Africa since 1994**




Education is a key component that is essential for generating high incomes and sustainable socio-economic development (Ojera, 2016). It is an essential ingredient in poverty eradication. In the modern technological world, education is considered as the first step for every meaningful human activity. It plays an important role in the development of human capital and is linked to an individual's well-being and opportunities for better living conditions (Battle & Lewis, 2002; Kyei & Nemaorani, 2014). The South African government has made significant strides in developing inclusive education policies when compared to other African states (Dalton, Mckenzie, & Kahonde, 2012). In inclusive education, which refers to an education system where learners with learning barriers attend the same classes as learners who do not experience learning barriers, all stakeholders, including learners, participate as equal members of society. In other words, the education system caters for learners with learning barriers and those without. They learn together in the same conditions, but use materials appropriate to their various needs (Kanjere & Mafumo, 2017). Therefore, there must be harmony among all components of the system if the system is to function properly and yield the required outcomes. The main challenge with inclusive education is a lack of adequate resources to support the objectives of the system. In South Africa, little has been done to prepare the educators and school principals to embrace the trajectory in education. Educators are battling to adapt the curricula to meet the diverse range of learning needs. Apart from challenges presented by inclusive education, teaching and learning mathematics and physical science has been fraught with difficulty over many years. While

mathematics, physical science and (some) technological subjects (STEM) are taught as separate subjects at school, presenting the STEM subjects in an integrated fashion will strengthen understanding of all of them. Therefore, a major challenge that exists is to transform science studies into an inquiry-driven, project-based learning domain by staff development or capacity development.

Mathematics is a unique subject that is a fundamental component of a school curriculum. It forms the basis for the development of all other sciences. In South Africa, all learners have to take mathematics, with majority of learners being enrolled for mathematics literacy. Therefore, in South African school settings mathematics consists of *mathematics literacy* and *pure mathematics*. Researchers reported a significant relationship between mathematics and physical science (Adeyemi, 2007; Charles-Ogan & Okey, 2017; Ogunleye, Awofala, & Adekoya, 2014). They assert that the effectiveness in learners' understanding and application of concepts in physical science can be guaranteed through adequate possession of mathematics knowledge. Adequate skills in and knowledge of mathematics and physical science are believed to be vital to success in modern life and socio-economic prosperity. Knowledge of mathematics is an essential tool for all members of society (Letsoalo, 2017b). As underscored by Carnevale (2005) in the current highly technological economic world, mathematics education and mathematics performance are key resources in the global context. It is a matter of concern that the TIMSS (Trends in International Mathematics and Science Study) found the average mathematics performance of South African learners in Grade 9 to be well below the international benchmark of 500 points (Visser, Juan, & Feza, 2015). In fact, the country was placed in the bottom 6 of 63 participating countries in terms of mathematics performance.

Proficiency in mathematics and physical science is increasingly recognised as fundamental to economic success for individuals and nations (Stevens, Wang, Olivarez, & Hamman, 2007). The importance of mathematics extends to the support and contribution to the purposes of general education (Breslich, 1966). In fact, knowledge of science (mathematics and physical science) in modern society cannot be downplayed. However, has emerged that these subjects are not easily accessible to all learners due to the demands they present (Letsoalo, 2017b). Scarpello (2007) reports that 75% of Americans gave up studying mathematics early and stay away from many careers that are related to mathematics. He identifies mathematics anxiety as one of the main reasons for this. According to Campbell & Prew (2014) the South African Department of Basic Education's reports indicate a 17% decline in the number of candidates who wrote mathematics between 2009 and 2013 (from about 290400 to 241400). At the same time, the number of candidates writing mathematics literacy rose sharply to 58% of the 2013 cohort. Likewise, the number of candidates who wrote physical science fell by about 17% over the same period (from 220900 to 184300). As the number of learners who elect to do mathematics drops, the overall number of learners who achieve an NSC pass with more than 40% in mathematics has been falling over the same period to 17% of the class of 2013. This means the national pool of students who are able to do a degree which requires mathematics is very limited. These include degrees such as engineering, law, accountancy and teaching degrees in mathematics and physical science. Owing to the dwindling numbers of learners who are successful in mathematics and physical science, South African learners generally have poor science skills (Bansilal, James, & Naidoo, 2010).

Apart from logical reasoning, understanding mathematics and physical science is a significant feature in the process of mathematics and physical science learning. Policy makers, education stakeholders, educators and researchers continue to grapple with the following questions: How can we understand the difficulties, frequently insurmountable, that many learners have with comprehension of mathematics and/or physical science? What is the nature of these difficulties and where are they encountered? As stated to by Lilis & Togi (2017), these questions have taken on a particular magnitude and gravity with current pressure for more mathematical and physical science training to be given to all learners to prepare them to operate in a technological and computer-oriented environment of perpetually increasing complexity. The questions present an educational challenge in classrooms (or in the school setting) as well as a theoretical challenge to research the development and learning of mathematical and physical science knowledge. The process of mathematical knowledge acquisition is so complex that new approaches are required. This paper makes no attempt to answer these questions, because its objective is to determine the effect of mathematics and physical science on the overall performances of matriculation learners in two provinces of South Africa. Matriculation (or matric), sometimes called Grade 12 is the final year of secondary or high school in South Africa.

## 2. Literature Review

Studies have been conducted to determine factors that affect learners' performance (Kyei & Nemaorani, 2014; Letsoalo, 2017b; Letsoalo, Maoto, Masha, & Lesaoana, 2017). It is accepted that learning is influenced by many factors, both cognitive and non-cognitive, also called affective factors (Letsoalo, 2017a). Cognitive factors include memory, verbal abilities and an aptitude for reasoning. These can be measured by setting performance and achievement tasks, where the answers given can be grouped as correct or incorrect, or acceptable or unacceptable. In other words, cognitive ability refers to an individual's ability to process, abstract, reason, remember and relate information. Though cognitive ability assessments are often thought of as measures of education, they are rather measures of more general mental capabilities. However, cognitive ability can be measured by an intelligence quotient (IQ) test. As highlighted by, among others, Kyei & Maboko (2016) and Letsoalo (2017a), for decades many non-cognitive factors have affected performance. Consequently the research community is now focused on affective factors. Affective factors are:

***Learner attributes or characteristics:*** Many studies have explored gender disparities and differences among learners. Gender disparities exist in the areas of schooling, academic achievement and school experience. Filmer (2005) reports that, partly due to school gendered structure of the school experience (Chowa, Masa, Ramos, & Ansong, 2015), enrolment at schools is significantly lower for female learners than it is for male learners. Tansel (2002) reports that, although high levels of enrolment have been achieved at the primary school level for both male and female learners in much of Turkey, substantial regional differences remain. In particular, in the south-eastern region, female learners begin to drop out of school around the third grade. A mother's level of education has a significant effect on female learner's enrolment (Tansel, 2002; Chowa, Masa, Ramos, & Ansong, 2015). In the study that sought to compare the overall chances of passing matric or Grade 12 between male and female learners in Gauteng province, Letsoalo (2017a) reports that the overall Grade 12 performance levels of male and female learners are significantly different, with female learners performing better. Demirbas & Demirkan (2007) and Sunday & Zaku (2013) warn that findings on gender are inconclusive since researchers have different opinions based on their findings regarding the effect of gender on learners' academic performance.

How learners perceive (and think about) school is an important predictor of learner achievement (Chowa, Masa, Ramos, & Ansong, 2015). Among other factors, a learner's self-concept, self-efficacy, attitude, and motivation are positively related to academic achievement (Adewuyi, Taiwo, & Olley, 2012; Barrows, Dunn, & Lloyd, 2013; Chowa, Masa, Ramos, & Ansong, 2015). Furthermore, test anxiety affects learners negatively. This effect is increased if the anxiety is dealt with in an unhealthy manner and extends over a long period of time (Barrows, Dunn, & Lloyd, 2013). Fentiman, Hall & Bundy (1999) report that a learner's age is significantly linked to the learner drop-out rate and somewhat associated with learner performance, as well as learner attitude and motivation.

***Home factors:*** A learner's background is considered to be the crucial factor that influences a learner's performance. The community, which includes parents, constitutes part of this background. Sudhir & Lalhirimi(1989) and Jehangir, Tahir & Saeed (2000) explain that parental education is an index of class status and some personality characteristics of learners. Learners of educated parents have a high level of satisfaction and fewer problems than learners of less educated parents or totally uneducated parents. The latter group have low emotional stability and high anxiety levels. Faize & Dahar (2011) reported that the performance of learners with educated mothers was better than those with illiterate mothers. However, as the level of mother's education rose, the difference in science learners' scores was not significant. This indicates that a certain minimum level of a mother's education is required for better learner performance. Englund, Luckner, Amy & Egeland (2004) opine that mothers with higher education are able to provide more support to their children in problem-solving situations at pre-school level, and that this early involvement by educated mothers contributes to high or better academic performance or achievement at later stages of schooling. Peters & Mullis (1997) reported that a mother's education level has an effect that is 20% higher than the father's education level on the academic outcomes of adolescents. Consumption of alcoholic beverages has a long history in South Africa dating back to ancient times (Kyei & Ramagoma, 2013). During pre-colonial days the consumption of alcohol was the preserve of elders, and other senior or authoritative figures, including health practitioners and traditional healers. Currently, in some households, drugs and

alcohol abuse are factors that contribute to learners' absenteeism. The consequences of missing classes are likely to be decreased motivation or poor academic performance by learners.

***School characteristics**:* At school level, socio-economic status (SES) is by far the single most important factor that accounts for the varying levels in learner performance (Rogers, 1997). Socio-economic status, commonly conceptualised as the social standing or class of an individual or group, is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position relative to others, based on income, education and occupation(Letsoalo, 2017a; Letsoalo, Maoto, Masha, & Lesaoana, 2017). Education research practitioners use wealth or SES measures as surrogates for well-being. Although many studies have been conducted on the effect of school resources on learner achievement, the question is far from settled (Hakkinen, Kirjavainen, & Uusitalo, 2003). South African schools are categorised or classified into five groups, called quintiles, largely for purposes of allocation of financial resources. The poorest schools are in quintile 1, while the well-resourced schools are in quintile 5. Schools in quintiles 1, 2 and 3, mostly located in rural areas, are no-fee schools, while schools in quintiles 4 and 5 mostly located in urban and semi-urban areas, are fee-paying schools. In the study that sought to compare the likelihood of passing Grade 12 between male and female learners; Letsoalo (2017a) reported that learners' performances were significantly affected by the school quintile. Therefore, the location, structure, resources and social atmosphere of a school can often be linked to its learners' academic success (Chowa, Masa, Ramos, & Ansong, 2015, p. 131). Closely associated with school environment is educator quality. Stakeholders in education consider educator quality to be the most important determinant of learner performance. Parents may send their children to distant schools due to the fact that those nearby are said to have poor education or poor teaching quality.

***Interaction of learner, home and school factors**:* The quality of interaction among learner, home and school has the potential to exacerbate disparities. As educators and resources are seem to affect the performance of learners, well-resourced schools that employ quality educators are more likely to produce better results. Similarly, under-resourced schools with unqualified or under-qualified educators are more likely to produce poor results. Lee, Zuze & Ross (2005) maintain that the effects of school and educator resources play various roles on the learning process of learners depending on the learners' SES. Motivation has a significant effect on learners' performance. Learners' motivation levels seem to decrease throughout the primary school years and then increase again just before the transition to secondary education (Eccles & Midgley, 1989). A lack of 'person-environment' fit has the potential to increase motivation. This implies poor integration of a learner's personal world into the school environment (Thoonen, Sleegers, Peetsma, & Oort, 2011). In South Africa, the introduction of outcomes-based education (OBE) paved the way for greater parent involvement in education. The new system expects parents to play a crucial role in the education system because they are required to share the responsibility of education with the state (Department of Education, 1997).

Furthermore, the new system requires parents to use knowledge gained to build and develop their community and the country. For most parents, the first hurdle is to understand how the new curriculum works and then to get involved with the governing bodies of schools. The system has to produce a new generation of learners who are well-equipped to deal with the challenges of a changing world. Transformational OBE expects the parents to perform a number of duties pertaining to education. Learners, educators and the community are expected to become a single, united voice in shaping the curriculum of the school (Singh, Mbokodi, & Msila, 2004). As highlighted by Fan & Chen (2001), parental involvement is operationally defined as parental aspirations for their children's academic achievement and parents' transfer of such aspirations to their children. These include parents' communication with children about school, parents' participation in school activities, parents' communication with teachers about their children, and the rules parents impose at home which can be considered to be school-related. This somewhat chaotic state in the definition of the main construct not only makes it difficult to draw any general conclusion across studies, but also could have contributed to the inconsistencies in the findings in this area. An alarm has been sounded about critical workforce shortages in those positions that require high-level mathematical and science skills (Stevens, Wang, Olivarez, & Hamman, 2007). Their fear about a dwindling pool of mathematicians and scientists has fuelled concern that countries, such as South Africa (in Africa) and United States (world-wide), will not be able to maintain their leadership in science and technology (Halpern, et al., 2007).

Driven by equity concerns and worries about insufficient capacity building in science, low female representative in the physical sciences continues to be a topic of priority among scientists, educators, policy makers and education researchers. While physical science can be learnt through observation, language and vocabulary are foundational. Students are able to observe chemical reactions, watch things change and observe interactions, but there are many students who do not understand the language and concepts. They cannot appreciate the importance of words, and/or confuse salient, critical terms.

In the study that sought to determine whether or not the status of the teacher has any impact on the performance of students in physics, Owalabi (2012) examines the effect of teachers' qualifications on the performance of senior secondary school physics students. The study concludes that learners taught by educators with higher qualifications perform better than those taught by educators with low qualifications. The results also reveal that learners taught by professional educators perform better, while educators' experience in teaching the subject is a significant advantage in physics.

High-quality staff development is a central component in nearly every proposal for improving education. In other words, staff development lies at the heart of almost every educational effort to improve learners' performances and achievements. Staff development programmes are designed to "alter the professional practices, beliefs, and understanding of school persons toward an articulated end" (Griffin, 1983). In his review of the literature on professional development, Guskey (1986) notes that nearly every major work on the topic of staff development discredits its efficacy. He attributes these historically dismal results to a poor understanding of educators' motivation and a lack of insight into both the individual and environmental factors in the process of change. In Abe's (2014) examination of the effect of educators' qualifications on learners' performance in mathematics, the results show that a significant difference exists between learners taught by professional educators and those taught by non-trained educator.

Unlike biological science, the physical sciences continue to have female underrepresentation with some of the largest gaps occurring in physics (Hazari, et al., 2013). There has been wide speculation about why such disparities continue to prevail. Gender differences in secondary mathematics are a prominent issue that has been the focus of many studies (Letsoalo, Maoto, Masha, & Lesaoana, 2016; Letsoalo, 2017a), with reported discrepancies in mathematics achievement of female and male learners being a contentious issue. Researchers have no reached consensus. Many studies that looked at the gender differences have mixed findings (Letsoalo, Maoto, Masha, & Lesaoana, 2017). While some studies show female learners outperforming male learners, notably those by Stevens, Wang, Olivarez & Hamman(2007), others report that the difference in performance between male and female learners is marginal (e.g., Letsoalo, Maoto, Masha & Lesaoana (2017)). Some even find male learners outperforming female learners notably Preckel, Goetz, Pekrun & Kleine (2008), Asante (2010), Stoet & Geary (2013) and Letsoalo (2017a).

The usual interpretation of attitude refers to someone's either liking or disliking a common target. Studies show that female learners tend to have a more negative attitude towards mathematics than their male counterparts (Hannula, 2002) with that attitude tending to become more negative as learners progress from primary to secondary or high schools (McLeod, 1994). An attitude to mathematics or physics is a complex mix of negative or positive emotions that are associated with mathematics, as well as individual beliefs regarding mathematics and behaviour associated with mathematics (Hart, 1989). The general attitude of a class towards mathematics can be related to the quality of the teaching and the social-psychological climate of the class (Haladyna, Shaughnessy, & Shaughnessy, 1983). Together with attitude, researchers have found that stereotyping plays an affective role in human life. Stereotype threat is a phenomenon in which the activation of a self-relevant stereotype leads people to show stereotype-consistent behaviour, thereby perpetuating the stereotyping. In other words, researchers have found that priming a social category can automatically elicit stereotype-consistent behaviours that usually manifest in decreased intellectual performance (Steele & Ambady, 2006).

**Theoretical Framework-**This study is based on:

**a) the supervision theory** as developed by Robinson (1968). According to this theory, supervision in the education sector is necessary to ensure that there are an adequate number of qualified educators, good

orientation programmes and availability of supplies and equipment. The theory postulates that supervision reassures educators that they do good work. This earns them recognition and builds confidence. The theory also states that supervision of classroom instruction is necessary to ensure that the functions of all educators are co-ordinated. According to the theory, educators differ in degrees of professional competence and in their need for advice regarding their classroom work. This theory identifies five important functions of supervision in the provision of quality education. These include: proper teaching methods, relevant teaching material, a sound learning environment, efficient school management and effective administration of funds. This study sought to find out after adjusting for school quintile in the multilevel model, how the matriculants performed in the two provinces.

**b) the theory of human motivation is** also called Maslow's hierarchy of needs (Maslow, 1943). This theory emphasises the role of human motivation to bring out the best possible outcomes in human efforts. According to this theory, a human-being is constantly preoccupied with a need that must be met at a point in time. This gives rise to another need which will not necessarily be satisfied in the long run.

**Figure 2: Maslow's hierarchy of needs**

This theory postulates that the satisfaction of a stage of need will automatically give rise to the next level of need (Maslow, 1943). In other words, human beings are fuelled by a desire to achieve goals. Attaining goals helps to satisfy specific needs and desires. Needs are categorised into a hierarchy, where certain needs must be met before others can be assessed (Maslow, 1943). Lower needs must be satisfied before higher-order needs can be reached. When learners are concerned about certain needs, their behaviours centre on meeting those needs. Other concerns will take precedence over learning and achievement. Therefore, is a need has not been met or has been neglected; this can affect a learner's performance and behaviour at school negatively. This theory tries or attempts to provide an understanding of why learners behave the way they do. It assists in determining how learning can be affected by factors such as physiological or safety concerns. This study is underpinned by the theory of human motivation. Figure 2 is a schematic representation of Maslow's hierarchy of needs.

**Purpose of the study:** The purpose of this study was to investigate the effect of mathematics and physical science, collectively called science, on the overall learners' academic performance in the Western Cape and Gauteng provinces. Specifically, the study sought to determine to what extent does science influenced academic performances of learners in the two provinces. It aimed at comparing the overall performance of matriculants in Gauteng and Western Cape provinces. The null hypothesis that matriculants in Gauteng and Western Cape provinces did not perform significantly differently was tested at $\alpha = 0.05$ (2-sided) or 95% confidence limit.

The guiding question was:
*Do matriculants in Gauteng and Western Cape provinces have different chances of passing matric, even after adjusting for subject-type (mathematics, physical science, English and others)?*

To achieve this, the researcher intended to draw inference at the province-level, the unit of analysis (Murray, 1998; Letsoalo, Maoto, Masha, & Lesaoana, 2016). This is the first study to be conducted that compares the

overall performances of matriculants in Gauteng and Western Cape provinces, wherein crude estimates and adjusted estimates were determined. Specifically, this is the first study that determined the effect of science on the overall performance of matriculants. The adjusted covariates were learner-gender, school quintile and subject-type. The study end-point was binary, which indicated whether or not a learner passed matric.

## 3. Methodology

This comparative, cross-section quantitative study followed an ex-post-facto design (Cohen, Manion, & Morisson, Research methods in education, 2000), and used secondary and clustered data called Grade 12 dataset, supplied by Umalusi, the Council for Quality Assurance (CQA) in General and Further Education and Training (FET) in South Africa. Grade 12 data requires multilevel models to account for clustering (Skrondal & Rabe-Hesketh, 2004; Rabe-Hesketh & Skrondal, 2005). These models are a more advanced form of simple and multiple linear regression models (Letsoalo, Maoto, Masha, & Lesaoana, 2016). The classical regression models, adopted to investigate the relationships between one or more independent variables and a dependent one, are based on the hypothesis of non-correlation between observations. The analysis of the individuals as non-correlated could lead to distortions, namely underestimation of standard error of the model or the attribution of non-existing statistical effects between the variables (Wu & Zhang, 2006). The Grade 12 data comprises of pseudo-learner identifiers, learning area (school subjects) per learner, final outcome, final score (%), province (Gauteng or Western Cape provinces), learner gender (male or female), school quintile and examination centre (school identifier). Statistical data analysis was accomplished by using the statistical software package called Stata V15 (StataCorp, 2017). Summary statistics for all categorical variables were presented as frequencies and percentages. The study end-point was whether or not a learner passed Grade 12 (passed or not passed). Multilevel data analysis for binary end-point, also called hierarchical logistic regression modelling was used to compare the overall performance of learners and to determine the effect of science subjects on the overall performances of learners in the two provinces. The interpretation of the results was performed at 95% confidence limit or 0.05 error rate.

## 4. Results and Interpretation

A binomial logistic regression or simple logistic regression predicts the probability that an observation falls into one of two categories of a binary dependent variable based on one or more independent variables that can be either continuous or categorical (Hosmer, Lemeshow, & Sturdivant, 2013). A simple logistic regression model assumes that the observations are independent. In case of dependent observations, the model that accounts for intra-cluster correlation coefficient is plausible. The data used in this study are typical clustered or correlated data. Multilevel logistic regression models, both crude (null) and adjusted models (Rabe-Hesketh & Skrondal, 2005; Wu & Zhang, 2006), were used to determine the likelihood of observing the outcome 'passed matric' between learners in the two provinces. The parameter of interest is odds ratio (OR), which is used to compare the relative odds of the occurrence of the outcome of interest, given exposure to the variable of interest (Szumilas, 2010; Hosmer, Lemeshow, & Sturdivant, 2013; Letsoalo, 2017a). Possible interpretation of OR is presented in Table 1 (Szumilas, 2010; Letsoalo, 2017a).

**Table 1: Interpretations of odds ratios**

| Odds Ratio (OR) | Interpretation |
|---|---|
| Less than 1 (OR < 1) | Exposure associated with lower odds of outcome, suggests that the odds of exposure are negatively associated with the adverse outcomes compared to the odds of not being exposed. |
| Equals 1 (OR = 1) | Exposure does not affect odds of outcome. This suggests that there is no difference between the groups; namely there would be no association between the suggested exposure and the outcome. |
| Greater than 1 (OR > 1) | Exposure associated with higher odds of outcome, suggests that the odds of exposure are positively associated with the adverse outcome compared to the odds of not being exposed. |
| | *Association does not necessarily imply causation* |

**a) Descriptive Statistics:** The participants in the study were 145783 matriculants (65245 [44.75%] males and 80538 [55.25%] females) who wrote the 2009 matriculation examinations in Gauteng and Western Cape provinces. The number of female participants was marginally higher than that of males in the two provinces. Table 2 shows that there were marginally more female learners than male counterparts in Gauteng Province (56.89% vs. 43.11%) and in the Western Cape Province (54.48% vs. 45.52%).

**Table 2: Distribution of gender by province**

| Gender | Western Cape province | | Gauteng province | |
|---|---|---|---|---|
| | Count | Percent | Count | Percent |
| Male | 19930 | 43.11 | 45315 | 45.52 |
| Female | 26304 | 56.89 | 54234 | 54.48 |
| Total | 46234 | 100.00 | 99549 | 100.00 |

Table 3 indicates that the number of matriculants in Gauteng province was higher than that in the Western Cape Province (99549 vs. 46234). However, the proportion of learners who passed matric was marginally higher in the Western Cape Province (73.93%) than in Gauteng Province (70.42%). The proportion of matriculants who did not pass was marginally higher in Gauteng Province (29.59%) than in the Western Cape Province (26.04%).

**Table 3: Distribution of results in the provinces**

| Result | Western Cape province | | Gauteng province | |
|---|---|---|---|---|
| | Count | Percent | Count | Percent |
| Did not pass | 12040 | 26.04 | 29443 | 29.59 |
| Passed | 34194 | 73.93 | 70106 | 70.42 |
| Total | 46234 | 100.00 | 99549 | 100.00 |

**b) Inferential Statistics:** Table 4 presents the results of the test for association between binary outcome (passed/not passed) and the provinces. The number of learners who passed matric (n = 104300 [71.54%]) were marginally higher than those who did not pass (n = 41483 [28.46%]). A Pearson's chi-square test for association, shown in Table 4, was performed to examine the correlation between province and study end-point. The proportion of learners who passed matric to the proportion of those who did not pass matric differed significantly in the two provinces ($p < 0.001$). Therefore, performance in the two provinces differed significantly, with the Western Cape Province being in favour.

**Table 4: Test for association between province and study end-point**

| Province | Not passed | | Passed | | Total |
|---|---|---|---|---|---|
| | Count | Percent | Count | Percent | |
| Gauteng | 29443 | 29.58 | 70106 | 70.42 | 99549 |
| Western Cape | 12040 | 26.04 | 34194 | 73.96 | 46234 |
| Total | 41483 | 28.46 | 104300 | 71.54 | 145783 |
| | $\chi^2_{(1)} = 193.7835$ | | $p < 0.0001$ | | |

Table 5 presents the results of the unadjusted hierarchical logistic regression model. Learners in the Western Cape Province were significantly 1.1928 more likely to pass matric than learners in Gauteng province ($p < 0.001$, OR = 1.193, 95%CI: 1.164 - 1.223). The odds of passing matric increased significantly by a factor of

about 1.19 for Western Cape Province over that of Gauteng Province. Therefore, the hypothesis that the chances of passing matric in the two provinces were the same was not accepted at 95% confidence limit.

**Table 5: Crude estimates**

| Outcome | | OR | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|---|
| Province | | | | | | | |
| | Gauteng[a] | | | | | | |
| | Western Cape | 1.1928 | 0.0150 | 13.98 | < 0.001 | 1.1636 | 1.2226 |
| Constant | | 2.3817 | 0.0165 | 125.52 | < 0.001 | 2.3497 | 1.4142 |

[a]Baseline category

Table 6 presents the estimates after adjusting for learner-gender and school quintile. School quintile is a significant predictor of the outcome ($p < 0.001$) while gender hardly predicts the outcome. Thus, school quintile significantly predicted the outcome in favour of the Western Cape Province. Learners in the Western Cape Province were significantly 1.5123 more likely to pass matric than learners in Gauteng province ($p < 0.0001$, OR = 1.512, 95%CI: 1.471 - 1.555). The odds of passing matric increased significantly by a factor of about 1.51 for Western Cape Province, over that of Gauteng province.

**Table 6: Model estimates after adjusting for gender and school quintile**

| Outcome | | OR | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|---|
| Province | | | | | | | |
| | Gauteng[b] | | | | | | |
| | Western Cape | 1.5123 | 0.0213 | 29.35 | < 0.001 | 1.4711 | 1.5546 |
| Quintile | | | | | | | |
| | 1[b] | | | | | | |
| | 2 | 1.2168 | 0.0289 | 8.25 | < 0.001 | 1.1614 | 1.2748 |
| | 3 | 1.4646 | 0.0315 | 17.74 | < 0.001 | 1.4041 | 1.5276 |
| | 4 | 1.8594 | 0.0400 | 28.83 | < 0.001 | 1.7827 | 1.9395 |
| | 5 | 7.6528 | 0.1734 | 89.83 | < 0.001 | 7.3204 | 8.0002 |
| Gender | | | | | | | |
| | Male[b] | | | | | | |
| | Female | 1.0139 | 0.0125 | 1.12 | 0.264 | 0.9897 | 1.0386 |
| Contant | | 0.9476 | 0.0192 | -2.65 | 0.008 | 0.9106 | 0.9861 |

[b]Baseline category

Table 7 indicates that school quintile is a significant predictor of the binary outcome ($p < 0.001$). The result in the adjusted model indicates that learners in the Western Cape province were 1.5122 more likely to pass matric when compared to learners in Gauteng province ($p < 0.001$, OR = 1.512, 95%CI: 1.471 - 1.555). Therefore, there is sufficient evidence that after taking into account subject-type, learner-gender and school quintile, learners in the Western Cape province were significantly more likely to pass matric than learners in Gauteng province.

**Table 7: Model estimates after adjusting for gender, quintile and subject-type**

| Outcome | | OR | Std. Err. | z | P>\|z\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|---|
| Province | | | | | | | |
| | Gauteng[b] | | | | | | |
| | Western Cape | 1.5122 | 0.0213 | 29.35 | < 0.001 | 1.4710 | 1.5546 |
| Subject | | | | | | | |
| | Mathematics[b] | | | | | | |
| | Physical Science | 0.9989 | 0.0015 | - 0.71 | 0.144 | 0.9959 | 1.0019 |
| | English | 1.0000 | 0.0011 | 0.02 | 0.981 | 0.9979 | 1.0022 |
| | Others | 1.2168 | 0.0008 | 0.01 | 0.991 | 0.9984 | 1.0017 |
| Quintile | | | | | | | |
| | 1[b] | | | | | | |
| | 2 | 1.2168 | 0.0289 | 8.25 | < 0.001 | 1.1614 | 1.2748 |
| | 3 | 1.4646 | 0.0315 | 17.74 | < 0.001 | 1.4041 | 1.5276 |
| | 4 | 1.8594 | 0.0400 | 28.83 | < 0.001 | 1.7827 | 1.9395 |
| | 5 | 7.6528 | 0.1734 | 89.83 | < 0.001 | 7.3204 | 8.0002 |
| Gender | | | | | | | |
| | Male[b] | | | | | | |
| | Female | 1.0138 | 0.0125 | 1.12 | 0.264 | 0.9897 | 1.0386 |
| Constant | | 0.9477 | 0.0193 | -2.65 | 0.008 | 0.9107 | 0.9861 |

[b]Baseline category

Therefore, if the school quintile was constant (i.e., if all schools were resourced equitably or equally), learner-gender was constant (all learners were of the same gender) and subjects were fixed (all subjects were the same) then the chance of passing matric was 1.512 more likely for the Western Cape Province than for Gauteng Province. Clearly, the odds of passing matric increased from 1.193 (crude estimate) to 1.512 (adjusted model). Although subject-type was found not to be a significant predictor of the binary outcome, its effect increased the chances of passing matric in the Western Cape Province.

## 5. Conclusion and Recommendations

In view of the findings of this study, based on the literature review and the empirical investigation, it can be concluded that:

The absence or inadequate educators, especially in the STEM subjects in basic schools, presents a major obstacle to the achievement of quality education, capacity building and the development of human resources. Educators, who educate the youth who are the leaders of the next generation of people, are an extremely important component of any society for a multitude of reasons (Owusu-Acheampong & Williams, 2015). Therefore, it is recommended that only properly or truly trained qualified educators should teach mathematics and physical science, especially in secondary schools. Training of under-qualified educators should be provided to enable them to adapt their teaching thereby improving performance of learners in the STEM subjects.

Based on the results from other studies, e.g. Owalabi (2012) and (Charles-Ogan & Okey, 2017), it is recommended that physical science learners should be properly groomed in mathematics, problem-solving schedules should accompany conceptual treatment of numerical problems in the physics classroom. Furthermore, it is recommended that learners, especially in the year of examination, should be taught by properly qualified and experienced educators. Prior research points to the importance of learners' self-realisation to achieve educational outcomes, which could be influenced by interventions that directly counteract learners' stereotypical beliefs (Dar-Nimrod & Heine, 2006) or affirm their personal values more broadly, resulting in increased engagement, grit, or confidence (Miyake, et al., 2010). Gender in secondary

schools is a prominent issue that has been a focus of many studies, notably Guiso, Ferdinando, Paolo & Luigi (2008) and Letsoalo, Maoto, Masha & Lesaoana (2016). Researchers have not reached consensus. Some studies show female learners outperforming male learners (Stevens, Wang, Olivarez, & Hamman, 2007) while others indicate male learners outperforming female learners (Hedges & Nowell, 1995). Therefore, male learners are not innately better at mathematics and/or physical science than female learners and vice versa. It can be concluded that any difference in test or examination scores is due to nurture (which may be stereotyping) rather than nature. Use of innovative teaching strategies would improve interactivity, understanding, and application of concepts (numerical and non-numerical) in the learning of mathematics and physical science classrooms. Further, it is recommended that the conditions for co-operative learning, namely Learner-centered approaches, be encouraged in South African schools, particularly in the two provinces because a co-operative learning approach could foster a positive attitude towards mathematics and physical science among learners. Therefore, adequately empowered educators, especially those that teach science subjects need to be made aware of the benefits and importance of co-operative learning. This approach changes the practice of educator-centred teaching approaches to learner-centred teaching strategies. This could be because learners who work in group feel that they can depend on one another for help thereby increasing their confidence in solving physical science or mathematics problems. This approach has the potential to change their attitude towards these subjects.

Results of this study indicate that the Western Cape Province provided better conditions for learners to pass matric. Strategies to empower mathematics and science educators should be intensified, especially in Gauteng Province. The current policy advocates for general approach or embraces a single-minded approach, which can be regarded as "*one-size-fits-all*" approach that does not recognise within-province dynamics. There is a need for differentiation in support approach since the dynamics in each province is different. Also, for Gauteng Province to perform on par with the Western Cape Province, a special mixed-approach designed study that will concentrate only on Gauteng province should be commissioned to gain more insight into those issues that affect teaching and learning of mathematics and physical science. To improve performance in mathematics and physical science, policy makers need to realise the effect of affective factors, and be aware of those factors that influence learners' performance. Finally, the researcher recommends that similar studies be conducted in all other provinces of South Africa involving all matriculation cohorts.

**Conflict of Interest:** The author declares that he has no financial or personal relationship(s) that could have influenced him inappropriately in writing this article.

**Acknowledgements:** The author would like to expresses his sincere gratitude to Given Luvhimbi (Information Librarians: Tshwane University of Technology), Alice Machele (Client Manager Services: Tshwane University of Technology) for technical assistance, Peggy J Ahrens for language editing and the Umalusi Council for allowing him to use the Grade 12 dataset.

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Journal of Education and Vocational Research (JEVR)
Vol. 8, No. 4, December 2017 (ISSN 2221-2590)

# Skill Development Policies in India: Implications and Challenges

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**Abstract:** India which is moving through 'demographic dividend' and wants to achieve tag of 'knowledge based economy' need to invest in skill formation and developing educated and skilled workforce. This article will begin by broad overview of education and critical evaluation of current skill development policies at school and vocational level. There would be a brief discussion on role played by private sector in training of workforce in India and what are challenges faced by employers and employees and where lies the conflict of interest. After that in concluding section the major problems will be combined together to come out with the broad basic reason for the failure of such policies and conclude by scrutinizing what can be done in future to bridge the gap between educated and employed. Policy approach to skill development is supply driven and less attention is paid to demand side factors. Study recommends creating national training funds which can be used to collect levies from organized and large firms to be used for skill development of the informal sector. Levy based financing can help in solving problem of free rider and moral hazard as is held by the private sector. Study also recommends making vocational education compulsory from 8th standard and bridging the wide gap that exists in Indian labor market between 'educated' and 'employable'.

**Keywords:** *Skill Formation, Skill Development Policies, Education system, Private Financing, Vocational Education*

## 1. Introduction

**Overview of Skill Development System of India:** For India, which is moving through 'demographic dividend' and wants to achieve tag of 'knowledge based economy', it then becomes all the more important to invest in improving skills and invest in technologies complementing the respective skills suitable for emerging economic environment. According to a study done by Boston Consulting group, India would have a surplus labor of 47 million by 2020 that is at the same time when there will be shortage of 56 million workforce in the rest of the world (BCG, 2007) The challenge that lies in front of policy makers is to train this large young population to gain productive and meaningful employment to gain a decent standard of living (Pilz, 2015). Skill Development is the answer to the problems of India but unfortunately according to UN in India less than one tenth of labor force has any vocational training (This includes both formal as well as informal training) (ILER, 2014). Even those who are trained are not able to secure employment. Policy approach to skill development is supply driven and less attention is paid to demand side factors ( (Singh, 2003); (Mehrotra, 2014);(Berman, Somnathan, & Tan, 2005)). To understand the same, it is important to note what is the meaning of the abstract term 'skill' and analyze link between education, skill and unemployment.

'Skill' means any marketable expertise however acquired, irrespective of whether marketed or not, or whether the intention is to market it or not (NSSO, 2013). Skill is broadly defined as a learned ability of an individual to carry out a set of pre-determined task(Srivastava, 2008). There is a misconception in India and many developing countries regarding skill development that skill formation refers only to vocational education. There are 3 type of skills ((Srivastava, 2008) (Mehrotra, 2014)(World Bank, 2012)):

**a) Academic/Foundational/Cognitive Skills-** basic abilities to read and write which are learnt in school or sometimes through informal means.
**b) Transversal/Problem Solving Skills-** These are the skills that belong to a particular occupation and can be transferred from one person to another. Ex-soft skills, communication, coordination and team skills
**c) Technical/ Vocational Skills-** job specific skills which are founded upon the first two of the above skills.

Skill Education should not be restricted to vocational training and is a much broader term that includes in its domain education that an individual attains. For the same it is important to analyze the level of education of workforce of our India.

**Table 1: percentage share of total workforce in India at respective education levels in 2011-12**

| Average Years of Education completed | Grade | Qualification and percentage of workforce in 2011-12 | | |
|---|---|---|---|---|
| **18** | **PG** | Post graduate and above- 2.53 | Science (0.58) Non Science (1.95) | |
| **16** | **UG** | Graduate- 6.82 | Science (2.7261)<br>Non Science (4.0939) | |
| **13** | **11th-12th** | Senior Secondary- 6.14 | Polytechnic (3 years)- 0.48 | CTS and ATS[1]- 2.26 |
| **11** | **9th-10th** | General Secondary-12.26 | vocational secondary-0.02 | |
| **9** | **6th-8th** | Middle-17.48 | | |
| **0-6** | **1st - 5th** | Up to Primary- 22.32 | Literate without schooling-0.47 | |
| **0** | **-** | Not literate-28.73 | | |

Source: Computed with help of (Mehrotra, 2014),(IMA, 2017), (GOI, 2013)and (AICTE, 2012)
[1]CTS- Craftsmen Training Scheme, ATS- Apprentice Training Scheme

Education condition in India is one of the worst as NSSO data conforms that around 68% of Indian workforce is less than 8th pass (28%- illiterate, 22%- below primary and 17%-middle) (NSSO, 2013).When elementary education is not completed by majority of population and current skill development system in most training programs does not allow people under 8thclass to participate in skill training program then the failure of such programs in inevitable. Number of graduates and above have increased from 23.6 million in 2001 to 33.3 million in 2005 to further 50.5 million in 2010 but employment opportunities for the same are not rising at the same pace. According to current training capacity around 5 million workers are trained per year but the requirement is of around 20 million workers to be skilled every year (Mehrotra, 2014). Current statistics show that roughly 3% of Indian labor workforce receives any sort of formal training where around every year 12 million workers are added to the workforce (Ernst and Young, 2011). In countries like Korea, Japan, Germany, around 85% of workforce in the age group of 18-25 have received some form of vocational training and the same figure in case of India drops down to 5% (Planning commission, 2008). Reasons cited for this are lack of monetary investment but in reality from past many years Union budget have allocated ample resources for production of skilled workforce but the problem has been the inefficient utilization of those resources. Around 21 ministries carry out skill development work even when it is not their expertise (MSDE, 2016).

Skill development programs have always been running behind numbers which started when it was set that by 2022 India would train 500 million workers. (Mehrotra, gandhi, & sahoo, 2013)argued that the set target was unrealistic and not backed by any empirical evidence and was a gross over estimation. The target through the years has kept on revising itself until Rajiv Pratap Rudy (now ex- minister of Skill Development and Entrepreneurship) abandoned the target even when new target in MSDE policy 2015 was skilling 400 million workers but that target is now kept in policy maker's minds. Skill development policies in India are incremental rather than institutional or transformational. Only focusing on creation of skilled workforce and not having corrections on demand side constraints is an attempt to correct macro policy distortions through micro interventions. This would result only in overcrowding and bumping out of low skilled workers but leave the economy with a large pool of unemployed skilled as well as unskilled workers (Singh, 2003).

Focus on skill development policies is assumed to have gained prominence among policy makers around the period of 2006-07 and it continues to be a major topic of debate i.e. how to produce 'skilled' as well as 'educated' workforce. In reality general and vocational education has been discussed at length in India through various committee and policy reports. This article will discuss the same in forthcoming section and that would be followed by discussion on school and secondary level vocational education. After that performance of ITIs and other senior secondary and graduate level skill development programs would be taken into account. Due to large level informal unemployment and around 68% workforce being either illiterate or less than 8th pass there are various informal sector skill development programs which will be taken into consideration in the fourth section. There would be a brief discussion on role played by private sector in training of workforce in India and what are challenges faced by employers and employees and where lies the conflict of interest. After that in concluding section the major problems will be combined together to come out with the broad basic reason for the failure of such policies and conclude by scrutinizing what can be done in future to bridge the gap between educated and employed.

## 2. Critical Evaluation of Prevailing Skill Development Policies

**School level skill Education:** Till the year 2013 children did not have any opportunity to acquire vocational education until they completed at least schooling at general academic level i.e. till class 10th. Foundational courses at preparatory level can prove to be stepping stone for success in skill development as is case with countries like China, Germany and Korea (Nayantara & Kumar, 2015). Dropout rate after 10th is very high in India due to socio economic conditions and low returns to education, so it is important to offer education which is in tandem with the world of work (Khare, 2015).When elementary education is not completed by majority of population and current skill development system in most training programs does not allow people under 8th pass to participate in skill training program then the failure of such programs in inevitable. Skill shortage will continue as long as secondary school system does not vocationalize which can make TVET (Technical and Vocational Education and Training) more aspirational.
Private sector participation is negligible at school level formation of curriculums and due to strong mismatch between training provided and needs of private sector, the whole process remains obsolete and of no use to the students.

**ITI's:** Most prominent way of providing skill training in India are the Government it is and Private ITIs (Which were earlier known as ITCs). There are Centers of Excellence (COE) formed which are expected to create multi-skilled craftsmen with better employability skills. Most of ITI courses require entry qualification of 10th or 12th class which makes over 50% of workforce not qualified for this system.

**Table 2: Total number of functioning ITIs and seating capacity till December 2016**

| Characteristic | Government ITIs | Private ITIs | Total |
|---|---|---|---|
| Functioning ITIs till December 2016 | 2150 | 11200 | 13350 |
| Seating capacity | 713245 | 2134085 | 2847330 |

Source: MSDE Annual Report (2017)

Percentage of functioning for government ITI is 17.5% and the same for Private ITI is 82.5 % and this gap is consistently rising according to recent trends. One should not be swayed into positivity by rise in number of private institutions through skill India mission as the trouble lies in the actual functioning of the institutes and their very low IT intake. ITIs spend almost 90% of their allotted in salaries of the workers of the institute which leaves very less support to maintenance and up gradation of facilities and other operational expenses (Khare,2015). According to a study, (Mehrotra, 2014)found that major problems related to ITIs are that placement is low, dropout rate is high, instructors are not well qualified and draw a very low salary and actual staff strength was less than the sanctioned posts. Comparing government and Private ITIs, it was observed that government owned ITI had more classrooms and practiced more trades but placement was better in private ITIs. People who got trained 67% had household income of less than Rs. 5000. Around 60% teachers themselves are ITI graduates and under qualified to teach. Knowledge and skill of laborer not at par with new technology. Crafts Instructor training scheme (CITS) was introduced in 1948 for training of trainers but the scheme did not work efficiently. Only 40% of 55000 TVET instructors have undergone instructor

training course (Ajithkumar, 2015).One of the major reasons among youth of not opting for ITIs are that there is neither job mobility nor enhancement of skills.

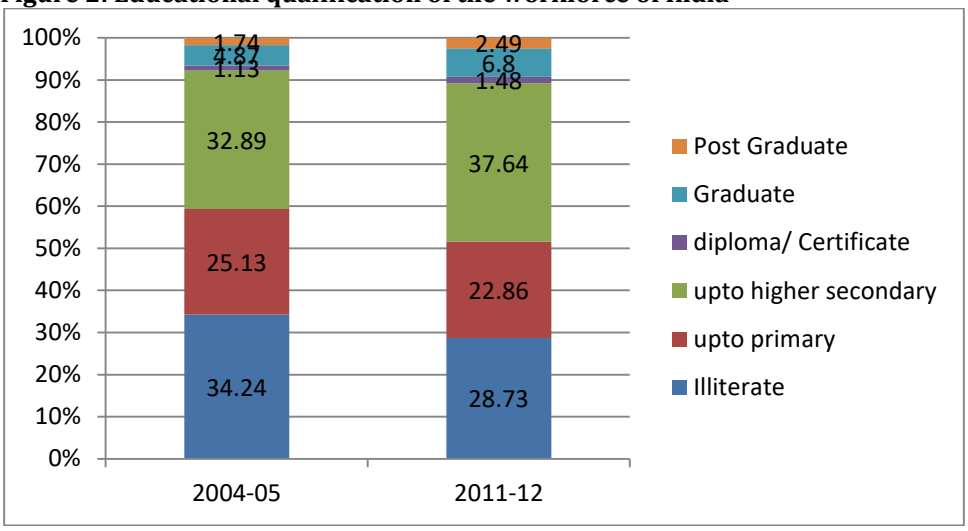
**Role of Private Sector**

Public private partnership (PPP) in skill development Programs is taken up as a business opportunity and often fully funded by the government which leads to high level inefficiency. Private industries don't want to get involved in funding of the skill training of individuals due to the problems of free rider and moral hazard. (repeat). Planning Commission task force have recommended that skill training should be market linked and demand led (2001) but problem remains with funding of such programs (Srivastava, 2008).Worker qualification in the degree he has attained and the work he/she has to do in the market here is highly mismatched. After liberalization measures were adopted the impact of globalization was thought to positively affect the labor abundant country to adopt labor intensive technologies and foster economic growth leading to large scale employment opportunities. Contrary to the belief, due to large scale competition and high quality standards, the employers are forced to cut labor cost and job-security protection which has hampered the labor market. Also the quality of goods has improved but quality of employment has deteriorated further as there is more employment created in informal and unorganized sector.(Rosenberg, 1976). New and improved technologies are adopted in labor process only when more labor power can be extracted from Alburtis is in contradiction to the conventional notion that the skill complimentary technologies will be adopted. If the capitalist finds other methods to extract higher labor power from workers, then new technology would not be adopted. These methods of extraction of more labor power are large scale flexibilization, outsourcing, formal-informal organization nexus, hire and fire policy, relaxation of labor laws etc. All these methods help in more extraction of labor power and relative to technology and skill advancement seem a better alternative for capitalist to increase profit. Presence of skill premium is already in question and through above argument it can be established that technological changes do not happen due to demand and supply of skilled workforce. Now for the above argument to work there is a need for unlimited supply of labor force and involuntary unemployment as well as they would help in acting as balancing force over the demand driven forces to not affect levels of profits. If there are not enough labor interested to work at given wage then the capitalist would have to look for other methods to increase profits but in a country like India where there is unlimited supply of labor and large involuntary unemployment here the argument works perfectly(Roy, 2012).Private sector does not have a conflict of interest if it gets trained workers but there is a certain power relation among the Indian capitalist class which does not want the population to be skilled and educated which is necessary for their suppression.

**3. Challenges towards Education and Skill Development**

Bureaucratic hurdles, lack of coordinated action between center and state government, lack of on-the-ground initiatives and poor execution has worsened the skill development policies situation in India. Indian work force is dominated by casual workers and many avenues for availing job drawing skills are not available for casual workers. Different Indian states are at different regional demographic and levels of development. 'One size fits all' policy for skill development has not lead to much success in Indian scenario.

**Figure 2: Educational qualification of the workforce of India**




Source: (IMA, 2017)

Now both the arguments have their own advantages and disadvantages but which should be focused more by an economy is a question to be asked. These aspects should be studied as to what kind of a labor a capitalist system prefers so that we can understand which perspective is more dominant. Capitalist system does not prefer a system of education where people are supposed to think alternative lifestyles that don't cater the needs of capitalism(Unni & Rani, 2008).What to be taught and how it benefits the production process is main aim of the system and any resilience against this system is subdued. In case of Indian economy, higher education researches have been neglected to a very large extent in both the fields of policy and inclusive development. Creating more and more secondary education attained and graduates is the purpose and returns to those educations are still not available in the market due to which we have a large section of skilled educated unemployed.

Indian Economy can either try to adapt to this change and produce a skilled labor force which can meet their own as well as global needs or they can let the continual exploitation of the informal economy by exploiting and feeding on the wage rate and continual falling of labor cost where size of our labor force will grow but their capabilities and standard of living will continue to perish (Robalino & Almeida, 2012). Another aspect that needs to be analyzed is the strong linkage between skilled workers and unemployment. Focusing on creation of more skilled laborers alone and not having correction of demand side constraints is an attempt to correct macro policy distortions through micro interventions. When a great number of skilled laborers are unemployed and the ones employed are withdrawing a very low salary, the argument of educational attainment leading to better jobs and high wages becomes questionable. What should be the motivation behind a person who may complete his secondary education or graduation to study more if it does not lead to better wages. High demand of skills and relative shortage of skilled workforce may be true in case of a few sectors but in a country like India overall where there is high degree of involuntary unemployment in both skilled as well as unskilled workforce, then the demand and supply of skills is determined by relative absorptive capacity of sectors (Satyaki, 2008). If a skilled worker is not able to realize the price of his labor power, it means it has only intrinsic and not extrinsic labor power. Even though the skill is marketable but does not fetch exchange value till the skill is put to use (Singh, 2003).

## 4. Recommendations and Thinking about Future

One of the recommendations is to make Vocational education compulsory from 8$^{th}$ standard at school level. Interests and abilities of the individual should be identified through proper diagnostic tests to offer basic specific and suitable courses on particular trade for remaining 5 years of their schooling. Implementation of this approach looks abstract and almost impossible but the implementation flaws are to be addressed through institutions which work towards developing inefficiencies in the system. Even if there are only 10000

schools but they should be used in training of the large informal workforce. Intervention at school level to create career counsel options where students interact with private players regarding which skills are most desirous in the labor market can help create awareness about the prospects available after acquiring vocational skill (Nayantara & Kumar, 2015).View that provision of skills should be market linked and demand led and this has been voiced by agencies such as Planning Commission (2008) and MSDE (2016) but the problem remains with funding of such programs. Among developing nations India has lowest investment in skill development.

National training funds can be used to collect levies from organized and large firms to be used for skill development of the informal sector. Several Latin American countries have funds dedicated for employment training. In China after 6 years of Primary Education, vocational education is introduced for 3 years and then for another 2 years vocational education for senior secondary school is decided on the basis of a senior high school entrance examination called Zhongkao (FICCI, 2015).Advantage Chinese system has over the Indian counterpart is that it is backed by vocational and training law 1996 but still the Chinese system also suffers from the problem of skill demand supply mismatch (Mehrotra, Gandhi, & Kamladevi, 2015)Germany is advancing from industrial based to knowledge based economy which is driven by technology and innovation with the help of dual system of education. There is an urgent need to take TVET away from traditional concept of manual labor (Mazumdar, 2015). Dual system of education has its own drawbacks. There are a few highly specialized companies who are not able to train apprentices in all areas, training cost is found to be very high by companies and many graduates at time are not able to cope up with specialized rigid training in only a particular field (Pilz, 2012). In case of India there is over regulation by government and sub optimal structuring so private sector needs to shoulder responsibility of development of skills (Venkatram, 2015). Even if trained youth were able to access placement opportunities they could get salary of Rs. 5000-10000 where aim should be to impart training that can fetch salary close to Rs. 30000. The need to run behind numbers needs to be addressed as training capacity even if increased but does it help in fulfilling the motive of producing trained employees needs to be questioned. Objective of government policies of vocational education should be to fill the gap between educated and employable (MSDE, 2016). So to summarize there are certain solutions recommended by various studies like building a LMIS, adaptation of NSQF and raise qualification of instructors which is at par with international standards. These solutions though attractive don't look feasible in near future and need to be relooked and reconsidered. In the current standing where there is abundant supply of institutions a long term strategy for skill development is needed for educated students which can be fit for work globally(Venkatram, 2015).Revamping the education system cannot be offered as a recommendation as it is practically impossible but steps in making the system more accommodative is needed. Curriculum needs to be work based and link between jobs and education need to be reconnected. Skill agenda is necessary to be put forward as national and global priority.

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**Journal of Education and Vocational Research (JEVR)**
**Vol. 8, No. 4, December 2017 (ISSN 2221-2590)**

# The Provision of Free Higher Education in South Africa: A Proper Concept or a Parable?

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**Abstract:** The provision of free-higher education is one of the most debated issues in South Africa today. The issue of free-higher education has drawn many commentators from sectors such as the media, business and within the political dominions. The main argument is where will the money to fund free-higher education will come from, whether the provision of free-higher education in South Africa is a proper concept or just a parable and also the terms of reference with regards to the provision of free-higher education in the country. By strictly examining the available and relevant literature on the concept of free-higher education in South Africa, the study was able to comprehensively understand the dynamics, implications and probability of providing free-higher education. Infrastructure challenges and economic growth are undoubtedly the major factors hindering the country from providing free-higher education, and unfortunately, with the government already forging ahead with implementing free-higher education without a proper and extensive feasibility study, the hasty implementation of free-higher education will have devastating implications for growth and service delivery in the country.

**Keywords**: *Higher Education, Debate, Socio-Economic, Parable, Feasibility*

## 1. Introduction

The 2016 widespread student protests advocating for the provision of free higher education across the country and the current state of restlessness in institutions of higher education led former President Jacob Zuma to establish a commission in January 2016, chaired by Justice Jonathan Arthur Heher (Ndaliso, 2017). The mandate of the Commission was to investigate, make findings, report on and make recommendations on the feasibility of making higher education free in South Africa, with regards to the Constitution of the Republic of South Africa, all relevant higher and basic education legislation, all findings and recommendations of the various presidential and ministerial task teams as well as all relevant educational policies, reports and guidelines; the multiple facets of financial sustainability, analysing and assessing the role of government together with its agencies, students, institutions, business sector and employers in funding higher education and training; and the institutional independence and autonomy which should occur like the financial funding model (The Presidency, 2017).Access to quality education is a pillar of strength in a country that is undergoing a developmental juncture, especially on socio-economic and political domains (Gunay & Kazazoglu, 2016). An unaffordable and expensive provision of either basic or higher education can weaken the character and the appearance of a democratic country like South Africa in terms of producing a competent human capital ready to contribute to socio-economic development. South Africa has provided free-basic education since 2006 and it has been anticipated that eventually, higher education at some point will also be catered for. Free-higher education currently, is one of the most debated issues in the country (Bitzer, 2009). At the same time, previously disadvantaged students have continuously pushed for free-higher education, to show their determination and will, students took to the streets to voice out and register their anger and frustration at the slow pace at which free higher education was being prioritised (Fourie, 2018).

The issue of free-higher education has raised eyebrows in different sectors throughout media houses, business sector and in the political dominions. While these sectors have welcomed the idea of providing free-higher education, the main argument has been where will the money to fund free higher education will come from and whether the provision of free higher education in South Africa is a proper implementable and sustainable concept or a parable. It remains to be envisaged as to what direction that the country will take in terms of implementing the concept. Nonetheless, then president of the country, Mr Jacob Zuma, announced the implementation of free higher education in December 2017, (Mailovich, 2018). However, South Africa faces numerous challenges such as youth unemployment, unemployed graduates, poverty and a significantly low Gross Domestic Product owing to various economic constraints which have plagued South Africa. Furthermore, the number of universities in the country is miniature as the country only has twenty-six (26) universities. Moreover, universities can only accommodate a certain number of students, therefore, with the

provision of free higher education in motion, it remains to be seen how universities will respond to this. Undoubtedly, the provision of free higher education has inspired great public debate and further engagement between the government, the management of universities and society at large. Notably, the student's dissatisfaction withstands despite the fact that South Africa's post-apartheid government discourse on state-society relations is centred on greater inclusive education for the nation (Engelbrecht, 2006). This inclusive education is therefore reflected in the South African Constitution's commitment to everyone's right to further education, in which the state through reasonable measures must make higher education to be progressively available and accessible. Since the announcement of free higher education in December, numerous political and economic analysts have questioned the exact motive and economic feasibility of the plan. Without leaning towards a particular view, the study explores whether the provision of free-higher education in South Africa is a proper concept or a parable? The paper initiates by unpacking the concept free education in the context of South Africa. The concept of free higher education in South Africa is generally new and it has raised questions regarding its affordability. South Africa's economic growth is currently very low, tax collection is decreasing and unemployment is increasing, this, therefore, raises a question, can South Africa offer let alone afford free higher education? Therefore, the rational of the study is to carefully scrutinise the concept of free higher education in South Africa and most importantly understand if the country can afford it without major implications in the near future. South Africa's quest to implement free education must ensure that it does not hinder the provision of other essential public services in the country, hence the affordability factor will be very crucial going forward.

## 2. Literature Review

**Operational Definition of Concepts:** It is important for an author to define concepts when undertaking a study or when writing an academic paper. This is because a word can have two or more meanings. Defining concepts helps in a case where a reader perceives a word as meaning something else while in that particular study/paper it means something different. This makes it easier to make its context understandable in terms of the study at hand. Understanding a word differently can impact the content of a study acutely, which may have some repercussions into understanding it. Some concepts are defined below for the purpose of this study.

**The term 'Free':** According to Merriam Webber Dictionary (2016), "free means not costing or charging anything". This means that whatever the item or service that is said to be free is of zero cost, and it charges nothing.

**Education:** Oxford Dictionary (2015) states that "education is a process of receiving or giving a systematic instruction especially at school or university, or it is an enlightening experience". Supposedly, this means that there is an expert and a learner who acquires knowledge for future usage. During this process, an improved knowledge and developed skills are attained.

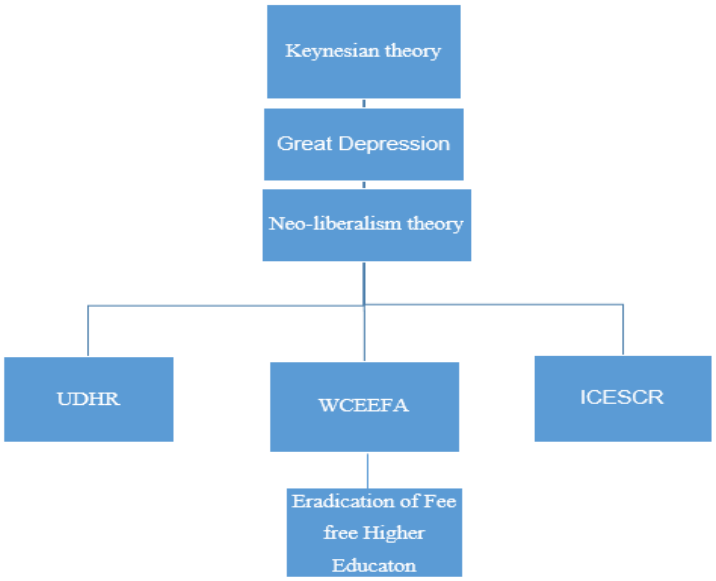
**Free education:** When considering the above, it can be said that free education is education that is incorporated with no costs to individuals acquiring it. The costs may be consumed by either public sector (business) or public sector (the government).

**Understanding the concept free education in the context of South Africa:** Universities South Africa (USAF) opined that "South Africa will still have a fee-based tertiary education system after government implements its new funding scheme". Because of this proposition, a pilot project had to be started which will entail funding only the entry-level students at higher institutions of learning (News24, 2018). This has to be extended to the following level per year for the period of five (5) years whereby it would reach the highest level of higher education. According to Bawa, the CEO of USAF, "each university will still set its own fee structure, to be approved by the institution's council, which will then be paid by bursaries funded by the Department of Higher Education" (News24, 2018). It can be said that it is free-higher education for all, but in actual fact, it is not because a huge number of potential students get left outside the boundaries of accessing higher education. While some are lucky acquire government's financial assistance, even after they do so, they are often shunned away at universities because of quotas set by universities. On a positive note, some

learners acquire spaces to study but not financial assistance which then takes us back to ask the terms of reference for this free-higher education system being currently paraded in South Africa

**Theorizing the concept of Free-Higher Education:** According to Brenner et al. (2010), the failure of the Keynesian system in 1929-1930 resulted in a Great Depression, as a result, the Neoliberal economic system emerged in the development agenda. The policies of neo-liberalism promoted deregulation, privatization and the reduction of taxes (Palley, 2005). Under neoliberal policies, multilateral organisations (United Nations) participated in developmental activities. The Universal Declaration of Human Rights in 1948 proposed that education has to be free, especially at the elementary and fundamental stage (Bray and Kwo, 2013). In 1966, the International Covenant on Economic, Social and Cultural Rights declared that higher education shall be made equally accessible to all, on the basis of capacity, by every appropriate means, and in particular by the progressive introduction of free education. This partly displays the normal expansion of higher education, and consequently of the burden on governments (Bray & Kwo, 2013). In 1990, there was the launch of the Education for All (EFA) movement at the World Conference on Education for All (WCEFA). In the event, there were 155 countries 33 international organisations and 125 nongovernmental organisations and institutes. The Summit recognised that higher education has to be paid. The concept free-higher education was rejected because nothing can be provided for free. Moreover, it did not promote the idea that school had to be free of charge (Bray & Kwo, 2013). The targets of the EFA were connected to the United Nation's eight Millennium Development Goals (MDGs), both the EFA and the MDGs were prepared on the same era under the auspices of neo-liberalism. The implementation of free-higher education is expected to be funded by the general taxpayers, which include the parents of students and learners (Psacharopoulos & Papakonstantinou, 2005). For that reason, the disapproval of the free-higher education under the neo-liberal policies cast serious doubts about the success of implementing and the sustainability of the free-higher education in South Africa. Moreover, the concept of free-higher education can be understood in the conceptual framework below.

**Figure 1: Conceptualization for Free-Higher Education**




Source: Authors

Having theorised the concept free-higher education above, the paper provides a framework (Figure 1) that helps to understand how the neo-liberal policies cancelled the very idea of free-higher education. It has been stated above that neo-liberalism emerged following the failure of the Keynesian system, which resulted in the Great Depression. The neo-liberalism through International Covenant on Economic, Social and Cultural Rights in 1966, declared the provision of free-higher education. However, in 1990, the UN held a conference (World

Conference on Education for All) which suggested that higher education should not be provided for free (Banerjee & Sharma, 2007). The dissatisfaction of providing free-higher education gives guidelines that it won't be easy for the country to successfully implement it. Although free-higher education may start well in South Africa, it may, however, have a negative effect in the long run economically. Regardless of the disapproval of the concept under neo-liberalism policies, the country (South Africa) is currently experiencing numerous challenges which may affect the current and the long-term sustainability of free-higher education. Some of these challenges are discussed below.

**Crisis and free-education in South Africa**: The Freedom Charter (1955) specifies that "The Doors of Learning and Culture Shall be Opened! It emphasizes that "education shall be free, compulsory, universal and equal for all children; Higher education and technical training shall be opened to all by means of state allowances and scholarships awarded on the basis of merit (The Freedom Charter, 1955). It puts an emphasis that "education shall be free, compulsory, universal and equal for all children; Higher education and technical training shall be opened to all by means of state allowances and scholarships awarded on the basis of merit (The Freedom Charter, 1955). Parker (2014) stipulates that "free" and "compulsory" refer squarely to basic education. Higher education and technical training, must "be opened to all" – that is, made accessible though financial support". This undertaking may have a different view of what most citizens consider the true definition of what the Freedom Charter articulates. This has become the foundation for the free education in the country's basic education levels and has enforced the current juncture whereby the free higher education demand escalated excessively and uncontrollably in almost all institutions of higher education (Gumede, 2018). This emancipated late in 2015 where students registered their anger over the slow pace in the delivery of free-higher education.

The notion of free-higher education gained prominent momentum after university students from all corners of South Africa protested in 2016 which led to numerous buildings been destroyed and vandalised in most universities across the country (Business Tech, 2016). This shook the whole country in a way that even opposition parties in parliament swerved from their main agenda of the time which was #ZumaMustFall and turned their focal point to #Free Education. Protesters were further motivated by the arrest of some student leaders (Mcebo Dlamini from Wits University & Bongumusa Khanyile from Durban University of Technology). Debatably one may opine that today, newly recruited students (first years) are enjoying the benefits of the scars and pains felt by those who partook in those strikes. This is because the government seems to have taken the wants of students and seemingly responded to them positively. Numerous authors, economists, analysts and journalists have been wavered and irresolute about the funds for free-higher education. This compelled the president to establish the commission to investigate whether free-higher education is implementable and economically doable in the country, hence this gave birth to the Heher Commission. The then President of the country, Mr Jacob Zuma, announced in December's ANC national conference that there will be free-higher education to all first-year students from 2018 and this will go on-and-on for a period of five years (Mailovich, 2018). This means that by the year 2022, there will be free-higher education to all university levels from entry level to the highest level. Even after that announcement, there were still uncertainties pertaining to where the money to fund free higher education will come from.

The political circles in South Africa have swirled with the term free higher education, with many political figures especially in the African National Congress (ANC), opining that it is the key in ensuring the development of previously disadvantaged groups (Muller, 2018). However, many political and economic analysts have questioned the true motives and economic feasibility of the plan with some dismissing it as a political tool being used to draw young and disgruntled university students who have been failed by the South African higher education funding mechanism (Masuku, 2017). The concept according to politicians would allow disadvantaged groups to equally compete with previously advantaged groups in gaining access to tertiary education. The question then is, who will fund the model, what are the economic implications and will it really be a success. Glenn and Castle (2018) uphold that "someone has to pay for education because it is physically impossible to deliver quality education while charging students nothing. If it is not students taking care of their responsibilities, it is the taxpayers who will pay through substantial grants and scholarships awarded to students every year". The issue of free higher education aims to resemble other free services provided by the government to the society at large. These services include low-cost housing, health services e.g., services provided in clinics and hospitals, free primary and secondary education and the provision of law

enforcement agencies (Ayeni, 2001). Glenn and Castle (2018) further state that "it is wrong to place this burden on the general population for a decision entirely resting on the individual's shoulders. Making education free would mean the money has to be found from elsewhere. The only options available to the government would be to raise taxes or cut services elsewhere. This can be seen in the next coming years whereby the South African government may introduce a special tax collection strategy in order to fund higher education. If the government considers reducing the budget allocation from other services in order to cater for free higher education, it will have negative repercussions for service delivery. Glenn et al. (2018) mention that it is not sufficient to reduce funding for other vital services than it is to make students pay for education. It does not solve the problem; it only shifts the problem onto another part of the population. This is another prolific prospect of overlooking the whole concept of the free-higher education in the country. Furthermore, the country's nominal GDP and the whole economy of the country does not give the benefit of the doubt in being compelled to cater and fully subsidise higher education for all.

**Funding free-higher education: where will the money come from?** When looking at the might-be sources of funds to finance free higher education, Glenn et al. (2018) articulate that "increasing taxes to pay for education will reduce personal freedoms. Economic freedom directly correlates with personal freedoms and by cutting disposable income through the raising of tax; it reduces the options available for families across the country. The household's income will be lessened which will refrain each family from advancing in its predilections. Some would argue that making education free would open up colleges and universities to a greater number of students, however, according to Glenn et al. (2018), this would not be the case. Although higher education is not free, it is in no way meant to exclude certain people from accessing it. Furthermore, a vast majority of students receive student loans to pay for tuition and maintenance, thus implying that there are no barriers for students to consider higher education even without a free tuition system. Such narratives are debatable because not all previously disadvantaged students are eligible or qualify for loans even those such as the National Student Financial Aid Scheme (NSFAS) which are government funded. With the current student loan system, lenders are far more forgiving and the repayments are much lower than a conventional loan. According to Glenn et al. (2018), the system already allows students to climb up the career ladder before they start to pay back significant amounts. They further opine that reducing fees would also make it more difficult to continue to improve the standard of education within schools and colleges. If these institutions cannot generate income from charging their students, they can only make enough to cover their operational costs and cannot invest in themselves and boost standards. This would only lead to the continuing decline of the country's higher education facilities and make the country less attractive for international students.

**Areas of concern:** South Africa only has 26 universities which is a huge challenge for the intake of all matriculates who exit secondary education each year. According to TVET Colleges South Africa (2018), "there are fifty (50) registered and accredited public TVET colleges in South Africa which operate more than 264 campuses spread across the rural and urban areas of the country. These public TVET Colleges are established and operated under the authority of the Continuing Education and Training Act 16 of 2006 and fall under the Department of Higher Education and Training. When considering the number of TVET colleges (50) comparing it to the number of 2017 matriculates (full-time and part-time) which was 798 289 (Gerber, 2017), one can tell that there are limited spaces to accommodate all those in need of higher education. TVET Colleges South Africa (2018) further opine that public TVET Colleges are subsidised by the state with approximately R8 billion per year. There are considerably more than 700 000 students in public TVET Colleges. The 2019/2020 target is that there should be 1 238 000 students in TVET Colleges. This means that TVET Colleges are in a rapid growth and development phase. This advances to the fact that the government has to invest more money towards TVET colleges in order to align with more intakes in the upcoming years. According to Helen Suzman Foundation (2013), "education in all its forms and at all levels needs to display the following interconnected and essential features: availability, accessibility, acceptability and adaptability i.e.:

- Availability - functioning educational institution must be available to all learners. This entails the provision of buildings, sanitation facilities for both sexes, teaching material, libraries, computer facilities and access to the internet.
- Accessibility - has three overlapping dimensions: non-discrimination, physical accessibility and economic accessibility; meaning education must be affordable, within safe physical reach, and must be granted on a non-discriminative basis.

- Acceptability - the form and substance of education, including curricula and teaching methods, have to be acceptable. This refers to the relevance, appropriateness and quality of education, subject to educational objectives required.
- Adaptability - education has to be flexible so it can adapt to societal changes and respond to the needs of learners within their diverse social and cultural settings".

The above-mentioned features of education point in one direction, the government is expected to expedite and avail education so that anyone who wishes to accesses higher education experiences no barriers. Another area of concern is that the country's 2017 GDP growth projection, which has been revised upward to 1 percent, which is higher than the 0.7 percent expected at the time of Medium Term Budget Policy Statement (MTBPS) last year. The country is anticipating growth of 1.5 percent in 2018, rising to 2.1 percent in 2020 (South Africa Budget Speech: 2018). Furthermore, the Minister of Finance stated that while this is a good start, there are immediate policy interventions that we need to make to ensure that we create the right environment for investment, growth and employment (South Africa Budget Speech, 2018). This plays a crucial role in service provision and job creation in the country. It cannot be denied that a country's growth is determined through the availability of infrastructure development, education and health facilities and technological advancements etc. A country's education system is one of the most fundamental and critical fragment that makes a strong country and it always requires special attention.

**Legislative and other mandates:** The Department of Higher Education and Training Annual Report (2016/2017) stated that the constitutional mandates the Department of Higher Education and Training descends its legislative mandate from the supreme law of the Republic of South Africa, the Constitution, within the relevance of Section 29, read with Schedule 4, which lists education at all levels, excluding tertiary education as a functional area of concurrent national and provincial legislative competence, whereas Section 29 states as follows: firstly, everyone has the right (a) to a basic education, including adult basic education; and (b) to further education, which the state, through reasonable measures, must make progressively available and accessible". It further says that, secondly, everyone has the right to receive education in the official language or languages of their choice in public educational institutions where that education is reasonably practicable. In order to ensure the effective access to and implementation of this right, the State must consider all reasonable educational alternatives, including single medium institutions, taking into account (a) equity; (b) practicability; and (c) the need to redress the results of past racially discriminatory laws and practices". Thirdly, "everyone has the right to establish and maintain, at their own expense, independent educational institutions that (a) do not discriminate on the basis of race; (b) are registered with the state, and (c) maintain standards that are not inferior to standards at comparable public educational institutions. It also says that "Fourthly, Sub-section 3, does not preclude state subsidies for independent educational institutions", (Department of Higher Education and Training Annual Report, 2016/2017). These give a clear insight as to what/how education in all levels should be structured in both public or private educational systems, and the exclusion of tertiary education has already tarnished the appraisals given to the national legislature. Salim Vally in Education Policy Consortium Paper 5 (2015) pointed out, that "approach to education, despite lip service to empowering poor communities is embedded in the neo-liberal obsession with technocratically-driven and fiscally conservative governance. This has not only impacted on the quantifiable aspects of education but also on its content and quality".

## 3. Methodology

The concept of free higher education is new in South Africa, it is a new and buzzing concept that has been widely discussed and debated in society, more especially concerning its affordability, and therefore, the study used the available secondary data in order to contextualize the concept of free higher education in South Africa. This method was helpful in looking at the concept from a policy point of view and in its holistic perspective, as a result, to deeply understand this new concept in a South Africa context. The study relied on extensively secondary sources as a means of collecting relevant and required data. It employed strict textual analysis of the available literature relevant the concept of free-higher education in South Africa. The qualitative research approach was utilized in the course of this study. The purpose of this approach was to put into context the understanding the underlying concept of free-higher education in South Africa and whether this approach is economically viable and more importantly will it be sustainable should it be

implemented and to also thoroughly engage existing literature to understand and dissect the socio-economic impact of free-higher education in South Africa. Forrester (2010) asserts that qualitative research uses methods such as participant observation or case studies which result in a narrative descriptive account of a setting or practice. While relevantly new, various scholars have tried to understand the concept of free-higher education, therefore there are rich sources of information, though some of these sources may not comprehensively speak directly to the provision of free-higher education in South Africa, they nonetheless offer views on the subject matter which will be utilized to further enrich the study.

## 4. Findings and Discussion

The concept of free-higher education has and is currently being debated in many political and economic circles in South Africa. The country's government has however forged ahead with its plans of introducing free-higher education, but the question of funding, implementation and sustainability remain unanswered. Whether the government will be able to sustain the concept remain to be seen, but undoubtedly, the concept has raised more questions than answers.

**Economy and sustainability:** Booysen (2016) stated that as governments across the African continent experience fiscal constraints owing to uncertainty in the global financial markets and weak local economies, funding for higher education is becoming more constrained. The current total regional expenditure in this area as percent gross to GDP is 0.78 percent, way below that of Organization for Economic Cooperation and Development (OECD) member countries, which is more than 1.5 percent of GDP in at least seventeen countries. This begs to question whether South Africa's free provision of higher education will be fruitful or not and whether funding will be available in the long term. Booysen (2016) then stated that the South African government's contribution to higher education funding in the democratic era has been on the steady increase, R11 billion in 2006 to R26 billion in 2013. In his 2017/2018 Budget Speech, then Minister of Finance, Mr Malusi Gigaba announced a staggering R57 billion for the realization of free-higher education and furthermore this massive amount only covers first-year students for now (Mokone, 2018). This sum is expected to increase next year as second-year students will be covered too. This will happen for the next five years. Contrary to the worries of analysts and journalists, then Minister of Higher Education and Training, Ms Hlengiwe Mkhize enunciated that funding for higher education will be available for the upcoming five years and the government does not know what will happen thereafter (ANN7, 2018). Debatably one may assume, judging from the minister's statement that government has not done a feasibility study to assess the long-term sustainability with regards to providing free-higher education.

The Provision of free-higher education can be viewed as positive and welcomed initiative because not only does it encourage young South Africans to enroll for higher education, but it also allows for millions of previously disadvantaged groups to access higher education. However, the major concern for analysts and policymakers is that with South Africa currently experiencing sluggish rates of economic growth, high unemployment, rampant corruption and mal-administration, the question then is where will the funds required to fund free-higher education come from and how will this affect economic growth. The country has been averaging 1.2 to 2 percent growth annually since the end of the 2008 financial crisis and with the cost to fund the initial phase of free-higher education reported to be around R60 billion, clearly South Africa in its current economic uncertainty cannot afford such a steep figure. One solution is for government to curb spending and reduce funds to other departments in order to raise the needed capital to fund free higher education (Donnelly, Patel, & Letsoalo, 2017), but analysts say this will further add strain to the economy as the country has already seen a R50bn in tax shortfall, sluggish economic growth and a high unemployment, reducing funds to other departments will ultimately affect public service delivery in the country. Some argue that government should increase its partnership with private organizations to fund higher education rather than government going at it alone as it will be a huge cost to the economy. The OECD (2012), also states that rather the government should provide free-higher education at different levels rather than to provide free-higher education in its totality. The Higher Commission, which was set up by former president Jacob Zuma explicitly stated that South Africa cannot afford free higher education currently, the commission opined that South Africa's economic condition makes it impossible for the government to provide free education. The commission suggested that training and vocational colleges should provide free registration but those who could afford to pay must pay. The commission noted that the country currently does not have the money to

implement free education and forcefully implementing the concept of free education would undoubtedly result in other important services being less prioritized. In 2016, then finance minister Pravin Gordan stated that South Africa cannot afford free education, he cited weak economic growth as the major reason. The former minister stated that if the country does not grow economically, it cannot create extra revenue needed to realize the provision of free higher education, however, he stated that more must be done by the government to ensure that the poor and vulnerable have access to higher education. Furthermore, former statistician-general Pali Lehohla opined that lazy students are to blame for holding back the implementation of free higher education, Lehohla stated that lazy students take time to finish their qualifications and end up using extra financial resources which could have been allocated to other potential students.

**Quality of education**: Pink and Noblit (2017) opine that anything that is free is usually associated with poor quality and unfortunately, the higher education system needs investments for it to run optimally and be innovative and attractive, therefore the idea of free-higher education in South Africa will likely reduce the quality of education offered. Chou (2014) furthermore; alludes that education especially higher education is an ever-changing phenomenon, and needs steady financial inflow in order for it to grow and develop. On the other hand, Robbins (2001) states that South Africa cannot sustain free higher education currently as the economy of the country does not support the idea, while the author acknowledges that it would be a great achievement for the country as it would allow South Africans from all corners to access higher education, however, the country's economic outline is not really in support of the idea and hence forcibly implementing free higher education for political benefits will exert tremendous pressure on the country's finances as the funds needed to realize free-higher education will be hard to come by. Timeslive (2017) conclude by mentioning that while free-higher education is positive step in terms of human capital development, developing regions face serious economic structural challenges which end up affecting growth and therefore South Africa must be vigilant in ensuring that implementing the concept of free-higher education does not affect the output in terms of quality at higher learning institutions. Snodgrass (2016) argues that South Africa must ensure that the provision of free higher education does not compromise the provision of quality education. Aall & Crocker (2017) state that in Africa, the implementation of universal free primary and secondary education greatly undermined the quality of education offered in schools. In the case of Uganda, through surveys, it was found that leaners in schools that were offering free education could not read or solve arithmetic problems. Snodgrass (2016) further argues that while education should be accessible to everyone, universities in South Africa ought to be innovative and develop solutions to complex issues in society, all this must take place in a conducive environment characterized by continuous investments. This has led experts to warn that the continuous pressure for South Africa to provide free education may eventually lead to the reduction in the quality of education offered at South African universities. Universities need adequate investments to function optimally, and furthermore, the government cannot guarantee sufficient and consistent investments for South African universities, hence the continuous call for free education must be carefully implemented based on available resources.

**Pressure on universities:** With free-higher education been chanted across South Africa, this will surely put severe pressure on universities to admit more qualifying students, exceeding the recommended student-lecturer ratio, thus resulting in potential overcrowding. Universities have previously stressed that they have not been adequately consulted on how the concept of the free-higher education would be done in terms of its implementation, already this year many universities have encountered registration troubles as many students demanded to register for free. The concept of free-higher education is still in its early stages of implementation, hence a lot of uncertainty still exists, undoubtedly though; universities will be under severe pressure to make for an increased number of students, thus, forcing universities to invest in infrastructure development. The University of South Africa (Unisa), stated the provision of free education in South Africa without a proper feasibility and financing plan will put universities under tremendous pressure to enroll more students. The university stated that already many South African universities are functioning at the edge of their capacity, and therefore cannot expand without consistent capital investments. Furthermore, Ligami (2017) states that universities are always under pressure to be innovative and hence need sustained investments to ensure innovation is possible, however, the announcement of free higher education without proper research into its affordability and implications will further pressurize South African universities. With South African universities already functioning under a tight budget and with limited investments in infrastructure, the premature announcement of free higher education may further exacerbate the crisis. Many

universities are overcrowded and lecturer halls accommodate an exceeded number of students, hence the announcement of free education will undoubtedly exert tremendous pressure on universities going forward.

## 5. Conclusion and Suggestions

Undisputedly, the question of free higher education remains and will remain a burning issue in South Africa's political and economic society. With the government already implementing the concept, many wonder whether it will be effective and sustainable, considering that South Africa is currently experiencing an economic growth problem. Furthermore; the funds to fund free-higher education will be highly problematic. The reduction in budget allocation to other departments in order to fund free-higher education will be negative for service delivery, this, therefore, entails that government must be very observant when implementing the concept of free-higher education so that it does not affect the functioning of other departments and the country's economic growth. It is with this pretext that the study recommends:

**Increase Private-Public partnerships:** Undeniably the private sector plays a huge role in South Africa and benefits from graduates produced by the country's universities. Therefore, a long-term and sustainable plan would be for the government to increase its collaboration with the private sector in terms of funding higher education. Both parties need to develop a mutually benefiting plan that will contribute towards the funding of higher education. Therefore, the government must not embark on funding higher education individually as this will be rather cumbersome and it will further put a strain on government resources. Former higher education minister Blade Nzimande stated that government cannot fund free higher education alone, and urged the private sector to be involved. The bill for funding free higher education is likely to grow significantly as more and more students aim to enroll for higher education, and with the government already operating under a tight budget, accommodating an increase in the number of students will prove to be very difficult. Therefore, the private with its financial capability may play a huge role in aiding government to provide free education. The private sector may undertake this function by this by providing grants, bursaries and scholarships to students. However, it is worth to note that the private sector in South Africa is already providing these, and therefore this implies that they would have to significantly increase these in order to accommodate a growing number of students

**Reduce government spending:** Undoubtedly, to fully implement free higher education in this current economic climate, the government would need to reduce funding on other public services in order to divert funds towards free higher education. Regrettably, though, this will result in other developmental projects being greatly affected in the process. Because the current economic climate does not allow South Africa to provide free education, reducing financial allocation to other services/departments may be the only way to fund free higher education without increasing taxes, however, it is also worth to note that this will have devastating implications for socio-economic development and public service delivery in South Africa.

**Invest in the construction of new Infrastructure:** The government should have anticipated that while universities have quotas in terms of the number of students they going to admit yearly, the concept of free-higher education has undoubtedly put them into a tight corner, and with insufficient facilities like lecture halls, student residences to accommodate an increased number of students, the government should prioritize the funding, development and the building of new universities in order to accommodate an extra load of students that will surely seek higher education buoyed by the term free-higher education. Moreover, there are limited universities in South Africa, it is also stated above that even the enrollment spaces in universities are limited, with this, clearly it means the country needs more universities in order for the program to be effective, sustainable and accommodate an increasing number of students. Many universities in South Africa are already struggling to secure adequate investments in infrastructure development, many universities are battling to fund student residences as more and more and students are enrolling for higher education, therefore; this calls for an increase in infrastructure investments. Surely, the implementation of free higher education will result in an increase in those hoping to enroll for higher education, so the provision of quality infrastructure will ensure that the implementation of free education adequately supported by infrastructure availability.

**Invest in TVET colleges:** The thinking in many young South Africans is that universities are better than TVET colleges and offer better employment opportunities, however in reality colleges are vital for the South Africa's economy as they produce graduates who have a combination of theoretical and practical information, people who are ready to enter the workplace unlike university graduates who have a mostly theoretical understanding. Consequently, the government must market TVET colleges and invest in their development and ensure that they attract students just like universities. Scarce skills, which are careers such are artisans, riggers and boilermakers are available in TVET colleges, and these are careers which South Africa is in dire need of, this meaning government must ensure the colleges are effective and efficient.

**Increase government subsidies/grants to universities:** Government subsidies to universities play a huge role in the overall running and functioning of universities, the provision of free higher education has exerted tremendous pressure on universities to prioritize the fundraising initiatives in order to cater for the increasing operational costs. Therefore, increasing the subsidies to universities will ensure that financially, they are able to use these subsidies to cater for the increasing operational costs, however, these subsidies have to be consistent as operating costs are forever increasing.

**Increase management oversight at universities:** Over the past 10 years, many South African universities, especially those in rural areas have been characterized by financial uncertainty because of the mismanagement of finances. Therefore, if the government is pushing ahead with implementing free higher education, it must also ensure that universities have sufficient systems in place that will monitor financial transactions as to avoid corruption and maladministration. Some South African universities have been previously blamed for having to squander millions of rands and to a great extent. If corruption is prevalent in universities, free higher education will be impossible to implement, hence the continuous advocating for proper accountability systems to ensure transparency. The concept of free-higher education in itself is a great idea as it will allow many previously disadvantaged students to access quality education, however, the funding for the concept and its implementation is a worrying factor especially because the economic growth is currently sluggish and while government has already gone ahead with its implementation, the sustainability factor will undeniably remain. It also suggests a provocative thought on whether the concept will be successful in its implementation and sustenance or rather it is used as political tool to garner votes.

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